Handbook of Research on

Creating Sustainable Value in the Global Economy

Ulas Akkucuk

Handbook of Research on Creating Sustainable Value in the Global Economy

Ulas Akkucuk
Boğaziçi University, Turkey

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701 East Chocolate Avenue, Hershey, PA 17033, USA
Tel: 717-533-8845 x100 • Fax: 717-533-8661
E-Mail: cust@igi-global.com • www.igi-global.com

List of Contributors

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Detailed Table of Contents

An overview of domestic and foreign literature shows that the concept of quality of services at higher education institutions (HEIs) is the focus. Quality of service is one of the main factors of competitive advantage. Perceived quality of services in HEIs can be defined as the difference between what students expect to receive and their perceptions of what they really get. If HEIs get acquainted with students' expectations, they will have the opportunity to adjust their behavior to what is expected of them, and thus to positively influence on the students' perceived quality of services. Globalization has created a more competitive environment and opened market for HEIs. It affected on ensuring high quality in HEIs. The quality of HEIs is of key importance for a society because the students, employers, and society have the benefits of it, and quality education contributes to economic development of the country.

This research focuses on network industries, specifically on the water industry in the context of the Czech economy in transition between 1992-1998, the state of the water industry towards the end of the 1980s, key legislative changes between 1991-92 that touched upon key administrative questions, and the future ownership of the water network and water market. The Czech Republic chose a specific way to approach the transformation of the water industry by gratuitously transferring the ownership of the previously state-owned infrastructural properties to individual cities and municipalities. The next part outlines the effectiveness of such (de)regulation process based on development of key industry indicators. Very slow development of industry indicators and lack of state financial support for capital investment in water infrastructure led to the subsequent privatization of water companies, which can be considered as a completely rational outcome of unsustainable market developments.

European energy, innovation, and climate challenges define the direction of a future European energy system; however, the specific technology pathways are policy sensitive and need careful comparative evaluation. Stakeholder dialogue or exchange is a very enriching experience, as it promotes the communication of different and sometimes controversial ideas, approaches, and expectations. The chapter introduces stakeholder consultation process, so as to analyse the impact of multiple future pathways and policies in the European energy sector. This will be done through a concrete methodological approach based on an institutionalised consultation process of the relevant stakeholders at policy, industry, and research/academic level. Key findings as regards the critical uncertainties affecting the future energy sector reveal that the level of cooperation and the level of decentralisation may play a crucial role in the design of alternative pathways towards a clean energy system.

Preface

During the first decade of the 21st century, the world has witnessed a plethora of corporate scandals, global economic crises, and rising environmental concerns. As a result of these developments, pressure has been mounting on businesses to pay more attention to the environmental and resource consequences of the products they produce and services they deliver.

Handbook of Research on Creating Sustainable Value in the Global Economy contains a collection of pioneering research on the integration of issues of sustainability within the traditional areas of management. While highlighting topics including green marketing, circular economy, and sustainable business, this book is ideally designed for managers, executives, environmentalists, economists, business professionals, researchers, academicians, and students in disciplines including marketing, economics, finance, operations management, communication science, and information technology.

The many academic areas covered in this publication include, but are not limited to:

- Circular Economy
- Clean Energy
- Economic Recovery
- Ethics in Management
- Green Marketing
- Renewable Resources
- Smart Technology
- Sustainability
- Sustainable Business
- Waste Management

I am very happy to finalize the seventh book project I did with IGI Global. I gave the first book proposal to IGI Global in the summer of 2013. This first book was finalized towards fall 2014 and published as hard copy in January 2015. This publication included 28 contributions and was released electronically around October 2015. Hence it has been nearly five years since the release. Later it also enjoyed Web of Science indexation. Sustainable development over the years has enjoyed ever more attention in the academic community. As a result I decided to pursue another book project with a similar title. Actually this book is an enhanced edition of the first book edited by me published by IGI Global – namely Handbook of Research on Developing Sustainable Value in Economics, Finance, and Marketing. I hope that Recent Developments on Creating Sustainable Value in the Global Economy with 27 contributions by authors from 11 different countries including Turkey, Slovakia, Croatia, Portugal, Bahrain, Poland,

Serbia, Czech Republic, Greece, Bulgaria, and North Makedonia. Of the 27 chapters 11 are by authors from Turkey and 16 are by authors from different countries.

Chapter 1 starts the discussion with a paper entitled "Eco-Innovation in Europe: Circular Economy and Sustainable Development". Eco-innovations according the European Commission determine the future of Europe and stand at the heart of the EU's policies. The focus of the Europe 2020 Strategy is on smart, sustainable and inclusive growth. Eco-innovations are perceived as a critical for carrying out objectives of the Strategy. To deliver the objectives of the Strategy Eco-innovation Action Plan (EcoAP) was adopted by the European Commission in 2011 and now it represents not only a crucial part of the European policy framework for sustainable production and consumption which supports a set of environmental initiatives but also serves a crucial factor to following the goals of the circular economy. At the same time, it is not enough clear empirically how eco-innovations are linked with the progress of the EU countries towards sustainable and circular economy.

Chapter 2 is titled "Narratives of Sustainability: How Did Uber Curate the Driver Category to Rationalize Its Business Model?" Given the unprecedented growth of communication technologies, a wide range of industries from transportation to accommodation has become a part of the sharing economy. The premise to exchange between what is already owned with what is needed has become a way to promote sustainable consumption practices. For many, the sharing economy is an important business strategy because it offers a way to make use of the underutilized assets, services and talents. However, business problems unveiled the sustainability premise and organizations had to deal with agent conflict. By analyzing the lawsuit case that is filed against Uber Technologies Incorporated between in 2013 this chapter aims to show how agents' and principals' interests are inconsistent with each other and how organizations use framing strategies to survive in the digital age.

Chapter 3 investigates "Smart City Solutions and the Potential of Using Web APIs: End-Users' and Technical Perspectives". This chapter presents the advantages of using APIs in the context of Smart City solutions and describes relevant successful practices. As there is still some uncertainty and the fear of compromising the security of data in these types of scenarios, most cities have just started using web APIs indicating that there are still opportunities for further enhancements. Different views on Smart City solutions result in different priorities and assumptions, so depending on the role it is possible to differentiate between the programmer's (technical) and customer/citizen's perspective. The research was conducted with two groups of respondents - with end-users and programmers. The purpose of the survey was to find out the preferences and characteristics that potential users are looking for from Smart City solutions, while the aim of conducted interviews with programmers was to explore their attitudes about using web APIs in Smart City solutions.

Chapter 4 is a discussion on "Sustainable Supply Chain Management Based on Digital Platform". The aim of the chapter is to analyze transport management (mainly planning, but also monitoring and executing) of the international supply chains based on digital platform model. This case study analyzes platform that supports the information sharing on different modes of the transport available mainly within Europe area. It should be underlined that multimodal network accessed by the platform supports both – sustainable transport development within the company and its supply chains and meets requirements of digital economy. This subject of analysis is part of the ChemMultimodal project implemented under Interreg Central Europe Programme between 2016 and 2019. The analysis are done on the case of chemical sector supply chain and its ability to response for challenges of sustainability within logistics activities. The developed platform (Intermodal Links) helped supply chains being more sustainable

by supporting usage of multimodality and – as a consequence – decreasing CO2 emissions caused by transport by more than 50%.

Chapter 5 focuses on "Industry 4.0 and Sustainability". Modern industry developed over several centuries and three industrial revolutions. Today, we experience the fourth era of the industrial revolution, the Industry 4.0. The advance of industrialization brought along many problems, including environmental pollution, global warming, and depletion of natural resources. As a result, the concept of sustainability began to gain importance. Sustainability can be achieved through a balance between economic, social, and environmental processes. In order to establish such balance, businesses need new business models or insights. At this point, Industry 4.0 can be regarded as a new business mindset that will help businesses and communities move towards sustainable development. The technologies used by Industry 4.0 bear a strong promise to solve these problems, after all. Even though Industry 4.0 attracts a lot of attention lately, few works are available on its impact on sustainability. This section examines the impact of Industry 4.0 on sustainability.

Chapter 6 is another look at the importance of new financial technologies. As technological innovation transforms our economies, companies and start-ups all over the world are performing developments on financial technologies called "FinTech/fintech" whatever it takes for a chance to thrive. It even sparked the invention of blockchain and the inception of cryptocurrencies (digital/virtual money) such as Bitcoin. The blockchain technology provides Bitcoin's public ledger, an ordered and timestamped record of transactions. Blockchain is one of a kind decentralized technology mainly used by fintechs and it is a distributed as well as decentralized ledger that presents a radical, new, modern and disruptive way of conducting all manner of transactions over the Internet. Blockchain based applications provides many opportunities to create a more sustainable world. With this research agenda, this chapter contribute to the discussion on future avenues for sustainability and Information Systems research on fintechs especially cryptocurrencies and blockchain based platforms and services.

Chapter 7 examines impact-relation map for the innovative investments. The purpose of the study is to construct the strategic impact-relation map for the innovative tourism investments. For this aim, a set of the criteria defining the innovative investment alternatives in the tourism industry is proposed for determining the possible impact and relationship between each other. Interval Type 2 DEMATEL method is applied to analyze the strategic priorities of the innovative investments and their influencing degrees in the European tourism industry. The findings show that luxury travel is the most important innovative tourism investment. Another important conclusion is that there is no influencing factor on making investment on educational visitors and medical services. On the other side, investment in shopping facilities and luxury travel influenced by all criteria. Hence, it is recommended that European tourism companies should mainly create new trends on the luxury consumption in order to improve tourism industry to contribute economic development.

Chapter 8 focuses on the obstacles to the growth of ESCOs in Turkey. Sustainable and clean sources of energy is an issue of financial challenges for developing countries. Turkey has a considerable potential for a sustainable and cheap form of energy. As a developing country Turkey implemented policies to improve renewables and energy efficiency in line with EU requirements. But there is incompetence of policy making and practice in which lack of familiarity with infrastructure investment and financing methods challenge renewable energy utilization in Turkey. The weak rule of law does not help to obtain culture, awareness and consciousness of energy efficiency in Turkey. The enactment of raising awareness of energy saving projects and companies for reducing costs of energy efficiency should be the first priority of government. Beyond infrastructural problems, the key failure of ESCOs is lack of risk culture

and poor risk management. Nowadays, the ongoing economic obstacles enhanced and ESCOs are facing financial distress and corporate debt restructuring which will affect the growth of energy savings in Turkey.

Chapter 9 illustrates the role of Islamic banking on sustainable economic development. This study aims to predict the future of Islamic banking in Turkey. 3 different Islamic banks operating in Turkey was taken to the scope of review. Within this framework, 6 different variables that are important for the banking sector have been identified. The data of these variables in the 2010-2018 period were analyzed by ARIMA method and 6 different models were established. As a result, it is predicted that Islamic banking will grow in the future and its profitability will increase. However, the ratio of non-performing loans is expected to increase, and capital is expected to decrease. Therefore, Islamic banks should be more cautious in this growth process. In this context, it is important to conduct an effective credibility analysis of customers to be loaned. This situation has a contributing effect on the sustainable economic development of the country.

Chapter 10 is a study on sustainable leadership as a vector of the circular economy. Formal leaders do not act alone but interact with all those around them and the results of a company are no longer focused solely on financial indicators. A sustainable leader must create a conducive environment for business development in a balanced way with nature and society. In this conceptual chapter, we aim to (i) present sustainable leadership by relating the characteristics of a leader to sustainability; (ii) consider that the role of this type of leadership is fundamental to the construction of a truly sustainable meaning, since it links government, people and companies in a sustainable meta-organization dynamics and green supply chain thus contributes to the circular economy. Government, businesses, and consumers must be aligned. The followers of truly sustainable leadership play a decisive role in influencing other leaders, people, organisations and results.

Chapter 11 provides examples on "Understanding Political Consumerism, Political Participation and Their Antecedents: Evidence From Turkey". Political consumerism is a form of self-expression where consumers boycott or buycott a brand, company or a product. The increase in the amount of these actions in recent years has led scholars and marketers improve their understanding of how and why consumers engage in political consumerism and what its predecessors are. By employing a wide scale survey among 360 participants in Turkey, this study presents empirical and qualitative evidence for boycott behavior and investigates how other forms of political participation and individual level characteristics have an effect on political consumerism. Results suggest main reason for boycott behavior in Turkey is due to political reasons and conservatism as an individual level value orientation has a negative effect on boycott behavior. In addition, online activism and voting participation behaviors have positive effects on political consumerism.

Chapter 12 performs an analysis of "The Role of Corporate Sustainability on Firm Value: An Application on Borsa Istanbul". This study investigates the role of listing in sustainability index on the firm values of Borsa Istanbul firms. Furthermore, the interaction effects of some firm specific characteristics on firm value are investigated. Firstly, the impact of each firm specific characteristics, and mainly sustainability dummy, on firm value is analysed. It is found that firms that are listed in BIST Sustainability Index have higher firm values. Secondly, the interaction terms with sustainability dummy and each firm specific characteristics are created. It is concluded that among the firms listed in BIST sustainability index, firms with higher leverage ratios, lower current ratios, lower price to equity ratios, lower asset turnover ratios and lower tangibility ratios have higher firm values.

Chapter 13 explores the "Economic and Environmental Impact of Large Financial Developments in an Oil-Dependent Economy: The Case of Bahrain". This study examines the economic and environmental

impact of large financial developments in Bahrain from year 2006 to 2016. To do so, the relationship between energy consumption, oil prices, market shares, dividend yields and economic growth has been investigated using Vector Error Correction Model (VECM). The key findings are summarized as follow: (i) long run relationship exists between the suggested variables. (ii) Both energy and financial markets are significant in the long run relationship, and positively affect the economic growth of Bahrain. (iii) According to the estimated ECM term, the model is stable in the short run. (iv) Decline in oil price has negative significant drawback on the economic growth of Bahrain. Accordingly, it is recommended that policy makers in Bahrain focuses on implement strong strategies that aim at encouraging investments in non-oil sectors without impeding energy sector or economic growth in order to move towards sustainability.

Chapter 14 explains "Circular Economy Measurement: A Case of the Developing Country Context". Circular economics (CE) is increasingly discussed among researchers, practitioners and politicians. The discussions between the parties and the confusion about the concept cause the issue to remain on the agenda. According to the general view, CE is the slowing, shrinking and closing of the welding flow to increase the welding efficiency. However, little attention has been devoted to measuring the CE level of a given economic system. The aim of this chapter is to demonstrate the emergence and development process of CE, and also to show how the CE level of any economic system can be measured. In this context, it is important for developing countries to interest with the issue, but not in practice. To put this into perspective, The study examined Turkey's economic system. Turkey's economic, environmental and social indicators examined were found to have a remote structure of the CE principle. It is expected that the results of the study will lead to a positive social change and become a framework for increasing the contribution of developing economies to the sustainable world.

Chapter 15 is on "Developments on Sustainable Finance: A Growth Opportunity for Global Economy". Worldwide, the growing impetus towards sustainable finance is aroused by the maturation and the destructive effects of carbon markets in the form of severe weather, floods, and forest fires. It is widely acknowledged that supporting the transition to a low-carbon, green and sustainable economy needs forefront of efforts to build a financial system. Given the provisions of sustainable finance, the policies that regulate the transition to green economy includes environmental social and corporate governance criteria. Sustainable finance is a type of financing that takes into account environmental, social and corporate governance issues in providing finance to investors. Therefore, this chapter aims to highlight the importance of sustainable finance providing a growth opportunity to the global economy. Thus, the developments on sustainable finance constitute a strong potential that supports economic growth globally.

Chapter 16 is on management of industrial waste. Chapter 17 is about "State Interventionism in Foreign Trade: A Response to Market Inefficiency". Chapter 18 explains using European CO_2 emission allowances for investments in storage technologies. Chapter 19 is on appropriateness of standard accounting tools in measuring social innovation in the new global economy. Chapter 20 goes on to explore an Analysis of quality of services in higher education institutions. The final chapters 21 to 27 describe studies conducted to analyze various regional sustainability issues, the clean energy sector, and ISO14000 environmental standards.

Ulaş Akküçük
Boğaziçi University, Turkey
September 2019

Chapter 1
Eco-Innovation in Europe: Circular Economy and Sustainable Development

Boris Dziura
EUBA Bratislava, Slovakia

Marta Vovk
EUBA Bratislava, Slovakia

Leonid Raneta
EUBA Bratislava, Slovakia

ABSTRACT

Eco-innovations according the European Commission determine the future of Europe and stand at the heart of the EU's policies. The focus of the Europe 2020 Strategy is on smart, sustainable, and inclusive growth. Eco-innovations are perceived as a critical for carrying out objectives of the Strategy. To deliver the objectives of the Strategy, Eco-Innovation Action Plan (EcoAP) was adopted by the European Commission in 2011, and now it represents not only a crucial part of the European policy framework for sustainable production and consumption, which supports a set of environmental initiatives but also serves a crucial factor to following the goals of the circular economy. At the same time, it is not clear empirically how eco-innovations are linked with the progress of the EU countries towards sustainable and circular economy.

INTRODUCTION

Nowadays among the main priorities of the development of the EU economy is the development of circular economy and improvement of sustainable economy indicators. When analyzing the progress of the EU countries in terms of these priorities, eco-innovation development stands as an integral part of the region's efforts to achieve this progress. According to the definition of the European Commission eco-innovations are "all forms of innovation activities resulting in or aimed at significantly improving

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progress towards the goal of sustainable development, through reducing negative impacts on the environment. Not only technologies, but also products, processes, services and business models". The largest sub-sectors in which eco-innovations role is crucial are recycled materials, renewable energy and energy efficiency, waste management, wastewater management, water supply, and (Peter Czaga, 2015). Eco-innovation and green technologies according the European Commission (2018) determine the future of Europe and stand at the heart of the EU's policies. The focus of the Europe 2020 Strategy is on smart, sustainable and inclusive growth. Eco-innovations are perceived as a critical for carrying out objectives of the Strategy. To deliver the objectives of the Strategy Eco-innovation Action Plan (EcoAP) was adopted by the European Commission in 2011 and now it represents not only a crucial part of the European policy framework for sustainable production and consumption which supports a set of environmental initiatives but also serves a "key to delivering many aspects of the circular economy: industrial symbiosis or ecologies, cradle-to-cradle design and new, innovative business models" (Euro Commission, 2018).

A broad theoretical framework for the role of eco-innovation towards circular economy and sustainability is presented in the literature. But at the same time there is lack of empirical evidence of the influence of eco-innovations on the sub-sectors which are under the focus of circular economy and sustainable development. It is mentioned in the literature that the way in which eco-innovation is to drive circular economy transition remains an insufficiently addressed issue and definitely not all eco-innovations are linked to a circular economy, and not all dimensions of circular economy require innovations (de Jesus, Antunes, Santos, & Mendonça, 2018). When following sustainable development initiatives including eco-innovations, A. D. Nuwan Gunarathne and H. M. P. Peiris (2017) have noted that the first issue to address is its assessment. Escrig-Olmedo et al. (2017) argue that "sustainability performance is a construct, and hence cannot be observed; it should therefore be anchored in observable reality by means of indicators". Other limitations to assess linkage between eco-innovation and circular economy and sustainability goals are presented in the next section.

LITERATURE REVIEW

In the professional literature is possible to find different concepts regarding characteristics of an economic system: red, brown, green, blue and solar economics. The **Red Economy** concept was also used for the countries with domination of planned economy. The red economy is a set of authoritative rules that define and manage the economy. In the professional literature is also known as the extreme form bureaucracy, where the amount of regulations is overwhelming, prescribes and influences the entire economy, with appears as extremely inefficient (Burkett, 2009; Dickson, 2014).

Brown economy is a model whose economic growth is largely driven by extraction of hydrocarbon fuels and the processing of petrochemical products such as coal, oil and natural gas. This model is associated with large amount of pollution, large amounts of emissions of carbon dioxide and other harmful substances in the air and water that have a negative impact on the environment. Economic development in this case depends largely on the use of resources that are non-renewable, while environmental pollution in their production and the risk of unsustainable growth (Winpenny, 1996). As an example, Russian Federation and the structure of its exports in 2018, where the export of mineral of raw materials and metals represented more than 70% of total country exports (EIA, 2016).

The green economy is a potential pathway compared to the brown economy, as the company could achieve a high level of industrialization, at the lowest levels of harmful substances emissions. The green

economy emphasizes the reduced consumption of non-renewable sources and aims, in the long run, to achieve significantly lower production costs while maintaining a favorable environment. It is important to provide a system of recycling of manufactured products in order to reuse valuable natural resources. It is considered that the green economy can be called a system that achieves a compatibleness of the high environmental social standard of the population with a high level of economic growth and the development of the country's economy (UNEP, 2011).

As one of the states that has begun to implement a successful strategy that seeks to combine the need for economic progress and a strong pro-ecological policy, we list China. In 2009, more than 900 thousand employees in the energy sector were operating directly related to renewable energy sources. In the IAC than 600 thousand worked in the field of solar thermal energy, more than 260 thousand in the field of biomass processing for energy purposes, more than 50 thousand in the solar photovoltaic. About region, although the successful part is the area of wind power, where more than 20 thousand employees were employed (UNEP, 2010).

On the other hand, there are also states which, despite their economic problems, are applying a rigorous ecological policy. For Example, Uganda where more than 80% of the population is employed in the agricultural sector (UNEP & UNCTAD, 2008), while the country itself has low consumption of artificial fertilizers even compared to sub-Saharan African countries (Kuestermann & Huelsbergen, 2008). Since 90. of the 20 century Uganda had a initiative in the agricultural sector, which gradually led to increased use of organic farming and eliminating the use of artificial fertilizers. Organic farming is defined by the United Nations Food and Agriculture organization (FAO, 1999), as a holistic manufacturing and management system that promotes a healthy agricultural ecosystem, promotes biodiversity, and natural biological cycle and preserves the soil. From the It prohibits the use of pesticides of synthetic fertilizers and certain types of chemicals and drugs in agriculture. In July 2009, the draft policy describes the vision, mission, objectives and strategies to support the development of organic agriculture as "one of the avenues for delivering self-sustaining growth as it provides mechanisms for individual farmers to improve productivity, add value and access markets which are keys to achievement of the Poverty Eradication Action Plan objectives"(Musiime, Keizire, & Muwanga, 2005).

There are other concepts such as **Solar Economy** concept. This term appears in the works of American author W. B. Stronge (2008), that concept applied to the economy of the state of Florida, which is referred to as an example, how can the economy of the state move from forestry and relatively simple forms of agriculture to a sophisticated type of economy, which takes into account the sustainability of the economy of the state with the aim of progressively minimising damage caused by human activities where renewable energy sources (wind, solar, biomass, geothermal, energy of sea-fighting waves, etc.) are used or are intended to be used for the production of electricity for the needs of the economy (EIA, 2019).

Starting with the 20th century the ecological movements a gradually has put the emphasis on the ecological boundary, which has already started to make economic growth irreparably destructive to the environment. Starting to use the concept of green (organic) growth, which was meant to serve socio-economic change of society (Bowen, 2012).

Among the leading "green entrepreneurs" can be found a number of interesting personalities, such as Paul Hawken, who has a successful career not only as an entrepreneur, but also the author of several works, which expresses the need to find another alternative path to the current economic model (Weinreb Group, 2013).

The main idea is that economic growth is not always inherently harmful to the environment and that environmental problems can, on the other hand, provide economic opportunities that would not other-

wise exist. Paul Hawken philosophy is **natural capitalism**, claiming that when businesses behave to natural resources, it is also supported by creative thinking within the enterprise, so they become more efficient and thus more profitable (Hawken, Lovins, & Lovins, 2000). Natural capitalism is an economic system that attaches economic value not only to manufacturing and financial capital, but also to human and natural capital. As a first he defined and applied in practice the natural capitalism of Paul Hawken, Amory Lovins and Hunter Lovins of the Rocky Mountains Institute in the USA. This philosophy of business coincides with the logic of the green economy.

The issue of the implementation of the green economy and *green* jobs in economic practice has gained increasing importance in the current period. The importance and impact of investments for example in the green economy is growing. The main factor is becoming an investment in sustainability, with the aim of exploiting alternative sources as well as available resources for the next generation and the production of green products (Speer, 2011).

For the phrase **"green jobs"** there is currently a large set of definitions. Green jobs are considered to include the protection of biodiversity and the natural environment (Speer, 2011). Green jobs can also be considered as those which do not directly support the green economy. There is also a definition set out in the *United Nations Environmental Program*, which defines "green jobs": Working in the field of agriculture, production, research and development, as well as in the area of administration and services that contribute significantly to maintaining or restoring the quality of the environment. This includes jobs that help to protect ecosystems and biodiversity, reduce energy consumption, materials and water consumption through high-efficiency strategies, reduce carbon emissions in the economy, and minimise or completely prevent the creation of all forms of waste and pollution (UN, 2019).

Nowadays, economic growth can be a way of tackling environmental problems through production and subsequent sales of only those products that require either resources in their production or which are mainly renewable sources in their production. One of the first steps in the transition from the limiting of economic growth towards green growth is the paradigm of sustainability, which begins to emerge in the official documents from 80. years of the 20th century (UN, 2012). Economic growth, environmental protection and social justice have ceased to be considered as the three antagonistic targets that compete. Sustainability resides in foreign literature as the so-called "*Triple Bottom line"*. **Triple-Bottom Line** is a term indicating three basic pillars of corporate social responsibility (CSR)-economic, social and environmental (Elkington, 2002). We can also mark it as a concept of triple company responsibility. This concept was first used in 1994 by the British entrepreneur John Enklington, when he expressed the view that all three objectives were to be enforced jointly (The Economist, 2009). The view that the executive economy, environmental protection and social justice are mutually supportive entities that have helped create a path for modern green thinking.

In the speech of the general secretary of the United Nations was stated: "At its essence, sustainability means ensuring prosperity and environmental protection without compromising the ability of future generations to meet their needs. A sustainable world is one where people can escape poverty and enjoy decent work without harming the earth's essential ecosystems and resources; where people can stay healthy and get the food and water they need; where everyone can access clean energy that doesn't contribute to climate change; where women and girls are afforded equal rights and equal opportunities." (Husain, 2015). This statement fully reflects the complexity of the sustainable development theme, where there is no emphasis on ecology as such, but underlines the interdependence between food security themes, climate change and gender equality globally.

The concept of **sustainable development**, which is constantly emerging in the works of many authors, as well as in official national and international documents on the ecological scale of economic development. The roots of the concept dates to 1662 when the English economist John Evelyn expressed the need of treatment of the forest. In his work he said: "planting and caring for trees should be understood as a national obligation for each country administrator to prevent the destructive use of resources" (Evelyn, 1664).

Other authors such as Hans Carl von Carlowitz and subsequently the then Finance Minister Jean-Baptiste Colbert and J. Evelyn further developed in their works (Sarre, 2013). The notion of sustainability appeared in the work of H.C. von Carlowitz *Sylvicultura Oeconomica, oder haußwirthliche Nachricht und Naturmäßige Anweisung zur Wilden Baum-Zucht* (1713). Their ideas directly or indirectly influenced the further ecological movement in 60. of the 20th century, as well as the law adopted by U.S. Congress under the name Multiple Use-Sustained Yield Act of 1960 (MUSYA) (1960) where it is directly said that sustainable development, in this case sustainable yield(concerning forestry) means: "Achieving and maintaining an annual high level of production of different renewable sources of national forests without deteriorating soil fertility" (Steen, 1991). The concept of sustainable growth appeared during the United Nations Conference on the Environment held in Stockholm in 1972. Initiatives to organize a similar conference have already emerged in the past, but the conference was the first to name a path to improve the socio-economic problems of the Earth's inhabitants. The *"declaration of the United Nations Conference on the Human Environment"* was adopted at the conference (UNEP, 2017).

Consequently, the concept of sustainable development also appears in the World Commission for R&D (WCED), for this Commission to use the Brundtland Commission, according to its President, which was the then Norwegian Prime Minister Gro Brundtland. Her appointment has gradually begun the development of further activities of the United Nations, one of the key points was the publication of the report "Our common Future" in 1987 (World Commission on Environment and Development, 1987). The document touched on every human activity that has something to do with nature and tried to outline not only the negative per with the pecky of the future, but also the possibility of remedying the environment and at the same time discovering new possibilities for further development in the form of a gentle use of seas and oceans.

Another concept, which is used either in scientific works or even official documents, is the concept of **renewable resources and renewable energy.** The very notion of a renewable resource was defined in 1962, by P. A. Weissom in his report to the National Research Council in the US, and he defined it as: "All living organisms providing a person with food, fiber, medicines, etc." (Weiss, 1962). The International Renewable Energy Agency is currently active in the world, with solar, geothermal and wind energy in general considered as renewable energy. However, There Is a precise definition according to the International Energy Agency: "Renewable energy is energy that is derived from natural processes (sun and wind) that are replenished at higher speeds than consumed. Solar energy, wind, geothermal, hydropower, bioenergy and ocean energy are renewable energy sources. The role of renewable resources will continue to grow in electricity generation, heating and cooling and transport." (IRENA, 2019)

In recent years, there is a debate on the development of the green economy in the **People's Republic** of China. *Green Development* economy is becoming important not only for central government, but also for the provincial government. The authors, especially Yi, H., Liu, Y. (2015) followed in their studies the development of a farm using clean energy resources at urban level in China. An analysis was used for the real quantification of green jobs and firms, which subsequently demonstrated that the distribution of green jobs in the China's economy is uneven in different regions. It was found that "... cities lying in the

province, where the use of environmentally friendly production practices is supported by 61.8% more green businesses and 54.3% more green jobs compared to cities located in the province without such a policy" (Yi & Liu, 2015). Scientists also emphasize the importance of developing the green economy in China due to the rapid development of the biotech industry throughout Asia. One of today's green imperatives for the development of the green economy in China is the massive development of renewable energy production with the objective to be achieved in the year 2050. Based on the results of the study authors Dai, H., Xie, X., Xie, Y. Liu, J. (2016) after have shown that large-scale development of renewable energy in China should not cause serious macroeconomic costs. These researches also concluded that it "... will lead to a significant increase in the green industry, to change the supply energy structure and to the positive side environmental benefits". It is estimated that "... The share of renewable energies will reach 56% in the year 2050 of the total energy generated, with sectors using nonfossil fuels to become a common part of the energy and their contribution to total GDP will be 3.4%. It will represent a proportion comparable to other sectors such as agriculture (2.5%), iron and steel production (3.3%) and construction (2.1%) " (Dai et al., 2016).

The authors of Tao, X., Wang, P., Zhu, B. (2016) Indicate in their work that energy and reduced CO2 emissions are decisive factors for the development of green economic efficiency in China. Scientists have pointed out the fact that different Chinese regions have different energy savings and the potential to reduce CO_2 emissions.

Qi-Min, C., Hua-Qing, X. (2014) study relevant ways how China could fill the carbon reduction targets after the year 2020. The authors found that "... the period from 2025 to 2030 is the time where there is a presumption to reach the peak in carbon emissions, which should be stopped to a level lower than 12 Gt (Gigatons) of CO2 and 8.5 tons per capita".

Authors S. H. Martínez, A. Kobrle, P. Rochedo (2015) analyzed the trends in power and emissions in **Latin America** up to year 2050 based on several scenarios depending on current trends. Research results have shown that the reduction of CO2 emissions is inevitable. This reduction in CO_2 emissions in Latin America is possible in the event of the elimination of current economic, environmental, social and technical barriers.

R. Janssen and D. Rutz (2011) examined the possibilities for the establishment of alternative markets for agricultural commodities by creating a program to promote the use of biofuels in Latin America. The authors conclude that achieving sustainability in biofuels will lead to increased development of the individual sector of the economy.

M. del P. Pablo-Romero and J. De Jesús (2016) in the work of the year 2016 examined the relationship between energy consumption and economic growth. The hypothesis was tested by energy-environmental Kuznets's curve, resulting in the shape of a reversed-shaped U curve a relationship between energy and income consumption. Research results have shown that the hypotheses related to the curve are not applicable in Latin America. Opportunities for the development of energy technologies in the framework of efforts to mitigate climate change in Latin America also authored by Van der Zwaanom at work of 2016 (van der Zwaan et al., 2016).

Over the past five years, industrial development has dominated one-way, or we can also call it a **linear model** of production and subsequent consumption. It was true that the products are made from raw materials, then sold, are used and then disposed of as unnecessary waste. This model was particularly successful in creating an affordable product palette for consumers and brought material wellbeing to millions of Earth's inhabitants. The linear model was also replaced in developed states by the original traditional economy, which has worked for centuries on the principle of re-use or repair of previously

produced products. However, we assume that it has required a greater proportion of manual work and has made the order of the lower amount of the investment carried out. The main part of this economic school was operated in the US. As one of the main theorists of this school need to mention W.W. Rostow, who believed that developed states had to go through five stages of economic development to reach the stage of economic expansion (Rostow, 1969).

The linear economy, as we have already mentioned, has been a whole devoted to economic growth and the environmental issue was not considered a major problem. The essential was economic growth and, in principle, the classical paradigm was dealt with, and in addition to growth, the fulfilment of the eco-nomic needs of the population. As opposed to it, there was another thought stream that developed its own way of addressing the accumulated ecological and economic challenges of the present day. As we have already mentioned, historically, it has always predominated the circulating model above the linear. Agricultural products were produced locally, purchased directly from the producer, the goods were not specifically processed prior to sale. The issue of packaging did not exist since they were rare and, if only partially possible, were reused. Food that has not been consumed has ended as a feed for the farm animals. Animal waste was considered a valuable resource and used as fertilizer. Also, the rule that appeared in recent times and that the waste can be considered as food was a very important part of all aspects of everyday life. We believe that while industrially developed states have abandoned, for the most part, such a system and the habits associated with it, consumption in the developing world has used the principle of "circle" in both consumption and production much more active.

The concept of the **circular economy**, built on a professional basis, can be considered very young, since the first stage was introduced only in the year 1989. The views and suggestions described in the work of D. Pearce and R. Turner have, in our view, also influenced the current policy (Pearce & Turner, 1990) European Union. We would like to argue that the work was an inspiration for the creation of EU legislation and as we have already mentioned in our work, the *EU action plan for the development of the circular economy* was adopted in 2015. The plan is based on the ecological use of resources, focusing its attention specifically on the area of waste management, with the main aim of being the recycling of municipal waste and, on the other hand, recycling of packaging. With the year 2030, the target is to be reached, which speaks by 65%, respectively 75% of the waste returned into circulation (European Commission, 2019).

It is not enough clear empirically how eco-innovations are linked with the progress of the EU countries towards sustainable and circular economy.

By Ellen McArthur Foundation (2013) circular economy was defined as "an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models".

Sustainable economy is defined as the "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987).

A series of theoretical papers explain how eco-innovations are related to the concept of circular economy and sustainable development. In a large body of literature a particular importance of the development of eco-innovations is established as they perceived as an effective transition path to circular economy. Prieto-Sandoval, Jaca and Ormazabal (2018) have emphasized the role of eco-innovations as "a way of creating a circular economy". They have distinguished three determinants of eco-innovation, in

particular, regulation and policy, supply side, and demand side and explained how they interact in circular economy. The regulation and policy determinants build the circular economy legal framework that supports the supply side actions such as cleaner production, the development of industrial metabolisms and sustainable business models. The demand side determinants, represented by consumers, should be able to take eco-innovative products in the market and practice sustainable behavior. Simona Frone (2017) has found that eco-innovation is a "way to improve the protection of the environment; a way to increase the efficiency of resource use, contributing indirectly to increasing economic competitiveness". Eco-innovation is perceived as a pillar of circular economy which has a double valence, both for environmental and economic accounting. Ana de Jesus and Sandro Mendonça (2018) have come to conclusion that the key role of eco-innovations on the way to circular economy is that they serve an "essential pathway for overcoming barriers to a circular economy transition". In transition to circular economy eco-innovations contribute to facilitating business models changes (from new product and service design to recomposed value chains), as well as change the way citizens interact with products and services (sharing, leasing, ownership, etc.) and promote advanced systems for delivering value (smart energy systems, sustainable cities, green mobility, etc.).

Rabontu and Babucea (2018) argue that eco-innovation that aims at obtaining sustainable services and products through sustainable technologies and environmental benefits through eco-innovation are in reducing resource consumption and emissions of pollutants. Loucanova et al. (2015) have emphasized that eco-innovations contribute to decrease of energy demands and total amount of emissions or existing environmental load and risks of health when supporting the overall idea of and healthy lifestyle and sustainable consumption which is "linked to the behavior and a motivation to purchase and consume green products, where consumers are engaged in environmental issue" (Severo, de Guimarães, & Henri Dorion, 2018).

Nevertheless eco-innovations and their role in achieving sustainable and circular economy goals is a burning topic, there is no much literature aimed at researching the multi-country differences in the EU region and comparing eco-innovation efficiency of the Member States with their progress in achieving the goals of sustainable and circular economy. Most frequently in the literature eco-innovations in the EU region are compared with eco-innovations in other countries or regions (Dobrea, Podgoreanu, & Borisov, 2015; Jo et al., 2015). In some papers eco-innovations in Eastern Europe countries are compared with eco-innovations in "rich" countries (Horbach, 2016). In a narrower territorial context eco-innovations have been considered in the papers of Bartoszczuk, Pawel (2015) and Urbaniec, Maria (2015). Park, Bleischwitz, Han, Jang, & Joo (2017) have identified among the EU countries eco-innovation leaders, average eco-innovation performers and countries catching-up eco-innovation on the basis of Eco-innovation Scoreboard (Index) 2016 (Euro Commission, 2018). But there is still less attention paid to researching empirically the contribution of eco-innovations to the achieving the goals of sustainable and circular economy.

Some authors have proposed a set of so called circular-economy-eco-innovation indicators which represent some indicators from the list of Eco-Innovation Scoreboard. In particular, Smol, M. et al. (2017), for analyzing the progress in achieving circular economy goals, have proposed to associate three indicator groups of Eco-innovation Index economy (eco-innovation inputs, eco-innovation activities and eco-innovation outputs) with the principles of circular and other two groups of indicators of the Eco-innovation Index (recourse efficiency outcomes and socio-economic outcomes) associate with the effects of the circular-economy-eco-innovation introduction. Eco-innovation Scoreboard is an effective measure for analyzing eco-innovation effectiveness among the Member States. But there are technical

difficulties in assessing to what extent eco-innovations contribute to the progress of the Member States towards circular economy and sustainable development according to the Index. Inexact correspondence between the indicators for measuring eco-innovation success and the spheres and indicators which they cover in terms of sustainable development and circular economy makes it difficult to research empirically the direct linkage between eco-innovation and sustainable development and circular economy. The relation between the components of Eco-innovation Index and sustainable and circular economy goals is presented in the table 1.

The presented in the table 1 relationship between the areas of circular and sustainable economy and the components of Eco-innovation Index gives an opportunity to evaluate an indirect influence of eco-innovation on circular and sustainable economy as linkages between introduced eco-innovation indicators and sustainable/circular economy areas do not necessarily mean direct relationships. For example, the increase in employment rate (this indicator is a consistent element of the Goal 8) is not always and not in very country dependent directly on eco-innovation inputs, notably, on Governments environmental and energy R&D appropriations and outlays or Total R&D personnel and researchers, or on Total value of green early stage investments. There is also no direct linkage between the components of eco-innovation outputs, notably, Eco-innovation related patents and Eco-innovation related academic publications or Eco-innovation related media coverage with Goal 9 (industry, innovation and infrastructure) and Goal 12 (responsible consumption and production). At the same time it should be noted that mentioned indicators also do not linked directly to circular economy goals, notably, to waste-related indicators and life cycle assessment of enterprises activity. The disadvantage of Eco-innovation Index when analyzing the contribution of eco-innovation to achieving sustainable and circular economy goals is in its limits to measure the effectiveness of eco-innovations in sectors (Park et al., 2017). Thus, taking into account above mentioned, it is rather challenging to evaluate the direct influence of eco-innovation on the progress of the EU countries towards sustainable and circular economy. Furthermore, there is also a problem to

Table 1. Linkage between eco-innovation, sustainable economy and circular economy

The components of Eco-Innovation Index	Sustainable economy indicators	Circular economy indicators
eco-innovation inputs	- Goal 8 (decent work and economic growth); - Goal 9 (industry, innovation and infrastructure)	- Regional authorities environmental and energy R&D for CE appropriations and outlays; - Regional total value of green early stage investments
eco-innovation activities	- Goal 7 (affordable and green energy); - Goal 9; - Goal 12 (responsible consumption and production)	-Firms having implemented CE–eco-innovation activities
eco-innovation outputs	- Goal 9; - Goal 12	- Waste-related indicators; - Life cycle assessment of enterprises activity
recourse efficiency outcomes	-Goal 6 (clean water and sanitation); - Goal 7; - Goal 9; - Goal 13 (climate action)	- Material productivity; - Water productivity; - Energy productivity; - GHG emissions intensity
socio-economic outcomes	- Goal 8; - Goal 9	- Employment in eco-industries and circular economy; - Revenue in eco-industries and circular economy

Source: developed by the author on the base of Park, Bleischwitz, Han, Jang, & Joo (2017) and Smol et al.(2017).

assess this influence in the Member States taking into account the different level of their eco-innovation performance and identify whether the countries with higher eco-innovation performance are characterized by more progress towards sustainable development and circular economy.

Despite the mentioned limitations, this research contributes to developing the scope of eco-innovation studies. Through reviewing theoretical framework for eco-innovation's influence on the development of circular and sustainable economy, this research gives insights into the ways of how this influence could be measured empirically at the macro level, notably, in the EU countries, differed by the level of eco-innovation performance.

METHODOLOGY

Hypothesis. Lack of empirical evidence of the contribution of eco-innovations to the sustainable development and circular economy at the macro level and in the EU countries in particular, has led to the following hypothesis.

The eco-innovation performance of the EU eco-innovation leaders, followers, loungers and laggards is consistent with their performance in terms of their progress towards sustainable and circular economy.

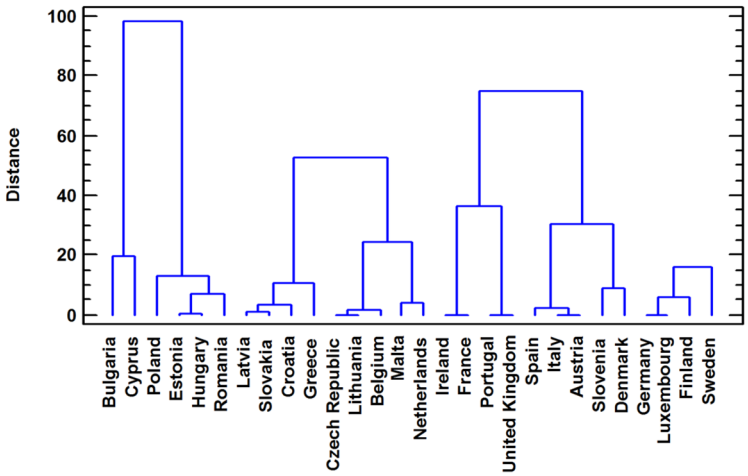
The character of the division the EU countries into eco-innovation leaders, followers, loungers and laggards then should correspond to their division into clusters in terms of their progress towards sustainable and circular economy.

In other words, we have tested whether the EU countries split into the similar groups after two clustering procedures: the first clustering based on the Eco-Innovation Index 2017 and the second clustering on the basis of the set of indicators of sustainable and circular economy. As we have already mentioned it is rather challenging to find out in a direct way the dependency between eco-innovation performance and sustainable and circular economy performance, such a method gives an opportunity to distinguish this linkage indirectly. Furthermore, application of clustering procedure in such a way helps to find out whether there are inconsistencies between the level of eco-innovation performance of the countries and their progress towards sustainable development and circular economy. If, for instance, eco-innovation laggards appear to be in the same cluster with the countries, advanced in terms of the development of circular economy and sustainability, there could be made a conclusion about the significant influence of other factors on the progress towards circular economy and sustainability. The purpose of the first clustering is to identify eco-innovation leaders, followers, loungers and laggards among the Member States. The purpose of the second clustering is to determine in what a way the Member States split into clusters in terms of indicators of sustainability and circularity and, finally, compare received clusters after two clustering procedures. Two clustering procedures have been implemented with use of Ward method.

RESULTS

In the figure 1 the results of the first clustering are presented and in the figure 2 the eco-innovation performance of the EU countries is showed [2]. Descriptive statistics of the first clustering is presented in the table 2.

Figure 1. Dendogram of clusters: on the basis of Eco-innovation Index 2017

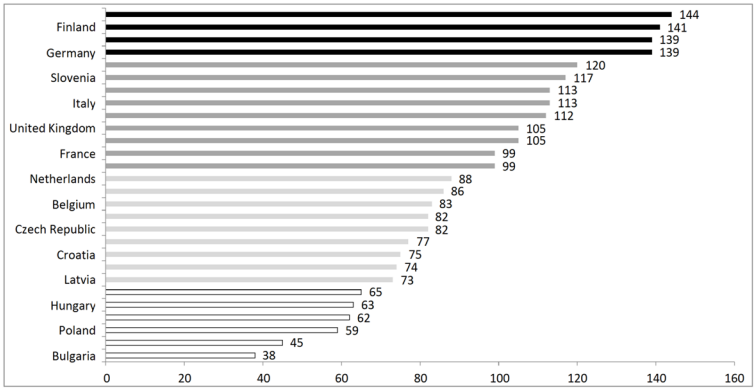


The second clustering has been implemented with the use of indicators which we selected on the basis of our findings from the literature review made above. According to literature review there have been distinguished the most important sub-sectors emphasized in the context of sustainable development and circular economy and determined indicators responsible for the development of these sectors (Brandão

Table 2. Cluster summary

Cluster	Members	Percent	Eco-innovation Index
1	6	21.43	55.3333
2	9	32.14	80.0
3	9	32.14	109.222
4	4	14.29	140.75

Figure 2. Eco-innovation Scoreboard 2017
Source: Eco-innovation Scoreboard 2017



Santana, Rebelatto, Périco, Moralles, & Leal Filho, 2015; Brito, 2014; Constantinescu & Frone, 2014; Geissdoerfer, Savaget, Bocken, & Hultink, 2017; Imaz & Sheinbaum, 2017; Krozer & Nentjes, 2006; O'Brien et al., 2014; Şener & Sarıdoğan, 2011; Sirbu, Crudu, & Ignatov, 2017).

Taking into account availability of the recent data for the all Member States, we have used the following indicators for the second clustering (Eurostat, 2019):

- Energy productivity, Euro per kilogram of oil equivalent;
- Generation of waste excluding major mineral wastes per GDP unit, Kg per thousand euro, chain linked volumes (2010);
- Recycling rate of municipal waste, %;
- Recycling of bio waste, kg per capita;
- Circular material use rate, %;
- Patents related to recycling and secondary raw materials.

In the figure 3 the results of the second clustering are presented and in the table 3 clustering statistics is shown.

In the table 4 the clusters obtained are shown.

Figure 3. Dendogram of clusters: on the basis of the indicators of circular economy and sustainable development

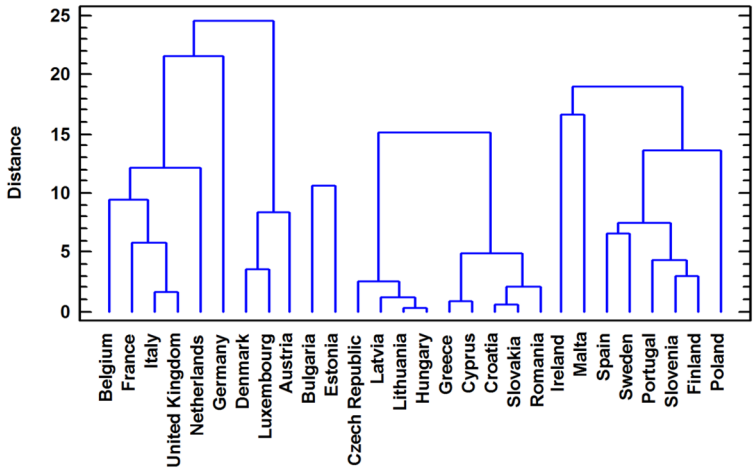


Table 3. Cluster summary and centroids

Cluster	Members	Percent	P	EP	W	RMW	RBW	CMU
	9	32.14	28.4589	10.0	54.7778	49.3556	114.889	15.0222
2	2	7.14	0.0	2.65	585.5	27.2	12.5	6.85
3	9	32.14	1.92556	5.36667	93.4444	20.6111	18.6667	3.86667
4	8	28.57	11.29	8.7375	78.375	31.6625	44.0	7.1375

Table 4. Comparison of the results of the two clustering procedures

	Cluster1	Cluster 2	Cluster 3	Cluster 4
Leaders	Germany, Luxembourg	Finland, Sweden		
Followers	France, United Kingdom, Italy, Austria, Denmark	Ireland, Spain, Portugal, Slovenia		
Loungers	Belgium, Netherlands	Malta	Latvia, Slovakia, Greece,Croatia, Czech Republic, Lithuania	
Laggards		Poland	Hungary, Romania, Cyprus	Bulgaria, Estonia

Source: constructed by author

According to the table 2 we can see that eco-innovation leaders and followers got into cluster 1 and cluster 2, except for Belgium and Netherlands, and eco-innovation loungers and laggards got into cluster 3 and cluster 4, except for Poland. In the table 5 the performance of the EU countries in terms of indicators of sustainable development and circular economy, used for the second clustering, is presented. The values of the indicators are ranged according to effectiveness, achieved by the EU countries.

Eco-innovation leaders
Eco-innovation followers
Eco-innovation loungers
Eco-innovation laggards

EP – energy productivity;
W – Generation of waste excluding major mineral wastes per GDP unit;
RMW – Recycling rate of municipal waste
RBW – Recycling of bio waste
CMU – Circular material use rate
P – Patents related to recycling and secondary raw materials

From the table 5 it could be seen that most of the eco-innovation leaders and followers according to clustering with the use of Eco-innovation Index demonstrate also higher effectiveness when analyzing the indicators of sustainability and circularity. Such countries as Malta, Netherlands, Belgium and Poland, nevertheless, are attributed to loungers and laggards according to Eco-innovation Scoreboard, in terms of indicators of sustainability and circularity have demonstrated even higher performance than eco-innovation leaders and followers that allowed them to fall into the same cluster with the mentioned groups of the countries.

CONCLUSION

How eco-innovation influences the performance of the EU countries towards sustainable development and circular economy is a substantial empirical question which remains opened in the literature. Much of the difficulty in tackling this issue lies in the inexact correspondence between the indicators for

Table 5. Performance of the EU towards sustainability and circularity

Countries	EP	Countries	W	Countries	RMW	Countries	RBW	Countries	CMU	Countries	P
Ireland	17	Luxembourg	20	Germany	65,6	Austria	175	Netherlands	26,7	Germany	92,7
Denmark	15,1	Cyprus	39	Austria	56,3	Denmark	144	Italy	18,5	France	53,7
Malta	12,3	Denmark	40	Belgium	53,6	Netherlands	143	France	17,8	Italy	34,9
Luxembourg	11,4	Ireland	40	Netherlands	50,9	Luxembourg	121	Belgium	16,9	Poland	34,5
United Kingdom	11	France	46	Sweden	49,9	Germany	114	United Kingdom	14,9	Spain	28,7
Italy	10,2	Sweden	47	Luxembourg	47,7	France	91	Poland	12,5	United Kingdom	24
Austria	9,4	United Kingdom	50	Denmark	45,1	Belgium	87	Luxembourg	11,3	Belgium	15,4
Spain	9,1	Austria	51	United Kingdom	43,7	Italy	80	Estonia	11	Finland	14,4
Germany	9	Malta	53	Italy	41,6	United Kingdom	79	Germany	10,7	Netherlands	14
Netherlands	8,6	Germany	56	Ireland	39,8	Sweden	72	Malta	10,2	Austria	10
Sweden	8,6	Spain	64	France	39,7	Finland	70	Denmark	9,8	Denmark	8,17
France	8,5	Netherlands	67	Slovenia	36	Portugal	64	Austria	8,6	Sweden	7,75
Greece	7,6	Croatia	70	Finland	32,5	Spain	62	Slovenia	8,4	Czech Republic	7,33
Cyprus	7,5	Italy	70	Estonia	31,3	Lithuania	41	Spain	7,7	Luxembourg	3,26
Portugal	7,5	Czech Republic	73	Spain	30,8	Ireland	39	Finland	7,3	Latvia	3
Belgium	6,8	Portugal	73	Lithuania	30,5	Slovenia	30	Czech Republic	6,9	Ireland	2
Slovenia	5,6	Finland	73	Hungary	30,5	Hungary	24	Sweden	6,7	Hungary	2
Finland	5,5	Slovakia	86	Portugal	30,4	Cyprus	21	Hungary	5,4	Romania	2
Croatia	5,4	Slovenia	91	Latvia	27	Romania	20	Slovakia	4,8	Slovenia	2
Latvia	4,9	Belgium	93	Poland	26,5	Estonia	17	Croatia	4,6	Greece	1
Lithuania	4,9	Latvia	97	Czech Republic	25,4	Slovakia	17	Lithuania	3,8	Lithuania	1
Slovakia	4,8	Lithuania	99	Bulgaria	23,1	Greece	15	Cyprus	3,1	Portugal	1
Romania	4,7	Greece	113	Cyprus	16,8	Poland	15	Latvia	3,1	Slovakia	1
Hungary	4,3	Hungary	114	Croatia	16,5	Latvia	13	Bulgaria	2,7	Bulgaria	0
Poland	4,3	Romania	150	Greece	15,4	Czech Republic	9	Portugal	2,4	Estonia	0
Czech Republic	4,2	Poland	186	Romania	13,1	Bulgaria	8	Ireland	1,9	Croatia	0
Estonia	2,9	Bulgaria	449	Slovakia	10,3	Croatia	8	Romania	1,7	Cyprus	0
Bulgaria	2,4	Estonia	722	Malta	7,4	Malta	0	Greece	1,4	Malta	0

Source: constructed by author

measuring eco-innovation success and the spheres and indicators which they cover in terms of sustainable development and circular economy. There is also a problem to assess this influence in the Member States taking into account the different level of their eco-innovation performance and identify whether the countries with higher eco-innovation performance are characterized by more progress towards sustainable development and circular economy.

Eco-innovation Index developed by the European Commission is considered to be an effective measure to evaluate eco-innovation performance of the Member States. But the disadvantage of Eco-innovation Index when analyzing the contribution of eco-innovation to achieving sustainable and circular economy goals is in it limits to measure the effectiveness of eco-innovations in sectors and, more importantly, subsectors which emphasized by the goals of circular economy and sustainable economy. Furthermore, there is also a problem of assessing sustainable and circular economy development with the use of indicators as the results of these development priorities are often difficult to evaluate and observe. All mentioned makes it difficult to assess the direct influence of eco-innovation on the progress of the EU countries towards sustainable development and circular economy.

We have addressed this problem by the application of the clustering method. We have conducted two clustering procedures for testing the following hypothesis: *the eco-innovation performance of the EU eco-innovation leaders, followers, loungers and laggards is consistent with their performance in terms of their progress towards sustainable and circular economy.*

The first clustering has been conducted on the base of the Eco-Innovation Index 2017 and the second clustering was conducted on the base of the set of indicators of sustainable and circular economy. The application of clustering procedure in such a way helped to find out whether there are inconsistencies between the level of eco-innovation performance of the countries and their progress towards sustainable development and circular economy. The purpose of the first clustering was to identify eco-innovation leaders, followers, loungers and laggards among the Member States. The purpose of the second clustering was to determine in what a way the Member States split into clusters in terms of indicators of sustainability and circularity. After conducting two clustering procedures received clusters were compared.

Our results have shown that eco-innovation leaders and followers got into cluster 1 and cluster 2, except for Belgium and Netherlands, and loungers and laggards got into cluster 3 and cluster 4, except for Poland. Most of the eco-innovation leaders and followers according to clustering with the use of Eco-innovation Index have demonstrated also higher effectiveness when analyzing the indicators of sustainability and circularity. We received interesting results in relation to Poland, Netherlands, Malta and Belgium as these countries are eco-innovation loungers and laggards according to our cluster analysis but at the same time they have demonstrated higher performance than eco-innovation leaders and followers according to indicators of sustainability and circularity and got in the clusters with eco-innovation leaders and followers. Thus, we can assume the significant influence of other factors on the progress of these countries towards sustainability and circularity. A more detailed analysis of these factors is a fruitful area for our future research.

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Chapter 2
Narratives of Sustainability:
How Did Uber Curate the Driver Category to Rationalize Its Business Model?

Merve Kırmacı
https://orcid.org/0000-0001-8587-9226
Bogazici University, Turkey

ABSTRACT

Given the unprecedented growth of communication technologies, a wide range of industries from transportation to accommodation has become a part of the sharing economy. The premise to exchange between what is already owned with what is needed has become a way to promote sustainable consumption practices. For many, the sharing economy is an important business strategy because it offers a way to make use of the underutilized assets, services, and talents. However, business problems unveiled the sustainability premise, and organizations had to deal with agent conflict. By analyzing the lawsuit case that is filed against Uber Technologies Incorporated between in 2013, this chapter aims to show how agents' and principals' interests are inconsistent with each other, and how organizations use framing strategies to survive in the digital age.

INTRODUCTION

Today organizations are expected to meet present consumers' needs while considering the requirements of future generations not just by preserving resources, but also by sustaining intangibles such as trust. Companies started to face pressure from governments, consumers, institutions and investors to undertake their social and ethical liabilities. Firms became more aware of the need to apply responsible approaches while seeking profit.

In a global and highly integrated economy, providing a reliable exchange and a consistent stakeholder value is challenging. The rise of digital technologies escalated these challenges as the transactions started to take place in a virtual environment with service providers all around the world. Digitized platforms provided access to under-utilized assets, services or talents, providing them *boundary-less* career op-

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tions and service delivery systems. This type of engagement also enabled a more sustainable business model as it offers making use of what already exists and matches it with what is demanded (Heinrichs, 2013; Botsman and Rogers, 2010). By doing so experts believed that sharing instead of owning would improve market efficiency, sustainability and enhance community bonds (Heinrichs, 2013). However some scholars pointed out conflicting interests between governments, business enterprises and service providers, as the will to make profit may not always align with the will to protect the well-being of stakeholders (Mi & Coffman, 2019).

The idea to exchange, lend or make use of the underutilized assets made sustainability seem so achievable that the disguised motivation to make profit over these exchanges and exploit labor power were dismissed (Martin, 2016). For instance, Uber Technologies Inc. has faced several allegations against its practices in the United States of America. They were criticized for using the premise to share and enable access to private cars while rejecting any liability regarding driver compensation, insurance and safety. The platform insisted on not labelling itself as the employer of the drivers. This issue led to larger questions such as whether freelance labor might really be sustainable or not. The controversies also indicated that Uber failed to create a legitimate business model and collaborate with local governments (Cohen and Kitzman, 2012). They most certainly had a dismissive management policy which caused the company millions of dollars (Scheiber, 2017). Despite the fact Uber proposed to lower the gas footprint, reduce traffic and enhance community bonds, the company showed that it chose profit over the well-being of its stakeholders.

By using the court case filed against Uber, this chapter aims to show that during times of uncertainty actors channel their actions in the most favored and rational behavior. Therefore digital platforms like Uber have distinct stakeholder engagement processes. Additionally, they use different discursive strategies to manage agent dynamics which this case will justify.

The remainder of the paper is organized into four sections. To anchor the statements above, the first section gives a brief review about literature on sustainability, the sharing economy and framing as an organizational strategy. The following section outlines how litigation files are used in literature and why they hold value. Next the court case that is filed against Uber Technologies Inc. is analyzed, alongside other qualitative sources about the case, through which the the platform's framing practices and agency conflicts can be observed. Finally in the discussion section, the implications of these strategies and recommendations are discussed for future research. The case shows that the sustainability premise of the sharing economy is obscured because expectations of the service providers and the organization are not aligned.

BACKGROUND

Sustainability and the Sharing Economy

Literature on sustainability in organizations focuses typically on three factors: commitment to economic, environmental and social aspects (Colbert and Kurucz, 2007). Scholarly debates have focused on organizational structure, design or operations for so long that the psychological and social well-being of organizational members of sustainability have been recently recognized. Supply-chain cycle time or cost reduction are ways to improve an organization but today, reducing waste, choosing more environmental-

friendly resources and enhancing stakeholder participation are also crucial for organizations to increase their business value (Garza, 2013).

Scholars defined sustainable organizations as healthy (Di Fabio, 2017) and built direct links between a healthy and a successful business (De Smet et al., 2007). Apparently, improved work conditions lead to improved performance and workplace attachment where organizational culture, climate and good practices promote organizational effectiveness (Lowe, 2010). Di Fabio (2017) proposes that there are four different levels to analyze a healthy workplace, which are individual, group, organization and inter-organizational levels. His work sheds light on the importance of healthy work places as these are the drivers of well-functioning societies. He also observes a shift from motivational paradigm to a meaning paradigm in today's workplace culture where coherence, direction, significance and belonging are vital for a long-lasting organizational life. He believes coherent stories that produce meaning, hope and possibilities are important to form a positive narrative about an organization which will ultimately affect the psychological conditions of workers. For that, he adds, organizations need leaders that inhibit social and environmental damage and who rather strive for ethical goals and work on more shared responsibilities at the workplace.

Today the rise of sharing platforms have transformed the way organizations function. For some it is the new pathway to sustainability (Heinrichs, 2013) as it promotes the notion of sharing rather than owning in more affordable ways (Botsman and Rogers, 2010). However Schofield (2014) discusses that this economy can have adverse social impacts such as de-institutionalization of markets as well as de-regulation of market transactions. Martin (2016) adds that until now the optimistic view of the sharing economy has led officials to overlook socio-economic injustices, participatory decision-making processes and social inclusiveness. However platforms should become aware that it would be unfortunate to prioritize economic growth without sustaining the well-being and safety of their stakeholders.

Martin (2016) argues the importance of analyzing "the field of sustainability transactions" by which he means the discursive strategies behind the narratives companies attain to shape their business processes. He focuses on framing techniques where deliberate communicative practices shape a position or mobilize a consensus around any idea or concept. Martin looks at the ways in which information is curated in line with peer-to-peer transactions and he finds that the sharing economy is depicted as an economic opportunity, a sustainable business and as a pathway to decentralized, equitable economy by the *actors* who wish to empower it. Actors who wish to demonize it, on the other hand, framed sharing economy as a field of unregulated marketplace that promotes the neoliberal paradigm and an inefficient domain to share. Therefore narration becomes a significant tool to elicit or rebuke a market or an organization.

Sharing economy may have benefits in terms of access and "production austerity", however there is still semantic confusion surrounding what the term encompasses (Curtis and Lehner, 2019). It is not clear whether it enables everyone to be their own boss or simply exploits independent labor power. Besides, sharing platforms' primary focus is still centered at profit maximization and yet they disregard certain regulations instead of focusing on encouraging equity and sustainability practices (Frenken, 2017). This not only detracts users to realize the economy's potential but also opens it up to subjective interpretations and regulations of control which are often in contrast to institutional prescriptions.

Framing and Strategy Making

Organizations often have a difficult time handling any kind of change. Technical, regulatory or economic shifts deeply affect the way organizations function (Kaplan, 2008). Some organizations adapt while some experience either internal or external resistance. Kaplan points out that it is the managerial actors that enable or disable change with their perceptions of what that particular change would bring to the organization rather than the change itself. She asserts that this creates a challenge for the strategy-making process as the external cues are often difficult to recognize. At that point subjective understandings come into play. In fact research in cognition in management suggests that cognitive frames are the means through which managers handle uncertainties (Walsh, 1995).

Goffman (1986) articulates the importance of frames as "guides of interpretation". He says primary frameworks of people shape how they recognize what is going on around them and organize social meanings. Frameworks can either be natural or social, meaning they can be either undirected or guided. They influence perceptions and are therefore useful tools to make sense of complex information, turning them into understandable coherent categories. However frames are personal and therefore implies agency. Each individual focuses on different features of a larger issue and uniquely highlights what seems to be important.

Framing is also depicted as "agenda-setting" (Scheufele, 2000), which indicates that anything can be portrayed with a certain goal in mind. It can be social or cultural, it can derive from an organizational pressure or constraint. As mentioned above framing offers individuals a way to understand their surroundings and is therefore highly effective. They provide "mental short-cuts" (Fiske and Taylor, 1991) for people and by using previously formed filters people interpret incoming messages fast.

Act of framing occurs mostly in uncertain or turbulent environments. Kaplan (2008) shows that during those times actors will transform their own cognitive frames in line with the most predominant one. Managers are shown to play a role in shaping interpretations of the environment and therefore the subsequent strategic choices made in line with them (Barr, 1998). If one frame does not align with an individual's subjective frame, then he or she performs framing practices. Kaplan (2008) defines it as "framing contests" which is a dynamic meaning construction process. Making strategy under uncertainty, then becomes a process of making sense of ambitious signals and choosing the most predominant one among them (Huff, 1990).

Constant framing or sense-making can be risky as active reinterpretation may lead to loss of control and disengagement from prior goals. It is also risky because predisposition to socially constructed *typifications* is easily malleable. Actors interpret external cues in line with their subjective perceptions. This creates a conflict between the principal and the agent who are in a cooperative behavior but have different goals and attitudes towards managerial decisions such as compensation, regulation and leadership practices (Eisenhardt, 1989).

From a legitimacy perspective, the framing and realignment of frames are problematic. Benford and Snow (2000) show that actors establish the credibility of their frames and their authority as claim-makers. They try to bridge what they interpret with what others perceive by extending frames to new issues or by transforming them to align with external reactions. These practices necessitate strong coalitions between actors and institutions so that their legitimacy gains approval. In other words, organizations either adapt to prevailing systems, change their definitions or identify their values with norms or institutions that have strong affiliations with social legitimacy. Legitimation, therefore, involves a change in organizational

mission or organization's affiliation with values to identify itself with legitimate social institutions and practices (Dowling and Pfeffer, 1975).

Maitlis and Christianson's (2014) review reveals that the framing process typically begins when there is an environmental jolt, organizational crises or when there is an external threat. They claim that an event must first catch attention in order to trigger framing. Weick (1993) is probably one of the first scholars whose case on firefighters represented the challenges to organizational routines and how making sense of certain cues have significant outcomes. Alternatively Vaughan's (1998) analysis on the Columbia mission revealed that organizational culture enables cues during times of crises. She found that NASA engineers framed deviance as normal which resulted in the disaster of the Columbia mission.

Following Vaughan (1999) it would not be wrong to say that when actors interact with technology they enact structures that shape their use of that technology. Their response becomes a rule and turns into a practice which later enacts new structures (Vaughan, 1999). This ongoing process exposes *structuration* of certain categories to constant change and therefore entails a continuous improvisation and reconfiguration procedure (Orlikowski, 1994). As a result, lots of subjective frames join the process and as cognitive frames shift over time new organizational characteristics emerge.

These theories articulate the means to understand how strategic choices are made via framing techniques. Be it individual, social, discursive or reflexive, those interpretations and narrations help conceptualize what is novel in organizations. However it is important to emphasize that agents and principals interpret these changes differently. Their practices often contradict with each other and this conflict bares risks for management. Very few studies have examined the intersection of agency and framing theory in the sharing economy. Therefore by using a court case, this chapter will explore the regulatory induced sense-making process of Uber. By doing so, the company's, drivers' and the institution's sense-making process will be revealed and the overall impact on Uber's public image will be shown.

Litigation in Social Science

The idea of judicial obedience and law being an endogenous concept to organizational culture indicates that law acquires meaning from society. As organizational structures become highly institutionalized and rationalized, association between legal compliance and organizational structure has become more intertwined. Although law is never fully endogenous to organizations, the extent to which organizational structures influence the content and meaning of law or vice versa is considered to be an important element in organization studies (Edelman et al., 2011).

Litigation documents are thought to reflect a totality where all kinds of institutions can find simultaneous expression (Messick, 1993). Messick adds that legal materials embody a *textuality* that reflects *hegemonic* principles. Despite spanning through different contexts, these legal files manage to show ruptures and conceptualizations of separate debates in a large time-span. In that sense, elaborating on court statements will help associating previously established norms to current ones, thus providing a position for analysis. (Ginzburg, 1982).

Scholars like Vismann (2008) mention that legal files act like mediators between rules and oral utterances. The focus is often on the institutionalization process rather than the act. In other words, legal documents reflect an event, a crisis or a jolt as a living organism that transforms over time. Therefore legal proceedings do not focus on the content or the meaning but on the function and process, which are both useful sources for observing change, shifts or rearrangements in organizational structures.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies and Problems

On August 16, 2013 four drivers filed a lawsuit against Uber Technologies Inc. in the northern district of California. The plaintiffs claimed that drivers who are using the platform, should be classified as employees given the control mechanism Uber has over their compensation and termination. According to them, Uber violates the California Labor Code, by not paying back certain expenses to the drivers and not giving their share from the fare that they allege as tips. Conversely, Uber opposes holding responsibility for arranging compensation. According to Uber, the business enterprise is not the guarantor of the payments or the tips. Transactions solely concern the driver and the rider.

During the whole procedure Uber describes itself as an agent which provides a setting where the ones who demand a ride can be supplied with the necessary means. However the company sometimes goes beyond being such a medium. It interferes in the ways in which drivers exercise their service but Uber's business model does not align with conventional transportation business models.

This chapter tries to show that agency conflict and framing strategies may conceal the premise of the sharing economy. The court case will unveil the relationship between service providers and principals, and how they negotiate organizational categories such as employment. Hence, this section's focus will be on the conceptualization of workers, what kind of an agency they possess, and how the organization curates it. The organizational structure, objective and the organization's interaction with agents will be central to explore how emerging organizational forms manage uncertainty and legitimize their position while obscuring the premise of sharing.

Organizational Analysis of Uber Technologies Inc.

In order to get a better understanding of Uber, the company's online sources and the lawsuit files are analyzed. All the materials were useful tools to understand Uber's organizational culture and to realize the transformation it went through over time. Changing responses of Uber about the employment category and the words Uber used to describe its relationship with the drivers, were carefully analyzed. Sources showed that service providers, principals' and institutions' views do not align with each other.

Uber underlines the fact that drivers are their partners. On the company's Youtube channel, several drivers are interviewed who all use the word "partnership" when they are asked to talk about their relationship with Uber. About 90% of the interviewees emphasize that they appreciate the flexibility Uber offers and that managing their own working hours is the greatest incentive behind this partnership. They say that they can spend more time with their families or on the things they enjoy doing. They say they find the app very easy to use, that it is responsive, affordable and accessible. They believe it does not feel like working, but more like waiting for the next great experience to happen. Also, during times of recession, Uber has offered a great way to turn downtimes into cash or to make extra money regardless of their experience in the driving sector. Musicians, videographers, football players, teachers, students, retired and physically disabled people are all given a chance to work at the platform. In that sense, the company is an important step in changing the outlook of disadvantaged people's futures and in helping to prevent discrimination.

Another thing that drivers continually emphasize is that they spend more time with family members, not missing important moments while their children grow up and also making time to take care of the

elderly. In that sense, redistribution of family time is an accomplishment of Uber that has raised the value of the company in the public eye.

Videos outline a more concrete frame for the structure and the process of Uber. The job it offers can be done anywhere anytime and with the tools people have at the moment. Relocation, retirement, unemployment or being a full-time employee at another company does not matter in order to be a part of this platform. It is a substantial financial incentive for people who want to pursue their dreams, who are socio-economically disadvantaged. It implements required policies while hiring which include criminal and background checks, and maintenance requirements for their vehicles, so it is also associated with freedom and prosperity. Experiencing the pulse of the city, meeting new people and receiving feedback instantly are all seen as great features of this new technology. On top of all this, drivers like being able to contribute positively to the environment by offering to share their personal cars, and say they find the technology extremely beneficial.

Drivers are classified as 'partners' in the agreements they signed until 2015. After 2015, a BBC reporter states that Uber has changed the classification of drivers from partners into customers (BBC News, 2017), which is a very important adjustment after the class allegations that are filed against the company regarding the miss-classification issue. Throughout the videos, people make statements such as; "I am my own boss", "Uber creates jobs", "It brings great service to its customers" in which the customer is the rider. They also describe their experience as "driving for Uber" which indicates an employee-employer relationship between them. After 2017, Uber uploads videos where the company officials say that drivers work *with* Uber not *for* Uber. It is an important change because the two prepositions alter the perceived relationship between Uber users, drivers and the management.

In one commercial, Uber summarizes itself as, "Uber empowers people to be their own boss, run the business the way they want, without giving up what matters to them the most. A freedom to follow their passion and still earn a good living" (Uber News Room, 2015). However Uber also runs advertisements in which it defines itself as "Everyone's Private Driver" or as "Moving People", "Making America Move Forward" which implies that their software identity is not enough to define them and that transportation is paramount for its business model.

Uber's organizational practices are very similar to corporate models. For example, every Monday, Uber sends drivers a statement regarding riders, rides and money taken. Further, the company organizes community events with the riders. They choose the best drivers and give them an award called "Sixth Star" for their outstanding achievements or contributions. Dahir for instance, a driver form Baltimore, is awarded with this prize because he has saved a rider's life[1]. Documenting the number of rides and the amount they make weekly, rewarding them for their performance or personal contributions are all everyday corporate organizational practices.

Some of the Youtube videos include instructions about driving style, keeping the car clean and tidy, when one should begin and cancel a trip, how to communicate with the rider and what to do when a rider leaves something in the car. Videos warn the future drivers not to bother riders if they do not show up immediately after they request a ride. It is stated that it will affect their mood and lead them to lower drivers' ranking. Moreover, it will even lead to their deactivation from the app which has already happened to several drivers around the world. These are interesting aspects of these media sources, because Uber claims that it has no responsibility over what drivers earn, how they are rated or what the experience of a ride should be. They clearly define themselves as a software company through which they provide an intellectual property, not a chauffeur service. In the defendant's motion for summary judgment, the defendant attorney states that Uber has no interest in the transportation aspect of this business. However

the court questions this statement as follows; " So if they're only providing software, why would they be concerned with who's buying it, whether they're qualified, how they're doing on the job? And why would they have control over the pricing, and whether to implement surge pricing or not, et cetera, et cetera. Why are they setting the rates by which drivers are getting compensated? Why do they have a right to terminate drivers under certain circumstances?" (O'Connor vs. Uber, 2015, p.19), which sums up the contradiction residing in the logic of Uber's business model.

Two news reports from the BBC and Studio SoCal share an interview with Uber drivers who are unhappy about Uber's management. The BBC news is about the Farrar vs. Uber case which resulted in favor of the drivers in London in October 2016, stating that they should be provided with the minimum wage and sick pay. The reporter interviews James Farrar and asks why he alleged such a claim. Farrar agrees that the flexibility is great. However he states that when he is offline he cannot make any money and the fares Uber sets are getting lower and lower. He says he does not even make the same amount as he did 6 months ago. His monthly income has got under minimum wage. Moreover, Uber moved up its commission from 20% to 25% world-wide, while it demands more from the drivers regarding the cancellation and acceptance frequency, maintenance, insurance, etc. So, Farrar says that Uber drivers now have to work for longer hours, take care the way they put their service in full responsibility, but if they do anything that might disparage the company image, they are easily terminated.

Similarly, one driver in California who speaks to the reporter David Nazar, states that working for Uber has turned into working for a sweatshop. Wages are terrible and the working hours to make an income has increased up to 50 to 70 hours a week. Maintenance, insurance and all other responsibilities overrun what they earn. He ends by saying that the State Labor Commission has actually approved their status as employees, but Uber still refutes this viewpoint. Therefore, through its videos and statements, in many ways Uber implies it actually employs drivers but fails to realize it. Ironically, it exercises a certain degree of control and yet denies the fact that it should be liable for that. Acknowledging Vaughan's theory of secrecy (1999), where organizations come up with ways to frame misconduct or disaster, Uber seems to have created a structural secrecy in which its irrational categorizations find a way to be legitimate.

Uber's Terms and Conditions

Uber's official terms and conditions from 2016 until 2018 are traced down to find if Uber changed the way it categorized drivers. In 2016 Uber states several expectations from the drivers. "The higher the quality of the service, the more riders want to take trips, which in turn means more opportunities for drivers to earn money…There are several ways we measure driver quality, with the most important being Star Ratings and Cancellation Rate" (Uber Terms and Conditions, 2016). This shows Uber's control over driver service not just in terms of cancellation, but also physical contact, inappropriate language, unwanted contact after a trip, misalignment with local legal codes and safety. All these categories are bound to certain sanctions and might have negative consequences for the drivers unless followed accordingly.

In the 2016 documents, the company strictly prohibits increasing the time or distance of a trip and claiming of false fees or charges, whereas initially Uber claimed that drivers may ask for more from the riders, because they are their own bosses. It seems that this practice has completely changed. Drivers now are bound to the charges determined by Uber and "Uber reserves the right to establish, move and/or revise charges for any or all services or goods obtained through the use of the Services at any time in Uber's sole discretion." (Uber Terms and Conditions, 2016). Drivers are also responsible for the costs of cleaning, damage and vehicle maintenance. Therefore, if something happens to them or to a passenger

while they are driving or if they get involved in an accident, the responsibility belongs to the driver. Uber holds no liability to compensate for any damage. It only assists the drivers on these matters, such as by guiding or encouraging them to keep track of their vehicles' maintenance, but nothing more than that. On the other hand, if drivers fail to do so their relationship with the company is terminated immediately.

From December 2017, Uber made significant changes to their terms and conditions following the court case. Uber now strictly emphasizes that the right to obtain transportation, logistics or delivery services through the use of the platform does not make Uber the provider of transportation or the transportation carrier (Uber's Terms and Conditions, 2017). The firm refers to itself as "the transportation request brand" and drivers as "transportation network company drivers". It underlines the fact that it holds no responsibility or liability for any transportation, goods or services provided to the user by third party providers. Unlike the 2016 agreement, there are no statements regarding the service or performance of the drivers. The agent and management relationship is mostly structured and explained through the 2017 agreement. It indicates that institutional norms and agent pressure significantly transformed the way Uber functions. However a deeper look at the court proceedings is needed which is the topic of the following section.

United States District Court Northern District of California

Transcript of Proceedings 2013 – 2019

The court case is a result of the misuse of the premise of the sharing economy. It indicates that the independent contractor system can no longer work effectively. Driver benefits such as health-care, pension plans, compensation, unemployment insurance and topics like discrimination and sexual violence can no longer be ignored, and that the organization should be held liable for the consequences of their implementations.

Proceedings center around four questions: employee versus independent contractor status, degree of supervision, the nature of the job and legal facts. FedEx and Borello cases are taken as points of reference by the court, and the defendant attorney suggests looking at the transaction and the relationship of the job rather than task characteristics. Providing a service to Uber or to the passenger is different according to the organization's point of view. Uber should be considered as a software provider as opposed to a transportation provider. This categorization helps with defining positions for the drivers in terms of who provides service to whom. However, the court challenges this assumption by asking whether Uber makes money out of getting a ride or from the software. Clearly the company gets remunerated for each ride with a commission rate of around 25%.

The product Uber transacts is claimed to be an intellectual property. Uber's attorney Mr. Hendricks explains it as; "… the commercial relationship between these drivers and transportation providers and Uber is one where they are our customer, where we license to them our software, and we receive a fee for doing that" (O'Connor vs. Uber 2015, p. 17). However, there is an obvious hiring process as well as monitoring and ranking which strongly indicate a relationship where drivers serve Uber. Uber has a certain quality control where it dismisses people who do not follow the rules and who damage the brand's image. Uber sets the rates and determines the way drivers get remunerated. Recognizing these standards in performance, quality and remuneration, Uber is found to do more than selling software at the app store.

Several analogies are made in order to illustrate the case. The defendant attorney gives hotel concierge as an example in which a hotel guest can ask the concierge for a dog walker in the city. The concierge can

offer a name, because he knows a lot of people around the city and might say he will refer a particular name next time if he or she gives the concierge a certain commission. This does not make him an employee of the dog-walker. The defendant attorney continues to define Uber as an opportunity creator and a lead generation service. He backs up this idea by discussing organizational facts such as not owning a fleet of vehicles or not ensuring the flow of transactions, and simply being an intellectual property. The money it demands from the drivers is outlined as a fee to access the software program. Consequently, the distinction between software purchase and transportation is emphasized where the defendant tries to prove that they are not a car service and only function as a broker or a recruiter.

Allegations are challenged by the plaintiff attorney again through the FedEx and Borello cases. Similar to Uber, FedEx also claimed that it was not a package delivery company while its main business was about delivery. They used the motto "a guy with a truck" for deliveries and made deals with truck companies as subcontractors. In the Borello case, the migrant farmworkers were classified as independent contractors; they managed their own working schedules, provided their own tools and received a share of each crop as their compensation. However, in both cases, the court decided that they were employees, because either FedEx or the grower controlled the financial relationship.

Working once in every 180 days for UberX drivers and every 30 days for UberBlack drivers is discussed as well. It is asserted that the time spent on work does not necessarily make them independent. The plaintiff attorney states; "There's nothing unusual about a company claiming that its workers aren't employees simply because they can work as much or as little as they choose" (O'Connor vs. Uber 2015, p.31). It is about expecting a certain quality over the duration of the job. It is not about working but the pressure to do the job while it is being done. Therefore, Uber's claims about not managing driver schedules or providing freedom to negotiate the fare remain invalid.

The defendant attorney later ties the case to an exterior obligation such as a vehicle, and says that Uber is not like the yellow cabs where the central transportation element is the vehicle. On the other hand, employment relationships can be built where there are no pre-existing exterior obligations. Therefore, the question becomes more about what weight should be given to facts. Uber does not seem to follow rules or obligations yet expects drivers to represent Uber in the best way they can. "Giving them an opportunity does not mean that now they're my employee, even though I benefit if they get the job and perform the services" (O'Connor vs. Uber 2015, p.45). So, for Uber the driver category is not bound to control but to instant gradations. Once drivers are on duty, they are expected to cover certain expectations. It is not about how often they work, but what the circumstances are like when they work. On the other hand, they can be dismissed if their acceptance rate is too low during the time they are online. One of the plaintiffs claims that he is threatened with suspension if he did not raise his acceptance rate to 80%, which challenges Uber's description of drivers being able to do whatever they want without penalty. "Uber does have an interest in the behavior and acceptance and the volunteer acceptance of the drivers, because if they don't volunteer and accept when they get the call it creates a problem" (O'Connor vs. Uber 2014, p.62). The defendant replies, "It's about being online only when you decided that you, in fact, want to accept trips" (O'Connor vs. Uber, 2014, p.63). This dialogue explains that the supervision is only valid for the duration of employment but yet again Uber does not frame it as employment. One way or the other there is a certain degree of control, and the way this control is legitimized has become a part of the structure of the organization in which Uber challenges the traditional liabilities of an employer and the definitions of an employee.

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The change in the way the organization defines employment is observed when the defendant attorney says, "Drivers are our customers. This is a commercial platform…What you are seeing is commercial and business control, not employment control" (O'Connor vs. Uber 2015, p.64). Clearly, the role of the drivers has moved from being a partner to a customer, because Uber claims that drivers are using the software property they own the rights to which makes them a consumer of their brand and thus their "customer". Riders in this relationship are classified as employers since they control the way the drivers exercise the service. Uber's role is to provide a space for those participants to meet. However, the understanding of this relationship changes when driver addendum, monitoring, rating and company warnings affect the driver status. As mentioned earlier, drivers should meet Uber's expectations and once there is control, the fact that passengers apply additional control does not negate the initial control. Not expecting drivers to show up at a certain place and time, or not even expecting them to show up, does not invalidate Uber's power when drivers work.

According to the claims of the plaintiffs, Uber manages the issues of cleanliness, timeliness, proper appearance, wearing a nice suit, button-up shirt, details about picking up a customer and being on the correct side on the road, etc. In addition, it rejects driver applications because of their choice of outfit and appearance. For instance, O'Connor, despite working for another vehicle company, had to be interviewed by Uber. He was first rebuked for his outfit and later rejected because he failed to submit a background test. It is stated clearly in Uber's written driver addendum that: "Uber reserves the right at all times and at Uber's sole discretion to reclaim, prohibit, suspend, limit or otherwise restrict the subcontractor from accessing or using the driver app or the device if the transportation company or its drivers fail to maintain the standards of appearance and service required by the users of Uber software" (O'Connor vs. Uber 2015, p.82).

Control and deactivation are important distinctions in Uber's business model and its liabilities. The proceedings prove that the degree, nature and specified organizational standards indicate contradictory policies when combined with termination and surveillance mechanisms. The insistence on framing their relationship in a "non-employment commercial setting" points out the clashing interests of the employer and the employee in a newly introduced business setting. It is important to analyze the process behind these changes in organizations because it shows that organizations reinterpret external cues in order to sustain their business model.

As the case continues in 2016, the court makes a clear emphasis that its sole concern is about the correct classification of the employees. The important point made in the 2016 court case is that the defendant lawyer accepts Uber's degree of control; "… there were allegedly – and maybe these were dated, but there were rules from time to time, suggestions, manuals, training things, bulletins about what radio stations to play, and how to greet people, and bottles of water" (O'Connor vs. Uber 2016, p.67). In that sense Uber changes its stance towards the relationship between control and employment. Over time it starts confirming their degree of control over driver actions but keeps its claim that it has nothing do with their employment status. It still does not clarify the drivers' positions within a hierarchical frame, but makes significant changes in the way they refer to drivers. Consequently, the regulatory environment and the conflict between agents caused Uber to adjust its definition for employment as well as to verify particular degrees of control.

Finally, after almost a two-year break, in 2018 the court dismissed the class action since some of the drivers work with Uber through an intermediary transportation company (O'Connor vs. Uber 2018, p.12). Now the case concerns 13.600 drivers instead of 365.000. Later in March 2019 the case is finalized and the court ordered Uber to pay $0,37 per mile to drivers to reimburse their lost income via tips.

The firm promised to better explain their deactivation policies and help drivers who are deactivated to get back on the platform. The last meeting is due to be on July 27, 2019, but the six years of discussion have showed that by exploiting asymmetries of information and power, organizations can incrementally develop more sustainable approaches to business and instantly develop new strategies.

SOLUTIONS AND RECOMMENDATIONS

By reading external cues correctly, companies can better resolve conflicting interests. Especially in an age of rapid technological change, discursive strategies are significant techniques to mobilize consensus. Therefore, emerging organizations in the sharing economy can collaborate with governments, institutions and users to minimize agency conflict and to improve their brand image. The role of shareholders can be crucial. In fact they can be drivers rather than barriers for sustainable business practices, because they can highlight the shifting nature of the relationship between environmental expectations and society's needs. This external pressure can shape future investments, policies and implementations.

If Uber had listened to the needs of its drivers before the court settlement, it would have avoided such a conflict. By being aware of the needs of its community, the organization would have created a connection between business and society instead of segregating the two parties. Similarly, by developing governance mechanisms that could enable agents' self-serving behaviors, the organization would have become the backbone of the sharing economy.

FUTURE RESEARCH DIRECTIONS

Through the case of O'Connor vs. Uber, this chapter explored the conflict between agents and institutions that ultimately led the organization to come up with reflexive strategies. Overall it seems reasonable to adopt a deeper look at the consequences of these strategies. Several recommendations are outlined below to use framing and agency theory in the sharing economy.

Discourse

Foucault says discourse gives meaning to and can be found within the practices of social structures (Miller, 1990). Discourse in turn shapes the dynamics of social structures. It reproduces regimes and gives birth to niche innovation. It plays an important role in creating narratives and framing processes. Polkinghorne (1988) says that narratives can provide a basis to understand strategies, how actors reshape perspectives and patterns of social action and enable institutional reforms (Smith and Raven, 2012). Therefore organizational studies can benefit from analyzing the narration behind organizational practices which would portray the relationships between agents and managerial groups, decision-making processes and how transformation takes place.

Organizational Reactions

Vaughn (1999) found out that even a non-profit organization like NASA has implicit but known policies which she named as "structural secrecy". Similarly Kaplan (2008) portrayed the dynamics of firm inertia

and adaptation during times of framing contests, that organizations would either resist or accept change. For her a frame would be deeply embedded in the structure of an organization. Alternatively, it can be depicted as "truce" (Nelson and Winter, 1982) that it would also determine the strategic direction the organization would take. Kaplan further asserts that change is bound to the actions of entrepreneurial actors. By doing so they can affect the perception of organizational members. These techniques offer direct measures to assess the consequences of framing strategies. A similar approach for the digital platforms would contribute to the gap in the literature, because the studies outlined above belong to the pre-platform era.

Employment

In many ways Uber's claim of being merely a technology company was problematic. The actor who is in charge is mixed and matched by Uber and those kinds of semantic adjustments only concealed the truth. In reality, Uber's business model has disregarded the well-being of its stakeholders. It led to a constant seek for legitimacy which resulted in the company branding itself as an intermediary between supply and demand. In this respect a new type of employment can be addressed for the sharing economy participants, influencing organizational decisions about outsourcing and management. Uber is an example of how post-industrial organizational arrangements are now insufficient and how Uber can be used to introduce fresh approaches for labor arrangements in similar organizations.

Krueger and Harris (2015) proposed a new category of employment called the "independent worker". They stated that these workers would not get any overtime, unemployment insurance or minimum-wage. They would only be able to organize collectively and this would relatively give them more rights than before. They also added that the current dichotomy between an employee and contractor would not be sufficient to manage new types of business dynamics, such as the digital ones, where the employee seldom meets the employer.

Theory Linked Contexts

A significant number of theories can be used to understand the transformation that organizational studies have undergone. Resource dependence, population ecology, contingency or institutional theories have been developed for large public bureaucracies for years. From an organizational behavior point of view misconduct, deviance, disaster or mistake (Vaughan, 1999) are largely studied. These theories and views can be applied to the sharing economy platforms where agents are often in conflict with each other, where there is substantial competition and outcome uncertainty that could make it challenging for principals to implement the necessary strategies. The richness of agency and framing theories would therefore be enhanced if these theories are further researched.

CONCLUSION

In many ways, automation may obscure the role of management, but as this research illustrates, algorithmic management cannot directly indicate worker autonomy. Uber's model clearly raises new challenges for companies that aim to produce scalable, standardized services for consumers in a digital platform. Uber's claim of being merely a technology company blurs the distinction between an Uber driver and

an Uber passenger. This also shadows the basic premise of the sharing economy, which is to share and enable access rather than to own. Unless financial priorities are put aside, the market cannot fulfill its premise and conflicts continue to emerge between agents and principals.

In the coming years, technology will continue to transform the market economy and as technologies shift, categories will shift too. Therefore new framing strategies will be implemented and thus more reflexive structures will arise. However management needs more efficient ways to allocate work and avoid conflict. In that respect, future leaders need more training on conflict management and developing skills to collaborate with local governments. In addition, creating meaningful patterns by responding to agent, society and institutional needs will be paramount. Consequently, this study contributes to the literature by pointing out the possible consequences of reflexive strategies and what might be done to minimize agency conflict in a digitized marketplace.

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Chapter 3
Smart City Solutions and the Potential of Using Web APIs:
End-User and Technical Perspectives

Ante Strize
PricewaterhouseCoopers, Croatia

Mario Jadrić
University of Split, Croatia

Maja Ćukušić
University of Split, Croatia

ABSTRACT

This chapter presents the advantages of using APIs in the context of Smart City solutions and describes relevant successful practices. As there is still some uncertainty and the fear of compromising the security of data in these types of scenarios, most cities have just started using web APIs indicating that there are still opportunities for further enhancements. Different views on Smart City solutions result in different priorities and assumptions, so depending on the role, it is possible to differentiate between the programmer's (technical) and customer/citizen's perspective. The research was conducted with two groups of respondents: with end-users and programmers. The purpose of the survey was to find out the preferences and characteristics that potential users are looking for from Smart City solutions, while the aim of conducted interviews with programmers was to explore their attitudes about using web APIs in Smart City solutions.

INTRODUCTION

In 2008, major breakthroughs occurred that announced the widespread emergence and implementation of Smart City solutions: the number of mobile Internet users grew-out the number of home Internet users (Burger, 2012), while more things were connected to the Internet than people (Evans, 2011). At the same

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time, over half of the population lives in cities (Silicon Labs, 2013) and predictions are that this figure will only continue to rise and reach nearly 80% by 2050 (Eurostat, 2016). The concept of the Internet of Things (IoT) in that regard has become very important as it enables connectivity between information technologies and infrastructure facilities (e.g. in public transport, public lighting, energy management, management of buildings and so on) (Jin et al., 2016).

As a concept, Smart City is defined in several ways, but most common traits are the implementation and distribution of information and communication technologies (ICTs) through public infrastructure in order to stimulate the social and urban development of the city through the growth of the economy, increasing the participation of citizens and efficiency of public administration (Yeh, 2017). The city is considered smart if it successfully balances the development of the economy, society, and the environment and connects all democratic processes through participatory government (Caragliu, Del Bo, & Nijkamp, 2011). Cities, but also less urbanized areas as well as their surroundings, can profit greatly using Smart City solutions to involve their citizens in smarter and more active city management (Kickbusch & Gleicher, 2014). It is widely accepted that the adoption of technology in public processes contributes to the growth of national GDP and higher salaries in comparison with workers of equal abilities in other countries (Beaudry & Green, 2002; Comin & Hobijn, 2004; Foster & Rosenzweig, 2010).

However, Smart City solutions are extremely complex in that they can connect to an unlimited number of different data sources, and at the same time can provide access to an unlimited number of different users (Sta, 2016). For this reason, it is key to properly resolve underlying technical issues in Smart City solutions related to collecting and sharing data and to controlling access to the same data (Badii et al., 2017). The ultimate goal is to allow each user timely access to relevant data, regardless of their purpose. This can be accomplished by using a universal protocol through which users can receive all the necessary information according to predefined rules. To resolve this challenge, the development and use of Web Application Programming Interfaces (Web APIs) with/in Smart City solutions are imposed as an optimal approach. Creating an API protocol allows communication and connection with other applications, regardless of their type.

In this chapter, the emphasis is on the use of web APIs for Smart City solutions. With that purpose, end-users' views about Smart City solutions and programmers' vision about the modes of their development is investigated, and best practices from a technical perspective are outlined.

APPROACHES AND PERSPECTIVES IN DEVELOPMENT OF SMART CITY SOLUTIONS

Smart City solutions can be implemented in a number of ways, differing in the perspective of the stakeholder who describes the concept. Two opposite concepts (top-down and bottom-up) are explained along with the third one, representing their combination (Walravens, 2014).

Approaches to the Development of Smart City Solutions

Top-Down Approach

A top-down approach is closely related to the technological deterministic idea of the "control room" for managing the city. It aims to provide ICT architecture for the purpose of monitoring urban activities

as well as tools that would (automatically) communicate with each other as a part of the infrastructure and adjust all parameters to the predefined optimal values (Dirks, Keeling, & Dencik, 2009). A city that monitors and integrates important infrastructure, including roads, bridges, tunnels, railways, subways, airports, ports, communications, water supply, electricity, and even some important buildings, can better optimize its resources, plan maintenance activities, and maintain security while maximizing the services it offers to its residents (Hall, 2000). This definition of a Smart City emphasizes the optimization of the process through the use of technology. In addition to collecting large amounts of data, it is essential that in this approach calculations, visualizations and predictions based on the collected data are used (Campkin & Ross, 2013). In this way, the data collected is converted into information that can further improve the processes within Smart City. In its most extreme version, the top-down concept implies that cities are planned, designed and built with a view of optimizing all urban processes using technology. An example of such visions are the urban areas of Songdo and Masdar, which, however, have been much criticized for excessive sterility, oversized planning, high costs, uniformity, and the like (Conway, 2013). In most cases, technology will, however, need to be integrated into existing infrastructure. There are numerous advantages of an integrated Smart City solution: many different activities and content can be monitored from a single central location, given the many aspects of life in the city. However, the top-down strategies are often criticized, whereby the main arguments are that they are dictated by commercial interests and that in turn raises a number of control and privacy (Hollands, 2008) issues posing a major security risk.

Bottom-up Approach

A bottom-up approach is based on the assumption that changes and improvements come from those who use the city, i.e. its inhabitants. It excludes all forms of top-down urbanism, primarily the influence of strong privately-owned companies. The bottom-up concept is primarily based on the idea of a Smart Citizen who works, lives and participates in a variety of activities in the city. Instead of seeking centralization, such a concept gives priority to openness by supporting a kind of creative chaos (De la Peña, 2013). Although these characteristics have a positive impact on the local level, they are still in conflict with the goals and desires of decision-makers, urban planners and the dynamics of the global economy. Various chaotic bottom-up concepts are opposed to the idea of a master plan, the "ideal" planning of the system. Although the idea of a master plan or an ideal, measurable and controlled condition often yields unsatisfactory results, relying only on the bottom-up approach is even more difficult to achieve. There are many examples that have resulted in a positive outcome by employing this approach, but in most cases, they are not long-term and lack the ultimate unified vision, but also they can be in conflict with some long-term goals planned by the city authorities.

Hybrid Approach: Smart City as an Innovation Platform

A hybrid approach considers Smart City as a platform that encourages the use of collective (local) knowledge of all involved stakeholders. In this way, Smart City is seen as the place where the public sector, private interest, and residents join together to get new ideas, collaborations, and innovations. This corresponds to a well-researched concept of a triple helix (private sector, public sector, and academia), or even a quadruple helix where the wider population is involved, depending on the situation (Leydesdorff & Deakin, 2011). The most convenient way for Smart City solutions to be successful is to use local innovation platforms where all stakeholders are involved (O'Reilly, 2007). There, local authorities act as

an intermediary that allows interaction between other stakeholders who have mutual needs and interests. An example of this approach is the way in which Google Maps records traffic jams. Instead of creating a costly and complex traffic control infrastructure, Google consistently collects information from its users on the roads and accordingly collects traffic status data. This is a typical example of a top-down concept where a particular traffic management system is created, while its users in a bottom-up manner continue to participate in the collection and sharing of data relevant to its functioning (Ratti, 2014). By selecting only one Smart City approach, whether it is bottom-up or top-down, it is likely that there will be issues in sustainability or achievement of goals.

Perspectives in the Development of Smart City Solutions

Technical Perspective

Technical perspective views a digital city as an integrated society that combines broadband communication infrastructure, flexible and service-oriented computing infrastructure based on open industry standards and innovative services that meet the needs of public administrations, its employees, residents and business entities (Malek, 2009). The purpose is to create an environment for sharing information, collaboration, interoperability and an ideal experience for all users in all parts of the city. The notion of a digital city evolves into an intelligent city – a city that has all the infrastructure and information infrastructure, the latest technology in communication, electronics and mechanics (ibid). The difference between a digital and an intelligent city is that an intelligent city is characterized by the ability to support learning, technological development, and innovation procedures. In that regard, a digital city is not necessarily intelligent, but every intelligent city has digital components.

End-User Perspective

End-user perspective focuses on the human dimension. Human infrastructure (for example, creative occupations and labor, scientific networks, volunteer organizations, non-crime environments, etc.) are an important axis in every city. The end-user perspective additionally encompasses social infrastructure (intellectual and social capital). A Smart City is said to be user-oriented if it offers various opportunities for realizing human potential and managing creative lives. A Smart City is also considered a learning city, i.e. one that improves the competitiveness of its urbanism in the overall economy. The learning cities adapt to the changes that occur within it and as such become more adaptable to the modern lifestyle. Similarly, the term Knowledge City is used to define a city that stimulates the development and use of knowledge (Edvinsson, 2006). The environment that enables learning has become an important mechanism in attracting qualified citizens and, as such, becomes much more sustainable.

WEB APIs IN DEVELOPMENT OF SMART CITY SOLUTIONS

Web APIs Context and Technologies

It is hard to imagine a modern software platform that does not support APIs. Programmers use APIs as an interface to access the collection of codes, frames, and data sources, in order to skip the programming

of some parts of their applications and accelerate the development process (Dagenais & Robillard, 2008). Using APIs, it is easier to outsource a certain portion of the process within an application. Just as the World Wide Web has opened up a great potential for growth and development, API services have made it possible to accelerate the growth of sharing services and data with external applications. The term web API can often be obscure and be identified with the term "web service", which is often mentioned today in various cases, and it does not have the same meaning everywhere (Alonso, Casati, Kuno, & Machiraju, 2010). Many use the World Wide Web Consortium (W3C) definition of a web service being a program, whose interface and connectivity can be defined, described, and detected as an XML (EXtensible Markup Language) creation. Although this definition is correct, it limits the use of technology to XML files, however, there are various alternatives today. In the context of APIs, different technologies pose challenges that programmers need to take into account: of particular relevance for the study at hand are Simple Object Access Protocol (SOAP) – a communication protocol (Espinhaa, Zaidmana, & Gross, 2015), Representational State Transfer (REST) – a software architectural style (Pautasso & Wilde, 2011), JavaScript Object Notation Remote Procedure Call (JSON/JSON-RPC) – remote procedure call protocol encoded in JSON data-interchange format (JSON-RPC, 2013). Due to space limitation, and in line with the differing objective of the chapter, the specificities of the technologies are not presented.

Web APIs are commonly used for two purposes. The first is to send data that is processed by an application that provides an API (API serves as service access), and the second is to send a query through the API to get the data that it contains. The data can be further stored and processed, depending on what the needs are.

Usage of APIs in Smart City Solutions

Smart City solutions collect large amounts of data from various sources, such as sensors, and from people who are moving and using the services of a Smart City. The most common data collected is traffic conditions, the energy consumption of houses and buildings, the use of household appliances, and the like. After all the data are stored, it can be further processed with advanced data analytics and used to create new and upgrade existing services to make life easier for the inhabitants. Such data may contain a wealth of information that can be used for various purposes, therefore it is extremely important to allow access to stored data to those who want to use them to further elaborate the Smart City idea. It has already been mentioned that the best approach to developing Smart City solutions is the one through an (open) innovation platform where all stakeholders can participate. In order to allow access to this platform, it is necessary to open secure protocols through which programmers can access them, and these protocols are precisely the APIs. In this way, with the opening of an API, for programmers who want to (further) develop Smart City solutions, it is much easier to achieve this without substantial considerations about the collection, storage, and processing of collected data.

There are numerous Smart City solutions in the world that can serve as a role model for other cities and a starting point for planning new solutions in this regard. Here, the emphasis is on the cities that use web APIs in their solutions and allow their use. As an example, solutions from four large foreign cities are presented based on a recent study (Boyd, 2015) and one from Croatia.

Barcelona

Barcelona is a city that has won numerous awards for its advanced Smart City solutions. APIs in Barcelona are published on several platforms. The main resource is Area Metropolitana de Barcelona (AMB, 2019), a platform collecting data from agencies related to transport, environment, land use and business data. The API documentation is available in Catalan and includes datasets, city news, research results, and more. Another resource is Sentilo (2019) – Barcelona's open source, Internet of Things (IoT) Smart City Infrastructure Platform, which aims to provide access to sensor and moving data (monitoring temperature and air quality, waste collection, parking, and more). The REST API provides access to city-level sensors, while the documentation includes detailed examples and guides. Barcelona also has Open Data BCN, an open data catalog that publishes numerous data sets, and Apps4BCN, a directory of all applications, APIs, and reviews where everyone can register and contribute.

New York

New York currently offers many different APIs on its development portal (NYC Open Data, 2019) including geo-clients, the Open311 API, event calendar, city administration spending reports, and many others that contain news and traffic information. Along with its development portal, New York uses the tool Socrata (2019), opening more data sets to be accessible through their APIs.

Melbourne

Australian city's data can be found in the Australian open data CKAN catalog (2019) and can be easily retrieved using APIs. Melbourne decided to use the Socrates as its data portal, which means that, as with New York, all datasets are available through Socrata Open Data APIs. To facilitate and encourage the use of the portal, the city has presented a flowchart for data usage, which is based on the potential role of the API programmer-users. They have also created specific sites for areas that are considered important such as social change, entrepreneurial opportunities, engagement of society and urban planning.

Singapore

Singapore has a detailed development portal for programmers (Singapur Developer Portal, 2019) offering four types of APIs that include the environment and forecasts, maps, traffic and library services. A list of all applications that use data sources from public administration and APIs is also available on the portal. The Singapore Developer Portal has an average of 30,000 visits a month, and most APIs are for machine-readable data in order to produce maps. Singapore also has a long-standing partnership with UP Singapore, a non-governmental organization that regularly maintains hackathon events. These events are aimed at encouraging the development and use of their web APIs by community organizations, independent developers and entrepreneurs. In this way, they promote services offered and engage stakeholders to participate in the project.

Split

Split is the second largest city in Croatia, and very technology-oriented. Although Split does not have a Smart City portal, various solutions have been introduced among the first in Croatia. One of these solutions is Smart Parking that instigated the city's tendency to digitize its processes and implement further solutions in this direction. The project required the placement of physical sensors in the parking spaces and of the collectors that collected all the information. Collectors are connected to the internet and send all data to a central database. With the use of API, anyone could access this data and use them further. What is more critical is that through the use of the API, development, and integration of future Smart City services is to be achieved.

RESEARCH ON THE TWO PERSPECTIVES IN THE DEVELOPMENT OF SMART CITY SOLUTIONS

Research Methodology

With a view to investigate different perspectives in the development of Smart City solutions presented in Section 2, a two-part research study was conducted first with end-users and then programmers of Smart City solutions.

For the first part, the sample was chosen based on the principle of availability and suitability representing the non-probability convenience and snowball sampling approaches. The sample includes young persons up to 30 years of age that either study or have completed some degree program. It is limited to participants that live in one of the larger cities that have at least one functional Smart City service. Knowledge about technology or about the Smart City concept was not a prerequisite since the intention was to collect the opinions of citizens as end-users, even of those who are not yet aware of the existence of such solutions. The distribution of a questionnaire developed in the eSurveyCreator application was done via social networks and e-mail. The introductory part of the survey contained a section related to demographics (gender, age, and place of residence), and the main part listed a set of 22 statements requiring participants to (dis)agree with them using a 5-point Likert scale (1 - I completely disagree; 2 - I disagree; 3 - I do not agree nor disagree; 4 - I agree; 5 - I completely agree). Statements were divided into 7 subgroups representing some characteristics/types of Smart City solutions.

For the second part of the study, the sample was formed based on purposive sampling due to the fact that there is a limited number of people that have expertise in the area being researched. Considering the interest of the study is in one specific field, a small group of professional programmers who have different years of experience and are familiar with the concept of Smart City was selected. Structured interviews were conducted using pre-defined open-ended questions, individually with each participant. The interview consisted of 4 background questions about the employer, gender, age and years of experience, as well as 10 questions to find out about their opinions and attitudes. Two control questions were used first to confirm that the programmer is familiar with the concept of Smart City and second to verify whether she/he has participated in a Smart City project.

Research Results

The research was carried out in June 2018 when all the surveys and interviews were conducted. For a clearer view of the results of the research, the report is hereinafter divided into two parts: end-users' and technical perspective.

Total of 57 respondents completed the survey for end-users, and as mentioned above, these were people up to 30 years of age (61.4% of the 18-24 year-olds and 38.6% of the 25-30 year-olds were involved in the study). About 60% of the respondents were female. All participants come from the two largest Croatian cities – Zagreb and Split. Table 1 and Figure 1, list and visualize the scores given by the respondents to seven groups of statements.

The first group of statements was used to investigate the current habits of users in using existing e-citizens services and online payments. Answers to the first question (1.1) are very interesting. Considering the convenience sampling, large deviations were expected, which in this case is 1.5. However, what makes a great deal of concern is that 50% of respondents are not familiar with the term of Smart City or its concept. This is particularly interesting because the participants are young people who are considered "digital generations" and are largely dependent on modern technologies and devices. Also, it is worrying that over 50% of respondents do not use the e-citizens portal at all, and only about 20% are actively using it. However, despite this, the average score for the use of the internet or mobile banking and online shopping is 4, meaning that most of the participants have a tendency of purchasing online and have confidence in technology in that area.

With the next group of statements (2.1 to 2.3), the attitudes of the participants related to the needs of practicality and time savings were examined. The results are expected, almost all respondents do not like to wait in rows and would prefer to use the internet the submit official documentation online. However, the following is interesting: people who do not use e-citizens services would also prefer to perform most of the tasks online. This elucidates the fact that the public is either not sufficiently familiar with the functionality of the e-citizens solution or that it has problems with functionality or access because of which it is not used.

The next group of statements (3.1 and 3.2) meant to explore the current and future aspiration for environmental concerns. In this case, the question was based on waste recycling as an extremely rising issue. Unsurprisingly, more than 50% of respondents said they recycled waste, though it is still less than 75% denoting the European Union's expected target (Europa.eu, 2017). However, it is interesting that more users would recycle waste if this meant reducing their waste costs, i.e. accruing to their financial savings.

Statements 4.1 to 4.4 intended to point out the need for smart traffic in the city. Using public transport was a control question because it is expected that people who do not use it, will not care for better transport connections or transport information. However, despite the fact the half of respondents do not use public transport, most of them responded that cities need to have better transport connections. They also want to have an insight into traffic information (arrival times). Traffic congestion is a problem for almost all respondents who would like to introduce smart traffic lights to deal with this issue.

The fifth group of statements examines user preferences about (future) health services. Almost 90% of respondents would like to be able to order medical examinations online, which can be associated with simplicity and time-saving. On the other hand, there are ambiguities about video-call examinations. The premise is, however, that this is a technologically more complex/advanced solution, and there is a need for personal contact.

In the sixth group of questions, the need for the simplicity of solutions is explored. It is obvious that great emphasis should be put on the usability of the solutions, as most respondents do not like to read the instructions and often skip them. There is also a high likelihood of users waiving from service if it appears to be complicated to use.

The last group of questions aimed to explore the attitudes and concerns of users towards privacy and security. Over 50% of respondents believe it would be useful to set up surveillance cameras, but most of them are also worried about their habits and behavior being tracked, which leads to the conclusion that most respondents are still unaware that video surveillance has the ability to track their behavior and habits and thus can be misused so to say. Furthermore, most respondents are concerned about who has access to their personal information, meaning that the issue of privacy and security is an important one, and due attention would be given when developing the solutions.

To offer a complementary, yet different perspective, 4 programmers were interviewed. The answers of the respondents are presented anonymously for the purpose of protecting their personal information. Programmer 1 is male, 25 years old and has 6 years of programming experience, and has not worked on a Smart City project yet. Programmer 2 is male, has 24 years and 4 years of work experience, and has participated in Smart City projects. Programmer 3 is female, has 25 years and 2 years of programming experience, and has not participated in a Smart City project. Programmer 4 is male, has 33 years and over 10 years of programming experience, and has worked on Smart City projects. Table 2 lists the interview questions and provides an interpretation of the answers given by the respondents.

SOLUTIONS AND RECOMMENDATIONS

The results of the study indicated that end-users express a great need for connectivity and different services within their city. They want better traffic insights, smart traffic lights, possibilities of performing administrative and official tasks and more. Although most of the respondents were not familiar with the concept of a Smart City, according to their preferences, they can be perceived as having the desire and the need to use such solutions. End-users prefer solutions that give them some added value, specifically, the feeling that they have managed to make some kind of positive change. In this study, it was reflected in financial savings by one of the possible services because participants were clear in their intention to recycle waste more (using smart waste solutions) if it would enable them to reduce their own costs. Another added value of Smart City solutions can be perceived as saving time. Users are accustomed to using online payment services. Accordingly, they recognize the value that they can create through the internet to pursuit time savings in interactions with public administration. Also, one of the important features for the end-user is security and privacy. Many users have expressed concerns about the privacy of their personal data and who has access to them. Smart City solutions must be clear about privacy and must not break the confidence of the users in protecting it. The next important feature is ease of use. Many users do not want to read and study detailed instructions for using any solutions. All users tend to simplify and when faced with complicated innovations – they are very easy to give up. Smart City solutions should allow their users to perform the same functions and processes but in a much simpler way. Digital transformation can enable this so there is no need for physical contact on one level, and on the next level, through process automation, remove the need for any user interaction.

To develop Smart City solutions in line with end-users' perceptions, none of the interviewed programmers advocate the top-down concept. They agree that bottom-up approach in the development of

Table 1. End-users' perspectives on some characteristics of Smart City solutions

Statements	1		2		3		4		5		Mean	StDev
	f	%	f	%	f	%	f	%	f	%		
1.1. I am familiar with the concept of Smart City	18	31.58	11	19.30	9	15.79	9	15.79	10	17.54	2.68	1.50
1.2. I often use e-citizens services	19	33.33	14	24.56	11	19.30	10	17.54	3	5.26	2.37	1.26
1.3. I often use internet or mobile banking	3	5.26	7	12.28	6	10.53	9	15.79	32	56.14	4.05	1.29
1.4. I often purchase and pay over the internet	5	8.77	6	10.53	9	15.79	13	22.81	24	42.11	3.79	1.33
2.1. I do not like to wait in line at counters	1	1.75	1	1.75	3	5.26	3	5.26	49	85.96	4.72	0.80
2.2. I would like to have the option of submitting official documents over the Internet	-	-	-	-	1	1.75	7	12.28	49	85.96	4.84	0.41
2.3. I would want to have information about the city news on your mobile device	4	7.02	4	7.02	9	15.79	15	26.32	25	43.86	3.93	1.24
3.1. I recycle waste	6	10.53	4	7.02	16	28.07	15	26.32	16	28.07	3.54	1.27
3.2. I would recycle more often if it meant savings in costs for waste disposal	2	3.51	1	1.75	16	28.07	15	26.32	23	40.35	3.98	1.04
4.1. I use public transport	22	38.60	9	15.79	2	3.51	9	15.79	15	26.32	2.75	1.70
4.2. I would want better public transport connections in the city	1	1.75	2	3.51	8	14.04	17	29.82	29	50.88	4.25	0.95
4.3. I would want the public transport information to be accurate and that I always have an insight into it	1	1.75	-	-	2	3.51	12	21.05	42	73.68	4.65	0.72
4.4. I would want the traffic lights to adjust to traffic to enable traffic optimisation	-	-	-	-	1	1.75	8	14.04	48	84.21	4.82	0.43
5.1. I would like to schedule medical examinations over the internet	-	-	1	1.75	6	10.53	10	17.54	40	70.18	4.56	0.76
5.2. I would like to have the possibility of a video call with the doctor	7	12.28	9	15.79	17	29.82	12	21.05	12	21.05	3.23	1.30
6.1. I do not like to read the instructions for use and I often skip them	4	7.02	8	14.04	19	33.33	11	19.30	15	26.32	3.44	1.23
6.2. I easily abandon the use of complicated devices and applications	11	19.30	14	24.56	16	28.07	5	8.77	11	19.30	2.84	1.37
7.1. I would find it useful to set as many cameras as possible around the city in order to monitor movement and security	6	10.53	4	7.02	16	28.07	15	26.32	16	28.07	3.54	1.27
7.2. I do not care who has access to my data in public services	26	45.61	13	22.81	6	10.53	3	5.26	9	15.79	2.23	1.48
7.3. It does not bother me if my habits and behavior are tracked (e.g. where I buy, go out, etc.)	27	47.37	11	19.30	11	19.30	3	5.26	5	8.77	2.09	1.30

these solutions is ideal when it includes advice and support from the government. Solutions that would be incepted and start to grow at the level of individuals are preferred rather than from the level of city administration whose role should be organizational, in terms of setting the goals and needs and aligning existing solutions to an integrated one. Furthermore, programmers consider it extremely important to support the openness of the solution, specifically developing Smart City solutions using the philosophy and open source licenses. It turned out that all interviewed programmers consider it almost impossible to create a Smart City solution without the use of web APIs identifying them as the most important factor in the process. Furthermore, the programmers consider the simplicity of the solution and adaptation to the needs of the users as other important factors to achieve better user acceptance. They also consider security and care for privacy as equally important. All solutions need to foster trust by their users and must not pose concerns for their safety or use of personal information. An additional factor that they consider as essential is comprehensiveness, meaning that Smart City solutions should include as many functionalities as possible to better support everyday life and needs of as many citizens as possible. In that regard, a Smart City solution should be seen as an innovation platform in which all stakeholders participate. In order to engage enterprises in the development of new Smart City solutions, there is an indication that the solutions should be designed as at least partially open source and open data projects. If appropriate, solutions should be publicly available in order to be upgraded and continued to be used in creating new ones. It should also be possible to share data while at the same time protecting sensitive data, and in that data exchange and other operations should be implemented using web APIs. Web APIs offer a strategic advantage through greater transparency and more efficient performance of public administration services, and by enabling a new wave of (local) innovation. With the current focus on Smart City solutions where open data, e-management, and real-time sensors play a major role in process automation and sustainability, APIs become an essential part of these solutions. Success stories and examples are provided in the chapter. Nevertheless, most smart cities have just begun using web APIs and there is a need for substantial improvement.

FUTURE RESEARCH DIRECTIONS

Finally, it can be concluded that it is necessary to examine Smart City solutions in more detail from the perspective of potential users as this study provided only a glimpse into insights of a small group of (future) users. Research with more participants focusing on detailed and systematic issues should be

Figure 1. Ranking of end-users' perspectives on some characteristics of Smart City solutions

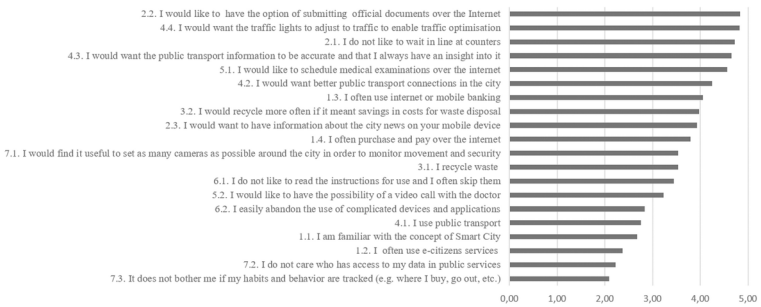

Table 2. Programmers' perspectives on Smart City solutions and their development

Questions	Examples of answers and comments
Do you often use modules/data from open source projects in your development (data, traffic conditions, weather forecasts ...) and which ones?	All respondents replied that they use various types of open source modules and data. Scripts, Google data, and services are often mentioned; *"Using them makes it easy to create applications because there are already solutions that are implemented in the existing environment.",* Programmer 2 states. Programmer 4 states that *"…this saves you a lot of time, and you can focus on the core functionality of the solution, while the rest is outsourced*".
Do you think a Smart City solution would be feasible as Open Source? What are the advantages/disadvantages of this?	Despite the fact that all the respondents confirm they use open source solutions in almost all their projects, none of them consider that Smart City is possible to be entirely open sourced. Programmer 3 states that Smart City solutions *"cannot be fully feasible as open source… because it creates privacy concerns to people... and opens up opportunities for malicious attacks because system information would be more accessible"*. Others warn of other problems and shortcomings of Smart City being an open sourced solution. Negative aspects are most associated with reservations about citizens' personal information and other sensitive data. However, as a positive aspect, they consider that *"many different programmers, even unconnected, can work on it and continue to develop it"*. It is also *"easier to join such a project and cheaper to maintain",* says Programmer 1. He also states that it would *"greatly facilitate development and encourage others to develop solutions branded as Smart City"*.
What is your point of view considering real-time data and do you consider them important when developing Smart City solutions?	Real-time data is something that all interviewees consider to be extremely important. The main reason for this is *"so that users can get relevant information"*. Programmer 4 considers real-time data as something *"that would facilitate the everyday life of citizens the most"*. He also states that real-time data are essential and along with historical data *"it can serve a variety of services for the purpose of forecasting and comparing in order to plan and analyze various services"*. All agree that despite the importance of real-time data, their collection and storing is not easy.
What is your favorite method of connecting to other platforms (manual, direct access to the base, web services - API, FTP and similar) and why? Do you think that the same applies to Smart City solutions and why?	As the most popular method of connecting to other platforms, all interviewees have listed the web APIs. The reason for this is primarily their simplicity and universality. Programmer 2 also states that this is also *"due to security, because it is more difficult to access database data since it is closed, and due to data interchange errors"*. Web APIs have also been chosen as the most popular "*because there are many different ones that are easy to work with, enable communication between different types of applications, databases, servers...".* Programmer 1 states that *"API is the best solution for Smart City because it is easy to maintain, easy to upgrade and comes with documentation that anyone can follow"*. The use of APIs in Smart City solutions is also useful *"because it could enable the development of small-scale applications that would easily be interconnected and integrated through web services regardless of their specifics"*.
Imagine developing an integral Smart City solution, which are the first issues/problems you are facing?	As one of the fundamental problems, two respondents consider the digital literacy of citizens, especially in Croatia, to be inadequate. Programmer 2 states that *"the problem is the environment, for example, in Croatia, I consider that people are not sufficiently 'computerized' to use such solutions"*. Programmer 1 explains that problems *"boil down to how to get to the user and the data",* as he considers that *"only a small number of cities in Croatia currently have sensors and other equipment because these require high infrastructure costs"*. Programmers 3 and 4 point out the importance of planning and sourcing of the problems to be solved but also their elaboration. Programmer 4 additionally points to the problem of support, specifically of *"support from institutions and participants, because without that it is difficult to have a sustainable project"*.
What would help to make the development of Smart City solutions easier?	Most agree that quality associates and the right team that will work on a Smart City project are essential. Programmer 1 states that it is important to *"get the support from the city administration because their subsidies-organizations would need to assist greatly numerous developers involved in the project"*. On the other hand, it is acknowledged that it is extremely important to thoroughly research and define the requirements. Programmer 3 adds *"extensive research through consultations, surveys, interviews with the targeted audience, elaboration of a detailed plan with realistic goals"* and more.
Which approach (top-down or bottom-up) to developing Smart City solutions do you find more appropriate and why?	On this issue, none of the respondents suggested a top-down approach. Two suggested that bottom-up approach was better while the other two considered the combination of these two approaches as ideal. Programmer 3, for example, states that *"a bottom-up approach might have been more successful because people are more interested in smaller projects whose benefits they can quickly see"*. Programmer 1 points out why he considers bottom-up as the only possible approach, since *"there is little support from the public management and therefore the only way for a society to develop is through own solutions"*. The other two developers consider that the combination of these two is a better case. As Programmer 2 says *"solutions are made at the level of individuals or companies, but with the prior consultation and support of the city."* Also, Programmer 4 points to a problem that may arise if the only bottom-up approach is used, and that is, *"that there will be many unrelated solutions and even a few that are the same because of non-communication and lack of planning"*.
Which features do you consider important for Smart City solutions to be accepted by end-users and why?	As the most important features of Smart City solutions, integration, and good functionality are listed. Programmer 3 states that *"this will stimulate users to really use the solution"*. Also, a great deal of emphasis is placed on the security and privacy levels provided by these solutions since it is clear that *"if someone thinks that the use and implementation of such solutions can undermine security or privacy to an extent, then this will result in negative attitude and failure to use."* Providing as much functionality as possible is extremely important to maximize the number of services in one interface. *"If the solution contains a small number of functionalities, then users will lose the habit of using it because the part performs 'smartly' and part in 'standard' mode",* Programmer 2 concludes.

carried out, with the purpose to examine their needs in a systemic way as well as to identify potential critical points to be addressed in the development process. It is clear that among end-users there are many different groups of users who have different affinities and motivation, therefore, proper sampling and robust analysis to identify these groups of users (by gender, age, abilities, etc.) and their perspectives are needed. Considering programmers' views, additional research should be conducted with those who have had more experience in the development of Smart City solutions. The purpose of further examination of the problems and issues they encountered would be to compile a set of guidelines and plans for devising and developing future Smart City solutions. It would facilitate the development path of new solutions and prevent the repetition of the same mistakes.

CONCLUSION

The Smart City concept has gained in popularity in recent years. Given the purpose and the focus of Smart City solutions, citizens today rightfully want easier and unobtrusive living in an urban environment they live in and expect that these solutions facilitate everyday activities and issues they face (administrative, traffic-related, ecological, energy-related and so on). To make this happen, Smart City solutions require a strong integration of information technologies into the organization of a city and everyday interaction with citizens. The development of such projects is extremely complex. As one of the main issues that are imposed from the outset is the connectivity of existing software platforms, which also implies sharing and using large amounts of data between these platforms. One of the possible solutions to the aforementioned problem is the use of web Application Programming Interfaces - APIs. Modern software platforms cannot perform well without the use of web APIs that enable easier data sharing and connections to other applications/platforms. It is important to note that it is easy to restrict the access/availability to certain data only so this can eventually be a very secure solution. The results indicate that end-users in a given context are less familiar with the concept and characteristics of Smart City solutions per se. However, they expressed the intention to use services that are often labeled as Smart City services. Furthermore, the research results suggest that a Smart City solution should be developed as the innovation platform by way of involving all stakeholders, whereby the most appropriate means for function and data exchange is by using web APIs. Consequently, most of the developed solutions should be made available to the public so that they can be upgraded and used to create new solutions, allowing data sharing and at the same time ensuring sensitive data protection.

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KEY TERMS AND DEFINITIONS

Application Programming Interface (API): A set of definitions that enable reuse of software code to control and enable access to hardware and software resources; in particular, a clearly defined method for one software program to interact with the other.

Open Innovation: A paradigm acknowledging and making use of in-house ideas as well as innovations from other businesses and the wider public to enable the flow of external knowledge into the organization which turns into projects in co-operation with external partners.

Open Source Software: A model of software licensing whereby access to the source code is without limitations, including the right to modify it by users. The costs of its deployment are lower than for proprietary software and due to the culture of collaborative development, the level of customization and quality is usually high.

Quadruple Helix: A model that emphasizes the interaction between four kinds of actors (Academia, Industry, State, and Media/Society) in the innovation-related processes.

Smart City: A city is considered smart if it has at least one running initiative targeting one of the six key areas (Smart Governance, Smart Economy, Smart Mobility, Smart Environment, Smart People, Smart Living).

Smart City Development Approach: Ranging from the public funding approach (also known as a top-down approach) to the market-oriented approach (also known as a bottom-up approach), city managers strategize in selecting the optimal and, frequently, a hybrid approach to suit the smart city context.

Web Service: A program whose interface and connectivity can be defined and described in a machine-processable format usually specified in Web Service Description Language. All web services are APIs. Advantages of using web services are interoperability, usability, reusability, deployability, and cost.

Chapter 4
Sustainable Supply Chain Management Based on Digital Platform

Katarzyna Nowicka
SGH Warsaw School of Economics, Poland

ABSTRACT

The aim of the chapter is to analyze transport management (mainly planning, but also monitoring and executing) of the international supply chains based on digital platform model. This case study analyzes platform that supports the information sharing on different modes of the transport available mainly within Europe area. It should be underlined that multimodal network accessed by the platform supports both sustainable transport development within the company and its supply chains and meets requirements of digital economy. This subject of analysis is part of the ChemMultimodal project implemented under Interreg Central Europe Programme between 2016 and 2019. The analyses are done on the case of chemical sector supply chain and its ability to response for challenges of sustainability within logistics activities. The developed platform (Intermodal Links) helped supply chains being more sustainable by supporting usage of multimodality and—as a consequence—decreasing CO_2 emissions caused by transport by more than 50%.

INTRODUCTION

Supply chains are driven by the demand and their management concentrates on planning and executing flows of the goods in the fastest and the cheapest possible manner. Each of the company belongs to several supply chains where they are supplier, customer or some other intermediary. All of those supply chains create a network of complicated flows of the information, goods and money. There used to be a conviction or even some authors proved that integrated supply chains based on collaboration and information sharing between each other are more competitive than others. However, today companies are facing different reality that is developed by digital economy. Digital economy changes all of the current rules not only in the area of technology, but also in terms of economy, regulations, policy, social,

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environmental or demographic aspects. At the same time digital economy creates the same conditions for all of the companies. It "supports" them by digital tools and "expects" to be used by them in the widespread manner. This situation covers also supply chains or better – demand networks. Therefore one can argue that today neither companies nor supply chains compete. The most sufficient solution seems to be a platform model. It connects directly all of the partners interested in concreate product flows management. The second important problem of competitive company management is its sustainable development. Sustainability means fulfilling economic goals of the company and being at the same time in line with natural environment and social development.

At the same time digital economy is starting to challenge supply chain managers in terms of sustainability, innovation and shorten lead times. This is due to the fact that digital economy and the digital technologies – that are the base for digital economy development – started to be a permanent element of business environment and customers expect companies to support their distribution and communication channels by the digital solutions (Nowicka, 2019).

One can admit, that nowadays managers have a possibility to use digital tools in different activities and business processes within the company and between them – for supply chains management purposes. However supply chain – as the 'megaprocess' – consists of many processes, sub-processes and interrelated activities. Therefore, due to its complexity, it still creates many challenges to gain competitive advantage by its proper management.

One of the most important process in the supply chain management is transport. Its importance is a result of the fact that decisions and their modifications (concerning i.e. modes of the transport) impacts on total costs of the supply chain and lead times – so two the most important criteria when diagnosing supply chain competitiveness (Nowicka, 2019). At the same time, transport management process within supply chain is supported by different types of tools helping managers to achieve supply chain goals to gain on competitiveness and/or sustainable development. However, transport operations are rarely indicated as those that add value to the company in the area of sustainability. This is mainly due to the fact, that the road transport is the most popular mode helping to achieve supply chain goals (i.e. improving flexibility, shortening time to market or decreasing costs).

All of the above circumstances are the reasons to study and develop transport management tools that are or will be able to support the increase use of environmental friendly transport modes – like railway or inland transport. However in most of the cases freight transport requires using different type of modes when delivering goods along one supply chain, especially when considering international trade. These complex multimodal connections can be planned in advance with the help of information and communication technologies (ICT) solutions, i.e. digital platforms. Some of such a platforms are available by the internet as an open access portals and can be used freely by any company. However they might be not sufficient for multimodal transport management – especially for the planning phase when managers are considering different scenarios of freight transport.

The aim of this chapter is to present the digital solution (the Intermodal Links Platform) for transport planning and improving usage of multimodality in transport activities. Today digital solutions can be considered as one of the most important factor impacting improvement of the supply chain sustainability by influencing on decisions within transport modes or any other processes or activities.

The chapter presents solution that was used and improved during the ChemMultimodal Project implementation. This platform helped to prepare several alternative scenarios of delivering chemical goods with usage of more sustainable transport modes. The project was developed under Interreg Central

Europe Programme between 2016 and 2019 and concentrated on analyzing multimodal solutions for decreasing of transport carbon footprint impact on natural environment.

BACKGROUND

Uncertainty is a defining feature of the current economic climate and this limits the ability to make clear and robust projections. However one can assume that, globally, demand for mobility will be growing over the next decades. According to OECD Transport Outlook 2019, global freight demand will triple between 2015 and 2050 based on the current demand pathway. At 4.5%, air freight is expected to have the highest compound annual growth rate of all modes through 2050, although representing a small share of total freight tonne-kilometres. More than three-quarters of all freight will continue to be carried by ships in 2050, more or less unchanged from 2015 (ITF, 2019). According to McKinnon (2019, pp. 5) freight transport is responsible for 8% and warehousing and terminals for 1-2% of global CO2 emissions. In contrast, ITF estimates that global freight transport accounts for 36% of the total transport CO2 emissions today. Those projections see its share of transport's carbon footprint increase to 48% by 2050. Road transport currently represents 18% of total freight activity and 57% of CO2 emissions related to freight. Its share of transport sector emissions is projected to grow from 20% to 24% by 2050 (ITF, 2019).

The freight sector is an important determinant for economic growth and road freight is a flexible way to deliver goods being a cost competitive solution to access most regions and addresses. Additionally it will probably remain an irreplaceable transport mode, particularly for last mile delivery (mainly in the challenging urban area).

Due to the above situation decarbonisation of freight transport – and decreasing road transport negative impact on natural environment started to be a subject of interest of many scientists and practitioners. For example, the Decarbonising Transport initiative was developed and led by the ITF that identified policies which are both cost-effective in mitigating the carbon footprint of road freight and improve the sector's operational efficiency. According to the results of the study conducted by this initiative, the main recommendations are the following:

- Broaden access to relevant data and improve their analytical uses for policies to decarbonise road freight transport.
- Scale up tested and low-barrier decarbonisation measures for road freight transport.
- Seek ways to overcome regulatory barriers to collaboration in the logistics sector.
- Demonstrate the business case for investing in decarbonisation measures.
- In the mid to long-term, mainstream the use of alternative fuels with ultra-low or zero CO2 emissions for road freight transport.
- Tailor decarbonising pathways to the economic and geographical realities of different country groups.

Additionally, according to ITF (2019), technological disruptions can lower freight-related CO2 emissions by 44% in 2050. However this projection is based on the results of analysis only a part of available solutions – namely: 3D printing, e-commerce, new international trade routes, autonomous trucks and high capacity vehicles. Also all of those solutions might solve particular problems that occurred in specific circumstances within particular supply chains. Similarly McKinnon pointed out that improve-

ment of 'material efficiency' reduces the amount of "stuff to be moved". The following activities or solutions might help to achieve this goal: Circular economy (increase recycling and remanufacturing); Digitization of physical products (convert freight consignments into electrons); Design products with less material (miniaturization, light weighting); 3D Printing (less material used and wasted, simplified supply chains) (McKinnon, 2019, pp. 23).

Additionally, to improve transport-intensity within supply chain the following steps can be taken (Christopher, 2016): review product design and bill of materials (materials characteristics, possibility to recycling or reuse); review sourcing strategy (especially low-cost country due to the distance); review transport options (choosing eco-friendly transport modes, design vehicles and vessels, etc.); improve transport utilization (empty loading spaces limitation); use postponement strategies (product customization can be finalized near point of use).

From the perspective of supply chain management there are different measures for energy reduction and decarburization within the transport and logistics activities and processes. Table 1 presents potential decarburization opportunities within the logistics and transport sectors (World Economic Forum, 2009).

According to Tavasszy and van Meijeren (2011) many of the initiatives mentioned in the Table 1 involve a rationalization of transport and supply chain processes. At the same time they can be a subject of holistic perspective when analyzing different scenarios of supply chain development – especially that part of the pointed in Table 1 opportunities interact between each other or are their consequences.

At the same time one of the goals of the White Paper delivered by the European Commission is that 30% of road freight transport over 300 km should shift to other modes such as rail or waterborne transport by 2030, and more than 50% by 2050 (European Commission, 2011, pp. 9).

Table 1. Effectiveness and feasibility of measures for emission reduction within the logistics and transport sector

Supply chain decarbonisation opportunities	Potential abatement mt CO2	Assessed index of feasibility
Clean Vehicle Technologies	175	High
Despeeding the Supply Chain	171	High
Enabling Low Carbon Sourcing: Agriculture	178	Medium
Optimised Networks	124	High
Energy Efficient Buildings	93	High
Packaging Design Initiatives	132	High
Enabling Low Carbon Sourcing: Manufacturing	152	Medium
Training and Communication	117	Medium
Modal Switches	115	Medium
Reverse Logistics / Recycling	84	Medium
Nearshoring	5	Medium
Increased Home Delivery	17	Medium
Reducing Congestion	26	Low

Source: (World Economic Forum, 2009).

All of the above circumstances and solutions lead to the conclusion that there is a need to reflect on ways to increase the use of multimodal solutions to manage supply chains geared to support sustainable development of the company.

SUPPLY CHAIN SUSTINABILITY BY MULTIMODAL TRANSPORT ACTIVITIES

As underlined, one of the most important trend influencing supply chain management was sustainable development in terms of fulfilling pro-ecology, pro-social and economic strategic objectives of the company. The main element of supply chain management directly impacting natural environment are transport activities. For one hand transport can play significant role in terms of achieving competitive advantage, for the other it rarely comes up against the objectives of sustainable development (Nowicka, 2017). Therefore there is a need to analyse usage of multimodal transport as a solution improving companies' impact on natural environment. Multimodal transport is a carriage of goods by two or more modes of transport UN/ECE, (2001). Its sustainability depends mainly on the level of the share of the eco-friendly transport modes. This means reduction of road transport in its current form when they emit high level of CO2.

According to the European Commission transport policy there is a need for reduction of road transport towards less polluting and more energy efficient modes of transport – namely multimodal transport. Therefore four types of actions support greater use of multimodal solutions should be implemented (European Commission, 2019):

1. The internalisation of external costs in all modes of transport, with a view to send appropriate pricing signals to users, operators and investors. The social and environmental costs of transport should be paid in line with the polluter pays principle.
2. More targeted investments into physical infrastructure, aimed at better interconnections between the single modal networks.
3. Better use of information (on traffic, capacities, availability of infrastructure, cargo and vehicle positioning).
4. Direct support for intermodal transport, as provided by the Combined Transport Directive (Council Directive 92/106/EEC), which aims to increase the competitiveness of the combined transport (defined as intermodal transport with a strictly limited road leg). The EU also provides financial support to multimodal/intermodal transport.

However, form the perspective of supply chain management, the usage of multimodal transport and increasing share of railway or inland transport is not always easy or even possible. There are several factors limiting the potential of shifting road transport to multimodal solution. The most important of them are described in Table 2.

All the described limitations of multimodality should be revised during the transport planning and routes within supply chains analyzing. When excluding all the obstacles for multimodal solution than the possible scenarios can be developed and built. During this process the new digital solutions might be helpful and shorten this phase of transport and supply chain management.

The modern solution that might strength the planning (but also the whole process of transport management) multimodal transport activities within supply chain are digital platforms. Platforms might col-

Table 2. Factors limiting the potential for modal shift

Factors	Description
Accessibility of transport modes	While each region is accessible by road transport, this is not the case for the other transport modes. These modes are only accessible through terminals. Depending on the existence of terminals near the origin and destination regions, other transport modes can be an attractive alternative for road transport (where pre- and end haulage by road is still necessary in most cases).
Transport distance	For intermodal transport, transshipment is necessary at terminals near the origin and destination regions. This transshipment requires additional handling and costs compared to direct road transport. On short distances, these additional costs of transshipment cannot be compensated for by lower transport costs; for longer distances, the transshipment costs can be compensated for by lower transport costs of rail, inland navigation and short sea. Per mode, a minimal transport distance in order to be able to compete with road transport has been determined: inland navigation 50 km, rail 250 km and short sea 350 km. We note that these distances may vary depending on the actual product and market environment.
Product characteristics	In logistics, product characteristics such as value density (value in euro per m3) and package density (number of packages per m3) are used to determine the important cost components within the total logistic costs. For freight flows with a relative low value density (less than 6000 euro per m3) and a relative low package density (less than 15 packages per m3) interest costs and handling costs are relatively low and transport costs are a more important factor in total logistic costs. For these commodities, transport modes with lower costs than road transport are an interesting alternative.
Size of shipment	The larger the size of the shipment, the higher the chance that transport modes will be chosen that can carry large volumes. Only shipments with a size above 1 tonne are considered to be interesting for rail, inland navigation or short sea. Note that this is a rather optimistic view, favouring the potential share of rail and waterways.
Speed	When goods have to be delivered in a very short time, in many cases, road transport is the best option. Therefore, for the potential of the other transport modes, only those shipments are considered that should be delivered in more than one day.

Source: (Tavasszy & van Meijeren, 2011).

lect and distribute large amount of data and information for sustainable transport management helping companies to build innovative supply chains. Platforms not only improve visibility of the flows but also might help to reduce risk within supply chains during the process of product distribution. It is especially important whenever any unexpected event happens during the process of transportation. Additionally multimodal platforms might easily help to analyze possibilities to shift road transport to multimodal solutions when companies are looking for supply chain sustainability improvement. One of the platform used for such an activities was Intermodal Links (www.intermodalplanner.eu) solution developed within ChemMultimodal Project.

THE CHEMMULTIMODAL PROJECT IDEA

The ChemMultimodal Project was implemented as the answer to the need for improving sustainability within supply chains in the chemical industry. The project was selected as one of 35 out of 620 all projects participating in the Interreg Central Europe Program competition in 2015. The main assumption of the Project was to achieve a 10% increase in the share of multimodal transport in the transport of goods in the chemical industry, with a simultaneous 5% reduction in CO2 emissions.

The main objective of the project was to promote the use of multimodal transport of chemical products. This was done through the coordination of activities between chemical producers, carriers, multimodal

logistics operators and public authorities in the Central Europe region. The implementation of this objective was based on a series of activities undertaken in several stages. The most important are the following:

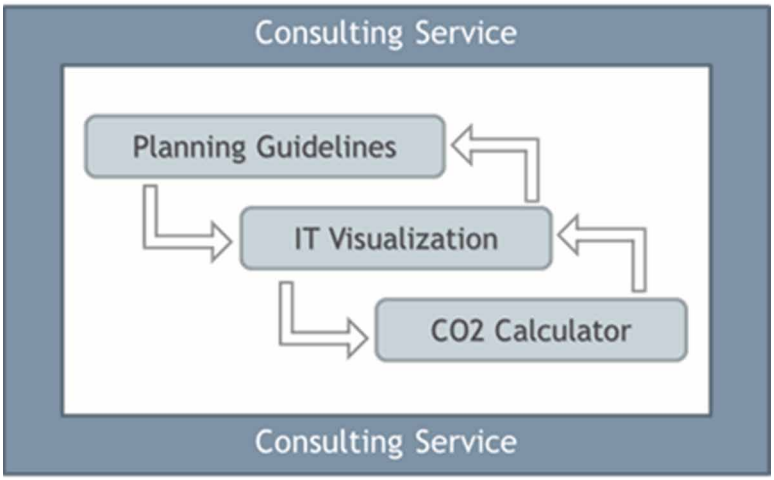
1. Identification of existing solutions regarding the flow of chemical industry goods in Central Europe. The aim of this stage was to identify existing barriers and the so-called "Bottlenecks" limiting the development of multimodal transport within supply chains in chemical industry.
2. Creation of a dedicated tool to increase the use of multimodal transport in the chemical industry in Central Europe or in the wider area. One of the element introduced within developed tool is an Intermodal Link platform that is a subject of further analysis of this chapter.
3. Building a set of recommendations against the possibility of providing new (also regular) connections for helping chemical industry with developing usage of multimodal transport in their supply chains.
4. Building awareness of the potential and role of multimodal transport in the chemical industry in Poland (and in the region) in terms of sustainability.

The ChemMultimodal Project presents a systemic approach to manage sustainable transport activities on a global scale. This is because it consists of four elements which complement each other to provide comprehensive solution – the toolbox – based on cooperation between partners in the supply chain. As underlined, the toolbox consists of four elements (consulting services, planning guidelines, Intermodal Links platform and CO2 emission calculator) and has been tested by each of the project's partners with chemical companies in the partner countries to facilitate real modal shift (Nowicka, in press). The toolbox elements and interrelation between them are presented on Figure 1.

The main elements of the toolbox are the following:

- **Consulting Service** for chemical companies to improve multimodal transport serves as a moderating framework for hosting workshops, bilateral meetings while discussing the potential to shift unimodal transport to multimodal. The aim is to establish bilateral cooperation and to develop a

Figure 1. ChemMultimodal Toolbox elements
Source: (Moritz, 2017).



database of contacts generated throughout the project. The main role of the project partners is providing information, engaging in discussion, facilitation of cooperation and networking between companies and logistics service providers.

- **Planning Guidelines** for increasing multimodal transport are established to capture necessary transport facts. The planning guidelines serve as an output sheet whereby most important indicators related to multimodal transport are gathered. Such indicators are:
  - Product type to receive information about the products characteristics,
  - Volume to estimate if intermodal transport poses a suitable alternative way of transport,
  - Countries crossed along the route with respective driving and loading regulations,
  - Bundling options to achieve a more efficient use of capacities and
  - The number of transport units. This number is based on the volumes (tons or liters) foreseen for the transport.
- **CO2 emission calculator** was developed based on activity-based method. It is useful for both, chemical companies and logistics operators, and provides the one-click calculation of CO2 emissions of intermodal connections from the place of origin to the cargo destination with possibility to define freight characteristics. The value of CO2 emissions is based on average emission factors (ifsl50.mb.uni-magdeburg.de/chemmultimodal/).
- **Intermodal Links Planner** that allows the visualization of existing multimodal transport routes and provides information about frequency of departures, availability of Logistics Service Providers and terminal operators, arranged feed, delivery of transports to and from different terminals. It fulfils the core requirements like European wide availability, high topicality of the routes and connections and integration of different transport modes (intermodallinks.com/GetAccess).

The project covered territories of Germany (Eastern part), Poland, the Czech Republic, Slovakia, Hungary, Austria and Northern part of Italy. Poland was represented in the project by two partners – SGH Warsaw School of Economics and the Polish Chamber of Chemical Industry. The ChemMultimodal project was implemented between June 2016 and May 2019 and was co-financed from the European Regional Development Fund (Interreg Central Europe Programme).

INTERMODAL LINKS PLANNER PLATFORM FOR SUSTAINABLE SUPPLY CHAINS DEVELOPMENT

The Intermodal Links platform has been developed to offer point-to-point multimodal solutions across Europe and adjacent regions. There are more than 18 000 direct connections offered by different providers in the system, 90% of them are the services supported by 50 largest transport operators (30 largest operators represent 75% of the direct connections and 10 largest operators – 44% of them). The connections by transport modes are shared between short-sea or ferry (48% of connections), railway (32%) and barge (20%). Information shared on the platform covered the connections with 1100 intermodal terminals and included information on logistics infrastructure from 56 countries (Bozuwa, 2018). It must be underlined that the platform constantly introduces new transport and logistics partners and their connections that allows supply chain mangers having a tool with updated information on current options for transport planning and management.

This tool is insightful and is based on tailor-made analytics strongly supporting modal shift strategies. It must be also underlined that this solution is free of charge and can be used for checking available solutions within European transport infrastructure and for building alternative scenarios of road transport and planning sustainable solutions (Bozuwa, 2018). Figure 2 presents the example of Intermodal Links features for transport planning and sustainable supply chain scenarios building.

Based on the Intermodal Links Planner platform partners cooperating within ChemMultimodal Project analyzed several road transport solutions that had a potential for shifting on multimodal scenarios in chemical industry in Europe. For example, there were several routes recognized and effectively shifted from road to multimodal (mainly rail, but also short-sea) transport within supply chains of companies located in Poland. In the first step the CO2 emission was calculated for road transport of each of the diagnosed routes. Next the new – multimodal scenarios were built to introduce more eco-friendly solutions for the same routes (destinations). Then the shift from road to multimodal transport was made in each of the supply chain of the companies that took part in the project.

After modal shifts have been carried out within the ChemMultimodal project pilots' phase, the CO2 emissions were calculated for each of the route to compare road and multimodal transport emissions. It should be noted that even when the distance is not that long (350 km), CO2 emission decreased dramatically – more than 53%. The higher railway share in multimodal transport, the lower CO2 emission was produced (Cichosz, Nowicka & Ocicka, 2020). The detailed CO2 emission reduction and tested routes details are presented in Table 3.

One can observe that there were at least 38% CO2 emission reduction after the modes were changed. The solution proves that supply chain sustainability can be easily introduced or improved within companies without high expert knowledge or costs. It can also be a good base for building different scenarios when introducing new destinations or revising cooperation with current business partners. The results achieved within the project were based firstly on the analyzing different routes in supply chains scenarios developed in Intermodal Links Planner. In connection with CO2 emission calculation managers can easily estimate their new sustainable supply chains scenarios and impact on natural environment even without particular tests.

Figure 2. Intermodal Links Planner platform for sustainable supply chain management
Source: (www.intermodalplanner.eu)

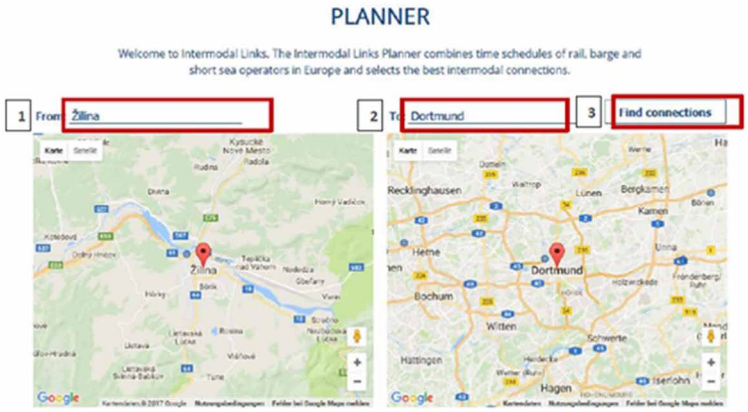


Table 3. Impact of modal shift on CO2 emission reduction

Route no.	Shipped materials or goods	Quantity (per month)	Road transport destinations and distance (in km)	CO2 emitted by road transport (per month)	Modal split (in %)	CO2 emitted by multimodal transport (per month)	CO2 reduction after transport mode shift
1	Plastic & rubber	22 800 t	Poland – Espania 2400 km	3 392,6 t	Short-sea (87%) Rail (12%) Road (1%)	1 892,8 t	1 499,8 t (44,2%)
2	Raw materials	125 t	The Nederland – Poland 1172,5 km	9 t	Rail (93,5%) Road (6,5%)	3 t	6 t (59,7%)
3	Raw materials	900 t	Loading and unloading in Poland 651 km	36,3 t	Rail (59%) Road (41%)	22,3 t	14,1 t (38,7%)
4	Raw materials	100 t	Loading and unloading in Poland 349 km	2,2 t	Rail (83%) Road (17%)	0,99 t	1,2 t (53,9%)
5	Raw materials	360 t	Great Britain – Poland 1 842 km	41,1 t	Rail (66%) Road (28%) Short-sea (6%)	21 t	20 t (48,9%)

Source: (Cichosz, Nowicka & Ocicka, 2020).

SOLUTIONS AND RECOMMENDATIONS

The presented solution shows some practical aspects – like circumstances – when multimodal transport impacting directly on pollution might help managers building more sustainable supply chains. However it should be underlined that as long as the cost and lead time will be a driver for gaining competitive advantage, the sustainability might be only for chosen ones or will be rather wishful thinking than business reality. Therefore there is a need to start changing the policy, regulations and law for transport management – in similar manner as it concerns production activities of the companies.

FUTURE RESEARCH DIRECTIONS

The future research directions should concentrate on possibilities to develop and implement integrated regional, international or global platform helping with transport or even supply chain management. However, as the technical solution should not be a case, there might be significant problem with information sharing between supply chain partners, Logistics Service Providers or transport operators. Who are currently not willing to share much of their solutions in the open access model. This situation will probably generate the main obstacle in developing and creating sustainable value in the global economy.

CONCLUSION

If the company strives to achieve consistency on operational, tactical and strategical level in terms of sustainable strategy implementation it should revise introduction of ecological transport modes into the supply chain. One of the solution meeting the needs of enhancement of ecological sustainability is multimodal transport development. The complex multimodal connections can be planned in advance with the help of platforms. Some of such a platforms are available in the internet as an open access portals. One of them that was developed and improved for ChemMultimodal Project was Intermodal Links Planner platform. ChemMultimodal Project results indicate that such a platform might strongly support supply chain management in terms of sustainability. It can help reducing CO2 emissions in transport activities by the support in building alternative scenarios limiting the use of road transport for multimodal solutions.

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Chapter 5
Industry 4.0 and Sustainability

Sibel Yildiz Çankaya
Bolu Abant Izzet Baysal University, Turkey

Bülent Sezen
Gebze Technical University, Turkey

ABSTRACT

Modern industry developed over several centuries and three industrial revolutions. Today, we experience the fourth era of the industrial revolution, Industry 4.0. The advance of industrialization brought along many problems, including environmental pollution, global warming, and depletion of natural resources. As a result, the concept of sustainability began to gain importance. Sustainability can be achieved through a balance between economic, social, and environmental processes. In order to establish such balance, businesses need new business models or insights. At this point, Industry 4.0 can be regarded as a new business mindset that will help businesses and communities move towards sustainable development. The technologies used by Industry 4.0 bear a strong promise to solve these problems, after all. Even though Industry 4.0 attracts a lot of attention lately, few works are available on its impact on sustainability. This chapter examines the impact of Industry 4.0 on sustainability.

INTRODUCTION

The first industrial revolution brought many dramatic changes in our world and our lives. As a result of industrialization, urban populations increased and living conditions improved. Industrial production, which expanded with increasing population, brought along some environmental issues over the centuries. The most important issues probably include the pollution of the natural environment, the depletion of natural resources, and global warming. As these issues deepened, the emerging concept of sustainability began to gain importance. Sustainability is defined "meeting today's needs without compromising the ability of future generations to meet theirs" (Brundtland, 1987). This definition has three dimensions: social, economic, and environmental.

Sustainability in an enterprise requires sustainable processes throughout the value chain, from product design and processing of raw materials to recycling. As this does not entail a simple transformation,

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businesses need new business models or insights to implement this. At this point, Industry 4.0 can be considered a new business mindset that will help businesses and communities move towards a sustainable development (Luthra & Mangla, 2018).

Industry 4.0 refers to smart factories with machines and production modules capable of communicating with each other and a high degree of automation in the industry, changing the way things work. The aim of this revolution is to provide flexible, fast, and personalized production, as well as efficiency in resource use. With Industry 4.0, production time and cost are expected to decrease, while production quantity and quality are expected to increase.

Industry 4.0 recently started to attract a lot of attention and there are not many studies yet on its possible effects on sustainability. However, Industry 4.0 has tremendous potential for the creation of sustainable industries (Kamble, Gunasekaran, & Gawankar, 2018). With smart devices and a smart production system, Industry 4.0 can contribute to improved sustainability by reducing overproduction, material waste, and energy consumption (Branke, Farid, & Shah, 2016; Waibel, Steenkamp, Moloko, & Oosthuizen, 2017; Wagner, Herrmann, & Thiede, 2017). For example, energy consumption (water, electricity, gas, etc.) can be monitored and optimized thanks to new energy management techniques Industry 4.0 supports (Ding, 2018). However, enterprises have difficulties with the disposal of ever-increasing amounts of waste, especially when it comes to keeping control over dangerous chemical waste in developing countries, where accidents are not infrequent. The technologies of Industry 4.0 make waste control and monitoring more effective. Moreover, with automation Industry 4.0 minimizes human errors and maximizes efficiency and quality in production (Ding, 2018). It also helps reduce uncertainty by ensuring that accurate information is transmitted full-time among the members of a supply chain. This data transparency improves accuracy in delivery and reduces waiting time. With respect to Industry 4.0, the aforementioned energy savings, resource efficiency, waste control, and improved delivery are important for both economic and environmental sustainability. Regarding the social dimension of Industry 4.0, several benefits for employees can be listed, including enhanced human learning through intelligent assistance systems or human-machine interfaces. This may help increase employee satisfaction (Herrmann, Schmidt, Kurle, Blume, & Thiede, 2014). Moreover, assigning smart devices and robots to ergonomically unfavorable and physically demanding workstations can provide significant improvement in employee health (Hirsch-Kreinsen, 2014). However, the current literature cannot provide a common perspective on whether Industry 4.0 will increase or decrease the number of employees in industry. While simple tasks are expected to disappear with Industry 4.0, tasks such as monitoring, collaboration, and training are still considered necessary (Kiel, Müller, Arnold, & Voigt, 2017).

In short, Industry 4.0 is expected to transform industrial production, as well as the structure of society with its economic, ecological, and social achievements (Kiel et al., 2017; Herrmann et al., 2014). However, as mentioned before, studies in this field are yet few. Industry managers need to achieve a better comprehension of the possible effects of Industry 4.0 on sustainability, if they aim to gain a better edge. Therefore, this study discusses the effects of Industry 4.0 on sustainability. First, it explains on the concept of sustainability, then expands on the concept of Industry 4.0, and finally discusses the effects of Industry 4.0 on sustainability.

BACKGROUND

Sustainability

As the impact of human activities and especially industry deepened, environmental problems became the subject of widespread and intensive debate. Global warming, ozone depletion, and the decrease in natural resources and biodiversity are the major environmental problems. These are not restricted to a local or regional scale, but their impact is global. Therefore, communities, governments, and businesses must act to achieve economic and social goals without harming the environment, i.e. to achieve a balanced growth (Eltayeb & Zailani, 2009). This urgency turned the issue of sustainability into an area of interest for governments on the one hand, and academicians and practitioners on the other, for this issue encompasses the themes of environment, profitability, and human elements, after all. Especially since the 1987 Brudtland Report, sustainable development and sustainability are increasingly incorporated into institutional strategies and government policies. The Brundtland Report defines sustainability as meeting the needs of the current generations without compromising the ability of future generations to meet their own needs. This definition has three dimensions: social, economic, and environmental (Brundtland, 1987).

Environmental sustainability relates to the environmental impact of organizational activities. The sources of environmental problems (such as production, transportation, supply, and product) need to be identified in order to develop a better understanding of the fundamental environmental problems and devise effective solutions. Industrial businesses consume limited resources and at the same time produce waste that causes environmental pollution. Therefore, the effects of the product on the entire supply chain should be considered with a life-cycle approach (Azapagic, 2003).

Economic sustainability is attained when businesses do not cause any harm for the natural or social environment they operate in while pursuing their goals of profit. After all, the heart of sustainable development is the economic aspect of the business which generates profit, creates jobs, and contributes to social welfare in general. Therefore, enterprises face two types of issues: micro and macro. The issues at the micro level include ordinary financial metrics such as shareholder value, turnover, profit, cash flow and sales, which are directly related to the economic performance of the business. Macro-level issues, on the other hand, are generally related to that business's contribution to employment and the GDP (Azapagic, 2003).

Social sustainability is to "ensure efficient use of natural resources today and in the future through developing and preserving the social environment that will support human needs and environmental sustainability" (Buckingham-Hatfield & Evans, 1996). Social sustainability concerns the responsibility of the business for the whole community, both now and in the future.

INDUSTRY 4.0

Four different industrial revolutions took place in history. The first industrial revolution, now referred to as Industry 1.0, began in England, then spread to continental Europe and to the rest of the world. In this era, machines powered with water and steam energy increasingly became dominant in production. As the steam engine became actively involved in the production processes, economies formerly based on agriculture and crafts turned towards an industrial basis. With all the changes this brought about,

Industry 1.0 is seen as a breaking point in history. Industry 2.0 refers to switching to the use of electrical energy in industrial processes and the mass production as a result of Henry Ford's assembly line based on a conveyor belt system. Industry 3.0 refers to moving towards a technology-intensive system in production and work in general. As for the fourth industrial revolution, according to researchers the internet of objects based on cyber-physical systems is the driving force of Industry 4.0 (Lin, Shyu, & Ding, 2017).

Industry 4.0, which was first introduced at the Hannover Fair in Germany in 2011, ushers in a new era with fundamental changes in industries, labor use, and production processes. It refers to smart factories with a fundamentally different way of work and production, a high degree of automation, and machines and production modules capable of communicating with each other. Industry 4.0 is the process of digitizing the entire value chain. In this industrial revolution, people, objects, and systems can be interconnected through a real-time data exchange. Moreover, machines and devices with artificial intelligence (AI) can learn on their own and adapt to changes (Hecklau, Galeitzke, Flachs, & Kohl, 2016). In this era, physical processes involved in production can be monitored, a 'digital twin' (or, 'cyber-twin') of the physical world can be created, and intelligent decisions can be made through real-time communication and collaboration with people, machines, and sensors. In short, production systems are smarter in Industry 4.0 (Zhong, Xu, Klotz, & Newman, 2017). The main purpose of the Industry 4.0 process is to ensure the emergence of Smart or Dark Factories.

Some of the key features can be listed as follows and are often used to describe smart factories in Industry 4.0 (Lin et al., 2017; Bonilla, Silva, Silva, Gonçalves, & Sacomano, 2018):

- Interoperability: machines, devices, sensors, and people can communicate with each other and work together.
- Virtualization: a virtual copy of the physical world can be created based on information from sensor data.
- Technical assistance: systems have the ability to support people in the processes of decision making and problem solving, as well as undertaking the tasks that are too hard or dangerous for humans.
- Decentralized decision making: cyber physical systems have the ability to make simple decisions on their own and to act as autonomously as possible.
- Real-time data acquisition: systems have the ability to collect, process, and communicate data in real time. This will allow rapid adaptation to changes.

Industry 4.0 significantly impacts the production environment by bringing fundamental changes to operations. Unlike the traditional predictive production planning, Industry 4.0 enables real-time production plans. With the development of intelligent machines, intelligent storage systems and intelligent production facilities, an integration based on end-to-end information and communication systems can be possible throughout the supply chain from logistics to production and marketing (Sanders, Elangeswaran, & Wulfsberg, 2016). In summary, with Industry 4.0 makes faster, more flexible and more efficient production processes possible, not to mention the higher product quality at a lower cost.

The following section describes some concepts/technologies related to Industry 4.0. They are also referred to as the components of Industry 4.0 in some sources: Cyber Physical Systems, the Internet of Things, Cloud Computing, Big Data, Autonomous Robots, Simulation, Augmented Reality, and 3D Printing. Even though these technologies actually emerged during the Industry 3.0 era, their development still continues.

The Components of Industry 4.0

Cyber-Physical Systems (CPS)

Cyber-physical systems (CPS) are the structures that involve communication and coordination between the physical and cyber worlds. This concept allows the synchronization of information about a physical workshop and a virtual computational space. They are defined as systems that integrate many processes such as production, distribution, and procurement of factories by creating a digital network structure. This ensures efficiency, transparency, traceability, and controllability of the production process (Hofmann & Rüsch, 2017). Furthermore, it creates intelligent systems (smart factories, houses, cities, etc.) by enabling objects to communicate with one another through the internet and makes it possible to obtain and analyze data.

The Internet of Things (IoT)

As a newly developing and rapidly growing technology, IoT receives great attention worldwide. The Internet of Things is defined as "the network system of devices, machines, vehicles, buildings, and various objects to collect and distribute data, and to communicate." IoT can be seen as a technological revolution in computing and communication. This concept refers to a structure in which objects around us can connect to the Internet and communicate with each other without human intervention (Perera, Liu, & Jayawardena, 2015). In addition to communicating with other objects, they can also use the data other objects generate. Objects and sensors communicate over a wireless network connection such as RFID, NFC, Wi-Fi, Bluetooth, or Zigbee.

The Internet of Things can enable data collection from any point in living and working areas. Sensors in the network monitor the conditions of quantity, position, vibration, motion, speed, temperature, pressure, humidity, etc. and communicate the digital results they obtain to relevant points. Clearly, IoT has a broad area of use for businesses. In some businesses, activities such as lighting, heating, machining, robotic vacuums and remote monitoring are performed by IoT (Zhong et al., 2017). Intelligent objects equipped with IoT can provide managers with the necessary data on all processes and situations (from stocks to costs) by monitoring the conditions required for factory production. And outside the business environment, IoT finds many uses in environmental monitoring, object tracking, traffic management, healthcare, and smart home technology (Hong et al., 2014).

Cloud Computing

Cloud computing is a new model that provides access to data storage and software applications over the Internet (Mohlameane & Ruxwana, 2014). Today, businesses have to work with large amounts of data from many different sources. Cloud computing makes it possible for them to store these large volumes of data even on low-capacity devices. The cloud where the data is stored can be accessed from any device and location, such as mobile phones, tablets, or computers, as long as they are connected to the Internet. Through cloud computing, users can share information and run applications or programs over the Internet. Cloud computing system provides users as a single server by combining the servers in different physical locations via the Internet (Kumar & Vidhyalakshmi, 2012). Also, when using cloud computing, there is no need to install software on each computer.

Big Data

Big data is characterized by high levels of volume (amount of data), variety (number of types), and velocity (speed). Thanks to technologies such as the Internet and IoT, a lot of data is now available, resulting in large data stacks. These data are obtained from a variety of sources, such as sensors, devices, networks, logfiles, transactional applications, the Web, and social media (Zhong et al., 2017). The data collected from these different sources is not only in large amounts, but also of complex quality. Conventional methods of data analysis are therefore inadequate to handle such data. Therefore, big data approaches are needed to analyze and manage these data in a more efficient and effective way. Big data can meet different requirements, in particular combining multiple irrelevant data sets, processing large amounts of unstructured data, and collecting information in a time-sensitive manner. As a result, big data emerged to meet the needs of analyzing, querying, and storing data in order to make better decisions (Song et al., 2017).

3D Printing and Additive Manufacturing (AM)

Additive manufacturing, also known as 3D printing technology, attracts increasing attention in several industries. Processing techniques such as cutting, drilling, grinding, and sanding, which are used in traditional manufacturing processes, are called 'subtractive manufacturing' because they are based on the method of dismantling parts and components. These parts and components are then combined to form the final products. In contrast, 3D printing creates the final products by forming consecutive layers of material. Therefore, it is called 'additive manufacturing.' In this method, since the product is produced in layers, there is no need to assemble parts and components. AM uses computer-aided design software to create a digital model first. The 3D printer then proceeds to create a three-dimensional object from the raw material in the form of a liquid or particle. At this stage, thin layers of raw material are deposited microscopically by the printer. The final product is completed by releasing successive layers (Kamble et al., 2018).

Additive manufacturing possibly has three main advantages over traditional production. Firstly, this method eliminates the constraints of traditional production and brings a freedom of design for innovative products (Tang, Mak, & Zhao, 2016). Secondly, AM's benefits such as reduced transport distances and inventories allow enterprises to increase their margin (Kamble et al., 2018). And thirdly, AM technologies have great potential to reduce the environmental impacts of traditional production (Tang et al., 2016). However, the fact that 3D printers allow the use of only a limited number of material types is one of the challenges of this technology (Kamble et al., 2018).

Autonomous Robots

The term robot is used to for machines or devices which are usually made of metal, in various forms, including that of the human, and are capable of doing the work of humans. Today, robots have an indispensible role in modern production. They have a significant contribution to high productivity by reducing labor costs and improving product quality (Bi et al., 2015).

Robots can be connected to an operator, as well as functioning completely without operator intervention. Those in this second group, i.e. the robots operating independently of the operator are called autonomous robots. They can also be classified as semi-autonomous or fully autonomous, depending

on their degree of operator-independent functioning. From the robot's point of view, the concept of autonomy means the ability of the intelligent and communicable machine to make its own decisions and to translate them into action through an embedded artificial intelligence application. Before Industry 4.0, robots were already in use for a long time to perform complex tasks in a variety of industry sectors. But today, they are increasingly autonomous, flexible, and collaborative. Even autonomous robots can interact with each other, work and learn side-by-side with people. Therefore, it can be said that these autonomous robots are much more capable those used in the past (Rüßmann et al., 2015).

It is thought that robots will perform tasks such as weight lifting, storage, transportation, or sensitive/dangerous tasks for humans and also perform them in more effectively and efficient ways than humans. Robots communicate with each other through a wireless network while performing the tasks assigned to them. The main objective is to enable people to communicate with robots and work in harmony.

Simulation

Simulation can be defined as the visualization of elements of the physical world in a digital environment. Simulation technologies are already in use for long to make future predictions and perform sensitive vocational training. They are also used in the designing stage of a product. However, in the future, simulations are expected to be used more widely in business operations. These simulations will be able to represent machines, products, and people in real time in a virtual model. This will allow operators to test applications first in the virtual world. For example, the operator can test machine settings for the next product. This can reduce machine installation times and improve quality (Rüßmann et al., 2015).

Augmented Reality (AR)

Augmented Reality is another technology that recently attracted attention with its applications in various sectors including education and entertainment. Augmented reality is a live environment where objects are augmented by computer-generated sensory input, such as sound, graphics, video, or GPS data (Jeong & Yoon, 2017). It can also be defined as the change and augmentation of the reality that users feel. This technology extends people's perceptual experiences in a variety of ways, blurring the distinction between real-world objects or environments and computer-generated virtual environments (Jeong & Yoon, 2017).

IMPLICATIONS OF INDUSTRY 4.0 ON SUSTAINABILITY

Environmental Sustainability

Manufacturing plays an indispensable role for economies, however, the further it developed, the faster became the depletion of natural resources and the more severe the environmental pollution. Components of Industry 4.0, such as IoT and robots, show great promise for solving these problems. Industry 4.0 contributes to the development of environmental sustainability by providing benefits in many areas from waste to resource management.

Waste Management

Waste management consists of different processes such as collection, transportation, processing, disposal, management, and monitoring of waste materials. Failure to perform these processes effectively both causes pollution and increases the costs (Perera, Zaslavsky, Christen, & Georgakopoulos, 2014). For example, the lack of a good waste collection system brings about serious environmental hazards and significantly cost increases. The decomposition of the waste, which is not collected in time causes the growth of bacteria and viruses and adversely affects public health (Dugdhe, Shelar, Jire, & Apte, 2016). Researchers and practitioners mention that IoT, one of the components of Industry 4.0, can be applied effectively in waste management (Hong et al., 2014). For example, efficient garbage collection planning can be achieved through smart garbage cans which notify cleaning staff when full (Perera et al., 2015). Hong et al. (2014) proposed the IoT-based smart garbage system. The authors state that the system proposed is not only for reducing food waste, but also helps governments save from costs, as well (Hong et al., 2014).

IoT technology also facilitates reverse logistics applications. One of the most difficult features of reverse logistics applications is the uncertainty about the quantity of products to be returned. Especially through the IoT installed in electrical and electronic products, businesses can collect all the information they need including initial installation, maintenance, repair, and disposal. As a result, it will be easier to identify and recycle end-of-life products with IoT. In this way, recycling companies will be able to estimate and monitor the amount of waste to be delivered to their facilities (Perera et al., 2014). One other technology that can help with waste management is AM, which produces less waste compared to conventional production (Huang et al., 2016).

Efficiency of Energy and Resources

As a result of problems such as increasing energy costs and global warming, energy consumption is at the center of much discussion in recent years. Businesses and governments in particular are looking for ways to use energy and resources in a more efficient and sustainable way. For efficient energy management, it is necessary to access and analyze energy data in real time (Tan, Ng, & Low, 2017). The components of Industry 4.0 have the potential to help businesses and governments in this respect. For example, by developing an intelligent street lighting solution using the Internet of Things, the right lighting level can be achieved (taking into account the city, time of day, season or weather), thus the amount of energy used for lighting can be reduced (Perera et al., 2015). Similarly, this technology can be used to save energy in indoor lighting and heating (Tao, Wang, Zuo, Yang, & Zhang, 2016).

In terms of enterprises, energy parameters in the production process can be monitored in real time thanks to raw materials, components, machinery, products and facilities equipped with IoT technology (Tao et al., 2016). This helps businesses find the best solutions to save energy by making it possible to monitor not only the total energy consumption, but the individual energy consumption of all items in the production process, as well. There are two other Industry 4.0 components that work together with IoT: cloud computing and big data. As mentioned earlier, the use of intelligent meters and sensors allows remote monitoring of energy consumption data in factories and cities. Large amounts of data collected from these meters and sensors can be stored in the cloud (Shrouf, Ordieres, & Miragliatta, 2014). In addition, intelligent techniques and algorithms are required to analyze this data stored in the cloud. For example, deep learning algorithms can be used to efficiently analyze large data generated by a large

number of devices (Mehmood et al., 2017). In this way, policies can be formed to optimize resource and energy use.

In addition to the ability of storing large amounts of data from IoT technologies, cloud computing decreases hardware use (Issa, Chang, & Issa, 2010). because businesses or individuals using cloud computing do not need frequent hardware updates and can use their devices for many years (Namboodiri, 2010). This will ensure both the efficient use of resources and the reduction of waste.

Robots are another component of Industry 4.0 that enables efficient use of resources. They ensure efficient material use by performing the job without errors. Furthermore, compared to humans, robots can further reduce raw material consumption and waste. Despite these positive characteristics, some robots need a lot of energy for operation and release greenhouse gas emissions if they are powered by non-renewable energy (Pan, Linner, Pan, Cheng, & Bock, 2018. Another technology that affects environmental sustainability is AM. Important criteria for environmental sustainability of the production process are the use of energy and materials, product life, waste, recycling, part consolidation and process optimization. Therefore, the sustainability of the production process is largely based on the working principle. Conventional manufacturing is subject to some difficulties and constraints as it is based on subtractive manufacturing. In addition, subtractive manufacturing causes large amounts of waste during production (Ahn, 2016). Unlike subtractive manufacturing, AM, the additive manufacturing contributes positively to the development of environmental sustainability by increasing material and energy efficiency, reducing life-cycle effects, and providing greater functionality in the field of engineering compared to traditional manufacturing. For example, the aircraft industry can improve fuel efficiency by producing some components (such as seat buckles) that can reduce the aircraft mass with AM (Huang et al., 2016).

Reducing Pollution

As mentioned before, data are collected from many different sources today. Therefore, big data approaches are needed to analyze and manage data in more efficient and effective ways. Big data can help develop policies in many areas such as minimizing soil erosion, preventing/reducing water, air and soil pollution, climate change, and more efficient use of resources (Song et al., 2017). For instance, farmers can use fertilizer more efficiently by collecting data on the nutritional needs of their fields. In this way, fertilizer is used only in amounts that can be absorbed by crops and the risk of polluting water with excess fertilized is eliminated (Wu, Guo, Li, & Zeng, 2016). By appropriately collecting and using large data, analysts can identify the relationships between them. Then, by analyzing the causality between these data, accurate estimates can be made (Song et al., 2017). In this way, big data can help scientists, policy makers, and city planners to develop environmental policies and strategies.

Robots, which are widely used in many fields, also play an effective role in reducing environmental pollution. For example, they make sure chemicals are applied in the exact amounts required and thus fewer pollutants are released into the environment (Comba, Gay, Piccarolo, & Ricauda Aimonino, 2010). AM, another technology, shortens transportation distances by bringing production and consumption points close to each other. In conclusion, the positive effects of Industry 4.0 on environmental sustainability can be summarized as follows (Bonilla et al., 2018):

- Resource efficiency
- Efficient use of materials, water, and energy
- Use of renewable energy

- Compliance with environmental strategies/standards
- Reliability of environmental cost accounting
- Development of innovative environmental policies
- Reduction of environmental impact
- Reduction of waste and greenhouse gas emissions

Social Sustainability

Industry 4.0 can contribute to the development of social sustainability by bringing benefits in many areas, such as community health and well-being. For example, a lot of research is made to develop technologies to complement and reinforce existing healthcare services. Implementation of IoT in the field of healthcare, in particular, can provide many conveniences. An IoT-based healthcare system enables all the resources needed to perform activities such as diagnostics, monitoring, and remote surgeries over the Internet. Thus, health services can be extended from hospitals to homes (Yin, Zeng, Chen, & Fan, 2016). In addition, people's health status can be monitored instantly through wearable sensors. In this way, a reliable, effective and intelligent health service can be provided to the elderly or people with chronic diseases (Yin et al., 2016). As this system can collect all the data needed, an effective healthcare system can be easily developed.

In summary, the use of IoT technologies in the field of healthcare can provide the elderly a safer and more independent lifestyle. Moreover, the installation of smart systems in buildings can help reduce the risk of disasters, such as fire, through an early warning system, increase the comfort levels of individuals living in smart cities, and make daily activities much easier. IoT installed in buildings or bridges can also instantly analyze the possible effects of earthquakes on buildings. Similarly, landslides and forest fires can be monitored, not to mention the possibility of monitoring the quality of air and water with IoT. This data from IoT can be stored in the cloud, allowing new decisions or practices to be implemented to improve human well-being. For instance, new applications can be developed in areas such as air, water, and noise pollution, safety, population movements, traffic or healthcare.

Just like IoT and Cloud Computing, robots are also used in healthcare services in addition to many other systems. For instance, magnetic microbots remove plaque from a patient's arteries or robots such as the Bestic arm help patients eat or regain the ability to walk. Moreover, considering the fact that the population is aging, robots are likely to play a part in the care of the elderly and patients. This is because robots are cheaper to maintain, not bored of repetitive work, do not need to rest and can be trained faster than humans. As a result, they can help nurses provide a better healthcare (Qureshi & Sajjad, 2014). In fact, robots already help employees in many industries. In particular, they have a positive impact on the well-being of employees by performing dangerous, monotonous, unreasonable, and dirty tasks more efficiently and accurately. They contribute to the reduction of the incidences of injury and death in the workplace (Pan et al., 2018). Similarly, augmented reality (AR) applications prevent employees from facing any risk or danger in performing critical tasks.

Another technology that can contribute to social sustainability is big data. Studies in this area indicate that big data can be used to predict natural disasters such as earthquakes and tsunami. Moreover, big data helps with predictions about the melting of glaciers, deforestation, and extreme hot or cold weather through the use of satellite images, meteorological radars and terrestrial monitoring devices. Big data is also used in the field of human health. The sum of data on patient health and well-being constitutes the largest data in the health sector. By analyzing these data, chronic and epidemic diseases can be

kept in check, slowed down, or even prevented altogether. For example, some researchers use big data analytics to identify biomarkers of prostate cancer (Mani, Delgado, Hazen, & Patel, 2017). Similarly, it is possible to come across studies indicating the importance of big data in the fight against influenza (Bort, 2012). As a result, big data can reduce health costs and improve the quality and effectiveness of the healthcare system.

AM is yet another component with important implications in terms of social sustainability. It can prevent long-term exposure to hazardous work conditions as opposed to traditional production processes (Ford & Despeisse, 2016). At the same time, work is underway to reproduce human organs with 3D printers and transplant them to human body. In this way, organ failure, large burn marks, as well as many other health problems can become history.

The positive impacts of Industry 4.0 as well as the possible negative impacts are a matter of debate. There is a consensus that robots will increase the productivity and competitiveness of businesses. But the real debate is whether this will lead to an increase in employment and wages. Autonomous robots, which constantly communicate with each other in industrial processes and have self-decision mechanisms make people worry about unemployment. The view that robots will replace human labor force gains more ground everyday (IFR, 2017). On the other hand, according to the International Federation of Robotics (IFR), the use of robots increased employment in many countries, including South Korea, China, Germany, and the United States. A brief study of employment statistics suggests that there is a small decrease in the manufacturing sector in developed countries (Qureshi & Sajjad, 2014). The use of such technologies leads to the loss of many low-skilled jobs, but also contributes to the development of many new jobs. (Qureshi & Sajjad, 2014). Another important issue concerns wages. Some researchers suggest that if robots replace workers completely, then wages drop, especially in low-skilled jobs (Sachs & Kotlikoff, 2012). An analysis of the economic impact of industrial robots in 17 countries showed that robots did not have a significant effect on the total working hours, but still wages increased in these countries (Graetz & Michaels, 2015). In general, it can be said that while ordinary or dangerous tasks that do not require expertise can be safely performed by robots, humans can turn to jobs that require expertise and creativity. Thus, the workforce will undergo a transformation with high level of expertise, optimizing systems and solving problems that may occur or are likely to occur in the process. As a result, it is certain that robots will create changes in professions and ways of doing business as in all industrial revolutions (IFR, 2017).

Economic Sustainability

Industry 4.0 contributes to improving economic performance by enabling businesses to reduce costs and increase sales, productivity, and customer satisfaction. IoT possibly plays an important role, especially in terms of business enterprises. The production and supply chain management of businesses that incorporate the IoT technology into their systems run more smoothly (Perera et al., 2015). With this technology, the visibility of the supply chain increases and businesses can monitor their products in real time. Moreover, they can collect data on their products or the environment such as temperature, light, humidity, or pressure (Perera et al., 2015). It is especially important to monitor the conditions (i.e. temperature, humidity, etc.) of perishable products such as meat and milk during the transportation process (Atzori, Iera, & Morabito, 2010).

Increased visibility of the supply chain enables businesses to respond to complex and variable markets without losing time. While traditional businesses have a response time of around 120 days for a

change, those using such technologies (e.g. Walmart or Metro) are capable of responding in a few days (Atzori et al., 2010).

Remote monitoring of products will also allow the creation of an optimal replenishment strategy (i.e. the elimination of unnecessary truck travel) (Perera et al., 2015). Moreover, thanks to this technology, businesses are capable of early intervention. For instance, the use of the data generated while the product is in use can help monitor deviations from normal conditions and thus detect potential issues immediately. This technology makes it possible to solve problems with a minimal cost. Furthermore, as mentioned in other sections, business costs are also reduced as IoT provides the most efficient use of energy and resources.

Another important component of Industry 4.0 for businesses is cloud computing. One of the main benefits of cloud computing is that it enables businesses to save capital expenditure as they can reduce maintenance, upgrades, and administration of Information and Communication Technology (ICT). Moreover, businesses using the cloud do not need to hire an IT professional, because the cloud provider performs management operations on behalf of the customer. Therefore, businesses can also save on labor costs through the cloud. In short, with the use of cloud computing, additional costs such as software licenses, hardware, ICT infrastructure support, and maintenance are eliminated. As a result, businesses can use their resources more efficiently. Another important advantage of cloud computing is accessibility. Businesses can easily access cloud computing from anywhere (Mohlameane & Ruxwana, 2014). This allows people to keep track of their business data even when they are on the move.

As another Industry 4.0 component, robots have the potential to increase the competitiveness of a business if used effectively. They can enable a faster development and delivery of products (IFR, 2017). Businesses that use more robots achieve their targets of cost reduction as they employ a small number of people. With fewer people in the business, the costs of labor, lighting, healthcare, legalities, food, heating, transportation, and everything conceivable are lower. Furthermore, workplace accidents resulting in injury or death are prevented. Robots also minimize the rate of errors in production.

Big data, which is another technology, attracts attention because it provides a systematic enabling businesses to be effective especially in the decision making process and achieving targets. With big data, enterprises can take advantage of both the market and the business processes by using the data they obtain in various ways. This is because it has the power to directly analyze and direct the decision-making and implementation processes of the business by analyzing the big data stacks correctly and producing meaningful results. Research shows that retailers can achieve a 15 to 20% increase in ROI by using big data analytics (BDA) technologies. For many businesses, using these technologies is recognized as an effective way to increase customer engagement and satisfaction. For example, businesses can design products that improve customer satisfaction through a historical analysis of orders and feedback. In short, customer behavior can be monitored continuously with this technology. Furthermore, through a deeper analysis of data from various sources, productivity and competitiveness of enterprises can be improved. For example, a manufacturer can process critical data and find critical parameters that have the greatest impact on quality and yield (Zhong et al., 2017).

The results of a research conducted by McKinsey Global Institute confirm that the use of big data has several benefits in many sectors including healthcare, public services, retail, manufacturing, and services. Organizations that successfully analyze and use big data benefit from (i) rapid decision-making based on real data, (ii) an improvement and development of consumer experience, (iii) increased sales, (iv) increased efforts to introduce new products, (v) reduced risks, (vi) effective operational activities, and (g) the introduction of high quality products and services to the market (Wielki, 2013).

Another technology that affects economic sustainability is AM. One of the major advantages that AM provides for businesses is the production of designs that are difficult or impossible to produce with traditional manufacturing techniques (Huang et al., 2016). AM reduces the need for storage, packaging, and transport and all associated costs (Kamble et al., 2018). Thus, supply chains will be shorter and simpler (Ford & Despeisse, 2016). AM's business benefits can be summarized as follows:

- Reduction of logistics costs by moving the points of production close to consumer locations
- Eliminating stocks through production on demand
- Offering custom tailored products
- Rapid replacement of spare parts
- Ensuring more efficient use of raw materials and other materials
- Reduced time and costs of installation
- Shortening the time between design and production

Machines and materials required for AM are still expensive. However, the prices are expected to decrease as AM becomes a more widely used production technique.

Another technology to focus on is simulation. Simulating production or service systems will allow for the identification of many problems and their reasons. Moreover, how possible changes can affect efficiency, effectiveness, and general operation can be determined by simulation.

On the other hand, augmented reality (AR) can be used in many different fields such as production, marketing, repair-maintenance services, and employee training. For example, employees can get repair instructions on how to replace a particular part by looking at a real system that requires repairs. These instructions can be displayed directly in the field of view of workers through devices such as augmented reality glasses (Rüßmann et al., 2015). With this application, time can be saved and the process can be performed without error. Augmented reality applications are used for marketing purposes as well as in production processes. They are primarily involved in promotional activities and contribute to the positive development of the brand-consumer relationship. Another field of application of augmented reality is education. For example, Siemens developed a three-dimensional virtual facility operator training module with augmented reality glasses to train employees on how to deal with emergencies (Rüßmann et al., 2015). In conclusion, augmented reality applications can minimize the human error factor in businesses, help train employees, contribute to improve collaboration and provide assistance for processes.

CONCLUSION

Industry 4.0 ushers in fundamental changes in industries, labor use, and production processes. As a result of the digitization of the entire value chain with Industry 4.0, smart factories emerged. The aim of this revolution is to provide flexible, fast, and personalized production, as well as resource efficiency. An expected result is a decrease in the time and cost of production and increase in its quantity and quality.

Many researches were done on the revolution of Industry 4.0, mostly focusing on the changes it brings along in production and consumption, together with the effects of these changes on commercial applications. However, the changes experienced with Industry 4.0 also have their repercussions on corporate sustainability. Kamble et al. (2018) and Stock and Seliger (2016) pointed at the tremendous potential of Industry 4.0 to create sustainable industries. However, studies in this field are very limited. Some authors

address the importance of Industry 4.0 components in reducing environmental pollution and efficient use of resources, while some examine these components in terms of public health and social benefits.

Moreover, some scientists argue that Industry 4.0 can pose a threat to humanity. When smart factories emerged, intelligent machinery/robots were thought to fulfill all the tasks of the blue-collar working class, pushing them to extinction and making some professions obsolete. However, the key point that should be kept in mind is that human capital is the most important factor for the success of Industry 4.0. Even if it is suggested that robots will replace human labor altogether, in fact robots ensure that jobs are completed and complemented by human labor. Furthermore, robots can be used to perform dangerous and non-value-adding processes that cause inefficiency in enterprises. In short, robots can undertake tasks that do not require any skill or expertise, while the workforce focuses on jobs that require expertise to add value. Thus, the workforce will turn into qualified workers with high-level expertise, optimizing systems and solving problems that occur or are likely to occur in the process. In a study conducted in Germany, the birth country of Industry 4.0, the employment rate in the production and automotive sectors was predicted to increase by 6-10% in the next ten years. In conclusion, it should be emphasized that Industry 4.0 has significant effects on all three dimensions of sustainability.

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KEY TERMS AND DEFINITIONS

3D Printers: 3D printers are machines that provide three-dimensional output of products designed in virtual environments.

Augmented Reality: Augmented reality is the physical appearance of the real-world elements created by enriching them in computer environment.

Big Data: Big data can be referred to as data characterized by high levels of volume (amount of data), variety (number of types), and velocity (speed).

Cloud Computing: Cloud computing is a new computing model providing data storage and access to software applications over the internet.

Cyber-Physical Systems: Cyber-physical systems allows connection and communication between humans, machines, and products, such as the exchange of information, triggering of actions, and independent control.

Internet of Things: IoT is term that combines different technologies and approaches, based on the connection between physical things and the internet.

Simulation: Simulation is the visualization of the elements in the physical world in digital environments.

Chapter 6
New Financial Technologies, Cryptocurrencies, Blockchain, and Challenges

Burcu Sakiz
https://orcid.org/0000-0001-8026-4775
Turkish Airlines, Turkey

ABSTRACT

As technological innovation transforms our economies, companies and start-ups all over the world are performing developments on financial technologies called "FinTech/fintech" for a chance to thrive. It even sparked the invention of blockchain and the inception of cryptocurrencies (digital/virtual money) such as Bitcoin. The blockchain technology provides Bitcoin's public ledger, an ordered and timestamped record of transactions. Blockchain is one of a kind decentralized technology mainly used by fintechs and it is a distributed as well as decentralized ledger that presents a radical, new, modern, and disruptive way of conducting all manner of transactions over the internet. Blockchain-based applications provide many opportunities to create a more sustainable world. With this research agenda, this chapter contributes to the discussion on future avenues for sustainability and information systems research on fintechs, especially cryptocurrencies and blockchain-based platforms and services.

INTRODUCTION

Since the global economy is interconnected, the events that took place in the USA also affected the world, bringing the world's economy to a standstill. During the first decade of the 21st century the world has witnessed corporate scandals like Enron Corporation collapse in USA and Parmalat S.p.A's financial fraud and money laundering in Italy, global economic crises –the financial crises of 2007-2008- and rising environmental concerns. Unfortunately the global financial crisis brought out the inherent shortcomings of banks and other financial institutions. The financial crisis also brought out the problems associated with having to store your money with a central authority. After the crisis, people were demanding a currency that would not be controlled by a central authority and there was a wish for a new system of

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money that would not have the shortcomings of regular currencies that leads use of blockchain technology and bitcoin.

Actually financial industry evolution was sparked by the 2008 financial crisis which lead birth of cryptocurrencies. The root cause of what happened during the subprime mortgage bubble in USA and then carried over to the whole global banking system was, in fact, society's unquestioning faith in financial institutions and the integrity of record-keeping systems in accounting and practices. The recent financial crisis has revealed the inadequencies of some of big institutions and has energized a loose coalition of entrepreneurs and information technology companies and start-ups try to reform and reinvent the current financial system (Olleros & Zhegu, 2016).

Digitization and Internet and Communication Technologies (ICTs) has a strong impact on the financial services industry. FinTech has become a popular term that describes novel technologies adopted by the financial service institutions. Many fintech, insurtech (insurance technologies) and banking start-ups have already adopted blockchain's brand-new development environment. The key technological enablers for implementing modern ledger systems are distributed database technologies and blockchain. These technologies offer new community-run, open source based opportunities for developing new types of services and digital platforms (Lindman, Rossi, & Tuunainen, 2017). The most popular example Bitcoin, for example, is a purely open-source project with no formal governance structures, developed, directed and managed by a more or less organized group of developers who themselves are often volunteers.

The blockchain, the ledger that underlies the famous cryptocurrency named Bitcoin, has huge implications for many industries especially on finance. The advent of cryptocurrencies and the blockchain technology has brought dramatic changes. Cryptocurrency (digital/virtual money/cash) is an internet-based medium of exchange which uses cryptographical functions to conduct financial transactions. They leverage blockchain technology to gain decentralization, transparency, consistency and immutability. The de-centralized nature of the blockchain makes cryptocurrencies theoretically immune to the old ways of government control and interference and eliminates need for mediation (Rosic, 2016). Also blockchain technology is kind a financial tool that can potentially play an important role in the sustainable development of the global economy.

After literature review, the rest of this chapter is organized as follows. Section 2 introduces fintech history and evolution. Then next subsection explains cryptocurrencies especially bitcoin and recent developments on that area. Another subsection covers blockchain architecture. Section 3 presents several typical blockchain applications in terms of sustainability. Section 4 discusses some possible future directions and technical challenges. Section 5 concludes the paper.

BACKGROUND

It is obvious that a new wave of technological innovations called "Financial technology" or "fintech" is accelerating change in the financial sector. Technological developments especially after Global Financial Crisis in 2008 are changing the nature of financial services, financial markets and institutions. FinTech is an emerging phenomenon. It refers to the use of technology to deliver financial solutions (Arner, Barberis, & Buckley, 2015). In simple terms, fintech can be defined as a form of technology that incorporates the financial and technological aspects in the delivery of financial services. Also, according to a World Economic Forum (WEF) report, a new challenge for the financial system was growing in the form of fintech – new entrants that promised to quickly reshape how financial products and applications were

structured, provisioned and consumed (Wef, 2017). The advent of Bitcoin and the blockchain has brought a lot of change to the world of finance even the world economy was formerly run using fiat currencies.

From mundane activities, such as paying bills online, to the more elegant ones, i.e developing blockchain-based virtual moneys (cryptocurrencies), the idea of fintech encompasses all processes that make handling finances easier by using digital technologies, internet and computer-powered algorithms. After global financial crisis there was a gradual loss of trust in the fiat currency system that gets more attention to the development of digital currencies. Even if financial sector evolved so fast in the fast few decades, the evolution of the financial processes dates back to 1918 when the Federal Reserve Bank in the United States of America (USA) developed the very first electronic funds' transfer system. In 2018, global investment in fintech hits $59,5 billion across 875 deals. Given the benefits that the technology brings, it comes as no surprise that 77% of fintech firms are expected to adopt the blockchain by 2020 (Vardhman, 2019). The technology behind bitcoin could transform how the economy works. Fintech is among one of the fastest-growing areas for venture capitalists

More than a decade cryptocurrencies, bitcoin and blockchain has attracted extensive attentions from both industry and academia. They have become hottest topics in fintech and research on it is emerging. These currencies, coins and blockchain ecosystem has been steadily maturing over the past several years. What it really means and what it stands for in the global economy and sustainability is very important. Blockchain, the answer to a lot of obstacles the world has to go through today, can be described as "the trust machine," indicating that it takes care of trust issues between individuals. Blockchain technology has paved the way for disrupting different business industries over the world. It is touted as one of the most significant technical innovations in digitalization of asset ownership in this century. The most impactful blockchain applications will require tight collaboration between developers, incumbents, innovators, and regulators, adding complexity and delaying implementation (Wef, 2016).

According to Satoshi Nakamoto (2008), the unknown inventor of Bitcoin, purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without mediation that eliminates transactions going through a financial institution. There are a lot of reasons to do so such as cost of mediation increases transaction costs, limiting the minimum practical transaction size and cutting off the possibility for small casual transactions, and also there is a broader cost in the loss of ability to make non-reversible payments for nonreversible services. With the possibility of reversal, the need for trust spreads. Blockchain is one of a kind decentralized technology and it is distributed as well as decentralized ledger that implements bitcoin architecture. Blockchain technology presents a radical and disruptive new way of conducting all manner of transactions over the Internet. Introducing the blockchain environment will actually enhance the economics because in blockchain, all the transaction are recorded right from the manufacturer to the buyer.

There is a substantial body of literature on blockchain, FinTech and cryptocurrencies from various sources, such as books, reports, blogs, wiki and forum posts, codes, conference proceedings and journal papers. A blockchain is essentially a distributed database of records, or public ledger of all transactions or digital events that have been executed and shared among participating parties. Each transaction in the public ledger is verified by consensus of a majority of the participants in the system. Once entered, information can never be erased. The blockchain contains a certain and verifiable record of every single transaction ever made. Blockchain environment refers to a fully distributed system for cryptographically capturing and storing a, immutable, consistent and linear event log of transactions between nodes in a network. It is similar to a distributed ledger that is consensually kept, saved, updated, protected, vali-

dated and cannot deleted by the parties involved in all the transactions within a public, hybrid or private network (Risius, Shoprere, 2017).

INTEGRATING FINANCE AND TECHNOLOGY

Evolution of Fintech

The rapid developments in financial technologies and digitization in recent years have a significant impact on all around the world. This new financial technology, called fintech, is rapidly becoming integrated into the lives of individuals and institutions in order to provide faster and easier financial services. The increase in the quality and diversity of the products and services in the field of financial services will result in the growth of global fintech ecosystem and the proliferation of fintech solutions. Moreover, new developments such as cryptocurrencies and blockchain applications in financial technologies allow consumers to access financial services more easily. The technological developments, changing customer habits and the structure of existing sectors show that they can be permanent by creating differences. In recent years, developments in card payment systems in the banking sector for example, the introduction of intensive use of mobile technologies has led to serious developments in the field of fintech. Fintech, the concept of financial technology, is a general concept that shows the applications and examples of technology in the financial sector. Fintech combines financial services with technology (Bilgiç, 2019).

Information and communication systems' technological changes enable new practices and business models to emerge and, in the case of fintech startups, disrupt the traditional financial services sector. Fintech term is often seen as a marriage of financial services and information and communication technologies. Keep in mind that, the term "FinTech" is not confined to specific sectors such as financing or business models (e.g. peer-to-peer lending), but instead covers the entire scope of services and products traditionally provided by the financial services industry. The interlinkage of finance and technology has a long history (Arner, Barberis, & Buckley., 2015). Table 1 is a list of summary items belongs for fintech evolution since 20th century.

Most of these competitive and cooperative fintech companies are in platform business. In digital world, market place startups have become successful for years. Ebay was one of the first examples of market place solutions. Many fintech firms seeking new customer journey to increase customer satisfaction by using new technologies. Countries witness more fintech startup formations when capital markets are well-developed, well-educated labor force available, the latest technology is readily available, and people possess more mobile fintechs subscriptions. When location of fintech companies evaluated, it is seen that majority of the FinTechs are in the USA because of Silicon Valley information system companies. World's second largest fintech market is located in London. London has the best business environment and infrastructure for fintech companies and uses the advantage of being well-known financial center in the world. Legislations encourage investors for establishing fintechs (Göktepe, 2018).

Through innovative use of technologies, firms working on financial technologies are delivering low cost personalized products and are having a significant impact on raising customer expectations. FinTech firms are now penetrating nearly every financial services segment including digital payments, digital insurances, regulators, big technology companies, banking, wealth management services, driving both innovation and disruption. Infrastructure-based technologies such as chatbots, blockcahin, robotics are reshaping the future of the financial services industry by enabling greater agility, efficiency, and accu-

Table 1. History of financial technologies

Year	FinTech Milestones
1918	The Fedwire Funds Service is established by the Federal Reserve Banks to transfer funds and connect all 12 Reserve Banks by telegraph using a Morse code system.
1950	Modern-day credit cards are introduced starting with Diners Club, founded by Frank X. McNamara
1960	Quotron Systems introduces the Quotron, the first electronic system to provide selected stock market quotations to brokers through desktop terminals.
1966	The global telex network is put in place, providing the communications necessary for the next stage of financial technology development.
1967	Barclays bank introduces the first automated teller machine (A.T.M.),
1970	The Clearing House Interbank Payments System is established to transmit and settle payment orders in American dollars for some of the banks in the world
1971	The Nasdaq is established in the United States. This signals the end of fixed securities commissions.
1973	The Society for Worldwide Interbank Financial Telecommunications is established to solve the problem of communicating about cross-border payments
1982	The first online brokerage, E-Trade, is founded. It executes the first electronic trade by an individual investor.
1983	Online banking is introduced in Britain by the Nottingham Building Society.
1987	The "Black Monday" stock market crash has consequences on markets around the world, showing how the markets are interlinked by technology.
1995	Wells Fargo develops the first online bank cheque account.
1998	A majority of banks in the United States set up the first transactional websites for Internet banking. Confinity (current PayPal) is launched.
2000	Dot-com bubble
2008	Global Financial Crisis
2009	Version 0.1 of the cryptocurrency Bitcoin is released and includes a generation system intended to create 21 million bitcoins through 2040.
2011	Google establishes Google Wallet, which allows consumers to use smartphones equipped with a near-field communication chip to make "tap payments."
2015	This year, for the first time, more people use mobile banking than those who avail themselves of a physical branch.
2015	The Chinese e-commerce giant Alibaba, announces "smile to pay," which enables consumers to authenticate mobile payments by scanning their face with a smartphone.
2017	Hyperledger Project is a multi-project open source collaborative effort hosted by The Linux Foundation, created to advance cross-industry blockchain technologies.
2018	Global investment in fintech hits $59,5 billion

Source: (Zimmerman, 2016 and the author)

racy. Financial technology firms are encountered in mobile payment systems, online saving tools, daily budget practices, personal financial consolidation, financial solutions for small and new businesses and accounting solutions, robot investment consultants and crowd funding in many different areas globally. FinTech companies and their applications can be a replacement for financial advisors to do simple transactions of people who are in medium and high-level income customer segments.

Development of Cryptocurrencies

Bitcoin and digital currencies/cashes are based on the idea of a distributed ledger trust mechanism called the "blockchain", a way of keeping track of trusted transactions in a decentralized fashion (Wef, 2015). Starting in 2009 with Bitcoin, the blockchain technology has developed beyond a global payments system and started to also impact other areas, i.e access to finance, supply chain management, digital identities, smart contracts, health care, land registries or aid, through decentralized applications. Unlike traditional banks, which contain their ledgers in a centralised location, blockchain uses a completely distibuted network of volunteer users (miners) from around the world to produce, record, monitor, and verify Bitcoin. Besides Bitcoin, there are currently 1,720 different cryptocurrencies in existence. In simple terms, they are all digital cash. Bitcoin, the first and still most important cryptocurrency.

Cryptocurrencies provide people across the globe with instant, secure, and frictionless money, and blockchains provide the permanent record storage for their transactions. Cryptocurrencies are like digital gold. Cryptocurrencies are also a fast and comfortable means of payment with a worldwide scope, and they are private and anonymous. Cryptocurrencies gave birth to an incredibly dynamic, fast-growing market for investors and speculators. Exchanges like Okcoin, Poloniex or shapeshift enables the trade of hundreds of cryptocurrencies. Their daily trade volume exceeds that of major European stock exchanges (Rosic, 2016).

There are a lot of definitions of cryptocurrency, one is an internet-based medium of exchange which uses cryptographical functions to conduct financial transactions. Cryptocurrencies are built on cryptography and are secured by math, not secured by people or by trust. Cryptocurrencies leverage blockchain technology/distributed ledger technology to provide decentralization, transparency, and immutability. A cryptocurrency insists of a network of peers. Every peer has a crypted record of the complete history of all transactions and balance of every account. When a transaction confirmed by peers, it can not be reversed, deleted, altered and become immutable because of underlying blockchain technology. Cryptocurrency properties are listed below (Rosic, 2016).

- **Irreversible:** Transactions can not be reversed after confirmation.
- **Pseudonymous:** Neither transactions nor accounts are connected to real-world identities.
- **Fast and Global:** Transactions are propagated almost instantly in the network and are confirmed in a couple of minutes.
- **Secure:** A public key cryptography system keeps cryptocurrency funds. Only the owner of the private key can send cryptocurrency.
- **Permissionless:** There is no gatekeeper. It's just a software that everybody can download for free.
- **Controlled Supply:** All cryptocurrencies control the supply of the token by a schedule written in the code. Most cryptocurrencies limit the supply of the tokens. In Bitcoin, the supply decreases in time and will reach its final number sometime around the year 2140.
- **No Debt But Bearer:** Cryptocurrencies don't represent debts, they just represent themselves.

In 2008, an individual (or a group) published a paper under the name of Satoshi Nakamoto entitled "Bitcoin: A Peer-To-Peer Electronic Cash System" and this became the birth of cryptocurrency and digital token systems. Cryptocurrencies are a part of this solution but the major innovation was to achieve consensus without a central authority. One of the most important part of Satoshi's invention was that shows a way to build a decentralized digital cash system. In the nineties even beginning of 21st century, there

have been many attempts to create digital money, but they all failed. Satoshi's paper was a breakthrough publication described a peer-to-peer version of the electronic cash that would allow online payments to be sent directly from one party to another -using cryptography to secure transactions- without mediation. That eliminates transactions going through a financial institution and a centralized trusted entity (Crosby et al., 2016). Nakamoto (2008) conceptualized the first blockchain from where the technology has evolved and found its way into many applications beyond cryptocurrencies in 2008. Bitcoin was announced as an electronic cash system that uses a peer-to-peer network to prevent double-spending. It's completely decentralized with no server or central authority.

Actually before Satoshi Nakamoto's paper, Haber and Stornetta envisioned the blockchain technology as a way to timestamp digital documents to verify their authenticity. It is hard to verify and determine the authenticity of a digital document, and reveal if the document has been altered. Timestamping digital document could be a solution for this. Their solution was to run the document through a cryptographic hashing algorithm that produces a unique ID for the document. Even if a single bit is changed in the document and it is run through the hashing algorithm again, the unique ID will be totally different. This idea was coupled with the related idea of digital signatures, which can be used to uniquely identify the signatory. Instead of sending the whole document to a timestamping service, users could just send the cryptographic hash value, which could be signed by the service to ensure that it had been received at a certain time and wasn't corrupted. Their paper is a prototypical version of the blockchains that power most cryptocurrencies today (Oberhaus, 2018). Moreover, that research paper inspired Satoshi and in Satoshi's paper has 3 citations by Haber and Stornetta (Nakamoto, 2008).

Again, Satoshi is not the first one who helds peer to peer system distributed concept and virtual currency. In 2002, a Turkish academician Emin Gün Sirer at Cornell University developed a protocol called "Karma". It was a digital currency for peer-to-peer distributed systems. Starting in 2002, Emin Gün Sirer and two fellow students aim was to build one global currency, with no inherent monetary value, which could be used to download digital things by creating the first distributed mint based proof of work. The main problem in decentralization is difficulty of cooperation between different participants and getting consensus. In their paper, they described three important characteristics that a system needs to have in order to facilitate peer-to-peer networks (Mahler, 2018):

- **Distribution:** It must be completely distributed with no centralized functionality or trust;
- **Replication:** Account data needs to be replicated to insure against loss and tampering (always better to not have all of your eggs in one and the same basket);
- **Coordination:** Coordination among the different replicas must be kept to a minimum (in order to minimize traffic).

Karma has proof-of work architecture and came six years before Satoshi did Bitcoin. Karma is designed to solve the freeriding problem. Often malicious participants in peer-to-peer systems consume resources without any contribution to their fair share, or otherwise force other peers into subsidizing them. A secure exchange mechanism ensures that nodes cannot counterfeit karma; an anti-inflation/deflation mechanism regulates the karma supply to ensure that prices do not over or under-flow. Additionally a reward mechanism makes the system incentive-compatible for participants. System also has a mechanism for a completely peer-to-peer scheme for tracking karma transfers protects against adversaries that corrupt a significant fraction of the system (Vishnumurthy, Chandrakumar & Sirer, 2003). Finally, Karma didn't really gain a lot of traction, because of its timing – bitcoin invented after global financial

crisis- and since it hasn't really been actively pushed as a practical payment system by its creators. The biggest difference to Bitcoin was definitely the way proof of work is being used. While it was only used for minting in Karma, within Bitcoin it is also a very effective way of finding consensus among the different parties (Mahler, 2018).

There are a lot of digital moneys developed. Cryptocurrencies have garnered much attention from the financial and tech sectors, as well as academics. According to coinmarketcap web site, total market capitulation is more than $267 billion. This is the list of most popular ones among 2326 coins today are shown in Table 2 below:

First well-known cryptocurrency Bitcoin's backbone technology is blockchain. Blockchain technologies create peer-to-peer environment and provide a trustless environment so that there is no longer a need to rely on a third-party to ensure payment transfers. The technology has in the last decade alone evolved so much as to giving rise to cryptocurrencies. The evolution of Bitcoin and other cryptocurrencies have both drawn significant attention and also threatened the very foundations of the financial system. Next title explains blockchain architecture and benefits in detail.

Table 2. Top 20 Cryptocurrencies by market cap

Name	Symbol	Market Cap	Price
Bitcoin	BTC	$181.130.315.203	$10.124,41
Ethereum	ETH	$20.301.635.913	$188,98
XRP	XRP	$11.658.574.752	$0,27
Bitcoin Cash	BCH	$5.471.154.208	$304,61
Litecoin	LTC	$4.673.384.512	$74,08
Binance Coin	BNB	$4.225.800.213	$27,17
Tether	USDT	$4.058.848.481	$1
EOS	EOS	$3.339.627.202	$3,6
Bitcoin SV	BSV	$2.405.469.661	$134,72
Monero	XMR	$1.402.145.994	$81,67
Stellar	XLM	$1.329.397.784	$0,067
Cardano	ADA	$1.281.742.937	$0,049
UNUS SED LEO	LEO	$1.196.240.772	$1,2
TRON	TRX	$1.167.489.930	$0,017
Dash	DASH	$814.699.111	$90,59
Chainlink	LINK	$789.181.895	$2,25
Ethereum Classic	ETC	$767.813.028	$6,8
Tezos	XTZ	$748.435.152	$1,13
IOTA	MIOTA	$687.441.177	$0,247
NEO	NEO	$680.124.784	$9,64

Source: (Coinmarketcap, 2019)

Blockchain Technology and Its Benefits

Actually after global crisis in 2008, the year 2009 is not the exact year that blockchain concept revealed. Blockchain history dates back to early 1990's by two scientist researchers: Stuart Haber and W. Scott Stornetta. They are both touted as the co-inventors of the blockchain technology. It is certain that several aspects of the Bitcoin blockchain architecture are based on Stornetta's work. They described the concept of a cryptographically secured network of blocks. The first mention of blockchain architecture was held in a publication that Stornetta coauthored described a digital hierarchy system known as a "block chain" that utilized digital time-stamps for ordering transactions. In their paper, they propose a practical, feasible way to time stamp of digital documents without sacrificing privacy. The researchers worked on a cryptographically secured chain of blocks whereby no one could tamper with timestamps of documents. Afterwords they both upgraded distributed ledger system to incorporate Merkle trees that enhanced efficiency thereby enabling the collection of more documents on a single block in 1992 (Haber, Stornetta, 1991).

Blockchain can be defined as a chain of blocks of information. These blocks of information are called as digital ledgers which are chronologically linked and replicated not in a centrialized database but in a distributed one. Information can be added as blocks and never deleted/altered and also any change is monitored and validated by the chain. Each block in the chain is protected by cryptographic algorithms, and only authorized participants can access the information. Although private blockchains exists, a typical blockchain is public and identified as "decentralized". There four main kinds of blockchain applications classified as money transfer and payments, property registries, contractual agreements, and identity confirmation. Replacing the dependency on trust with cryptography means that most verification, identification, authentication, authorization and similar forms of assurance, accreditation, certification, and legalization of identity, origin, competence, consistence or authority of persons or assets can be assured by mathematics. (Ljutic, McPhee, 2017).

Blockchain technologies or distributed ledger technologies (DLT) come with a range of benefits that no other technology has been able to provide the business community in the past. Blockchain applications might have a profound impact on development-oriented investment, not only by revolutionizing global payment systems but also through improvements to access to finance, supply chain management, digital identities or land registries. With the new technology, recording, tracking, verifying properties of physical products, linking and sharing will be done in real time. For example, it can effectively reduce human errors, while eliminating costs and time delays that plague transactions in today's supply chains. There are numerous benefits of blockchain such as decentralization, persistency, anonymity and auditability. Following are some of the key benefits of blockchain (Leblanc, 2019).

- **Transparency and Immutability:** As it is a shared database, data are readily available to all parties involved in any kind of transaction, providing maximum transparency. The immutability of data makes it even more trustworthy as well. So, once the data are created, it can't be deleted or altered.
- **Process Integrity and Disintermediation:** The parties in any transaction will know that everything will be done exactly as the agreed upon protocol dictates. Readily available and trustworthy data also eliminate any needed intermediation by a third party.

- **Lower Costs and Faster Transaction:** Blockchains have a great potential to cut overall transaction cost and time by eliminating the overhead costs of exchanging assets and the involvement of third-party intermediaries.
- **Access to High-Quality Data to Everyone**: All parties involved in a transaction will have accurate, timely, consistent and complete data they need to know to make a well-informed decision.

4 years ago, a World Economic Forum Report states that around 10 percent of GDP by 2027 will be stored on blockchain and similar technologies (Wef, 2015). Blockchain technology has a growing number of financial and non-financial use cases. There is a wide spectrum of blockchain applications ranging from cryptocurrency, financial services, risk management, internet of things (IoT) to healthcare, identity, insurance, real estate, supply chain, contracts, public, government and social services.The economic, political, health care, humanitarian, intellectual property and legal system benefits of blockchain start to make it clear that this is potentially disruptive technology that can have the capacity for reconfiguring all aspects of society and its operations. Blockchain revolution can broke down into three categories explained in Table 3 below (Swan, 2015)

Additionally, distributed ledger technology has several essential features developed in time. One is that it allows a deep transition from a centralized transactional model, which until today has prevailed, to a decentralized one. Distributed, de-centralized system should turn out to be a more robust, trusted and reliable solution than is usually provided by a centralized authority to its stakeholders (Collomb, Sok, 2016). Table 4 below summarized standard transactions versus blockchain ones.

While blockchain technology is effecting financial sector heavily, new industry leaders are emerging. Financial services seems near term future leader of blockchain. Other sectors such as energy, industrial

Table 3. Blockchain Revolution

Year	Blockchain Revolution Explanation
Blockchain 1.0	Currency (deployment of cryptocurrencies in application related to cash, i.e currency transfer,remittance, digital payments)
Blockchain 2.0	Contracts (entire state of economic, market, financial applications)
Blockchain 3.0	Applications (beyond currency,finance and markets- especially for government, healthcare, science,literacy,art and culture)

Source: (Swan, 2015)

Table 4. Standard Versus Blockchain based Transactional Models

Standard	Model	Blockchain
Trusted 3rd party/central coordinator/mediator	Paradigm	Trustless system/pseudonymous participants
Centralized server/many clients	Architecture	Peer-to-peer network
Single Copy	Database	Multiple copies
Controled access/firewalls	Security	Cryptography
Intermediation	Price / Cost	Consensus/proof-of-work
Private	Accessibility	Public

Source: (Collomb, Sok, 2016)

products, healthcare and utilities. For example, from a supply chain perspective, such visibility will help ensure efficient transactions, while promoting food safety, efficient recalls, the elimination of counterfeits, and the assurance of ethical trading partners (Leblanc, 2019). In Table 5 below it is shown that proportions of sectors effected by blockchain's distributed ledger technology. Industries more than %1 percentage is listed. (PwC, 2018).

Using blockchain technology is one of the effective way for big banks to cut costs. In fact, it's projected that they can save $12.3 billion per year and reduce the infrastructure by 30% . For example Ripple, which is one of most important cryptocurrencies designed specifically to be compatible with the existing financial structure, is leading the way by operating with 15 out of 50 global banks (Vardhman, 2019).

Blockchain and the Sustainability Opportunity

Blockchain technology has come to be associated especially with cryptocurrencies, yet the technology can also assist in a variety of other endeavors By placing trust and authority in a decentralized network, rather than in a powerful central institution, blockchain – the technology underlying Bitcoin and a growing number of financial and non-financial use-cases – could reconfigure how we assign, protect and transfer many assets and services, including in the natural environment. (Le Seve, Mason & Nassiry, 2018). Even if there are a lot of advantages of blockcahain technology, there are some issues need to be solved. Unlike fiat currencies, Bitcoin is not linked to a central bank or any institution. It is "mined" amidst sprawling computer farms that require incredible amounts of energy to operate. When it comes to energy consumption, in 2018 the global power needed to create cryptocurrencies could rival the entire electricity consumption of Argentina and be a growth driver for renewable energy producers from the U.S. to China. Miners of bitcoin and other cryptocurrencies could require up to 140 terawatt-hours of electricity in 2018, about 0.6 percent of the global total. That usage is more than expected power demand from electric vehicles in 2025 (Tomesco, Loh, 2018).

Led by Bitcoin, digital moneys have shown promise as infrastructure for pseudonymous online payments, cheap remittance, trustless digital asset exchange, and smart contracts. However, Bitcoin derived blockchain protocols have inherent scalability limits that tradeoff between throughput and latency. (Eyal, Gencer, Sirer & van Renesse., 2016). Despite its potential, blockchain protocols face a significant scalability barrier and there are sustainability issues. Because of inefficiencies and some protocol based problems, experts continue to develop new coins and protocols such as Bitcoin Ng and Avalanche. One of

Table 5. Industries seen as leaders in blockchain

Industry	Blockchain Involvement
Financial Services	46%
Industrial products and manufacturing	12%
Energy and Utilities	12%
Healthcare	11%
Government	8%
Retail and Consumer	4%
Entertainment and Media	1%

Source: (PwC, 2018.)

the important ones is Emin Gün Sirer's team's newly developed 3 protocols called Snowflake, Snowball and Avalanche. They combine the best of Nakamoto consensus with the best of classical. These are fast, efficient and less energy consuming ones compared to Bitcoin. He aims to eliminate non-sustainable proof-of-work mining of Bitcoin. Bitcoin itself is technically very hard to use right now. It's incredibly limited in its scale and its performance and when the network is congested, the fees go too much. With these new systems they call autonomous blockchains, where two people can engage in secure communications and secure data sharing without recourse to a public blockchain — without having to make any of the information public and without a private blockchain, either, without having to designate third-parties to hold their data (Fernando, 2018).

Unlike blockchains that rely on proof-of-work, protocols developed by Team-rocket are quiescent and green. These protocols do not incur quadratic message cost and can work without precise membership knowledge. They are lightweight, quiescent, and provide a strong safety guarantee, though they achieve these properties by not guaranteeing liveness for conflicting transactions (Team-rocket, 2018). Their paper introduces a brand new family of consensus protocols suitable for digital moneys, based on randomized sampling and metastable decision. The protocols provide a strong, robust, efficient probabilistic safety guarantee, and a guarantee of liveness for correct clients. The protocols do not use proof-of-work (PoW) yet achieves safety through an efficient metastable mechanism. So this family avoids the worst parts of traditional and Nakamoto consensus protocols (Demirbas, 2018).

As major technology providers like IBM, Alibaba, The Linux Foundation, Apple and Microsoft invest in infrastructures to support blockchain, it will be easier for a number of applications to move in this direction. The way of business transactions can change by blockchain. Also there are promising outcomes of blockchain applications such as sustainability, reduced environmental impact and better assurance of human rights and fair work practices. For human rights and fair work case, product history clear reports can help product buyers to be confident that goods being purchased are coming only from sources that have been recognized and trusted as being ethically sound. For supply chain case, visibility will help ensure effective transactions, while promoting food safety, efficient recalls, the elimination of counterfeits, and the assurance of ethical trading partners (Leblanc, 2019).

Blockchain technology is not limited to processing bitcoin transactions for example, as one of the USA renewable energy company Solar Bankers plans to apply a far more energy efficient form of blockchain technology to the energy sector and develop solutions for off-grid electricity networks with the aim of helping developing countries expand rural electrification. Their decentralized ledger system would enable individuals to trade energy amongst themselves without a utility company as a middle man. Their system uses the highly scalable and efficient blockchain platform to create a digital currency system for effective and secure electricity trading. Solar Banker's model is currently being tested in a pilot project in Izmir, Turkey. The model tested by Solar Banker together with the Turkish company named Enerclever. The model could allow remote areas in developing countries to better participate in the global economy in a sustainable way (Jost, 2018).

FUTURE RESEARCH DIRECTIONS

Fintech includes different sectors and industries such as banking, education, fundraising and non-profit, health care, intellectual properties, smart contract, investment management. Fintech also involves the development and use of cryptocurrencies and its underlying technology blockchain. Under fintech um-

brella, blockchain is a distributed database technology that maintains a continuously growing list of data records in blocks that are confirmed by the nodes participating in it. Swan (2015) presents seven technical challenges and limitations for the adaption of blockchain technology in the future research directions:

- **Throughput:** The potential throughput of issues in the Bitcoin network is currently maximized to 7tps (transactions per second). When the frequency of transactions in blockchain increases to similar levels, the throughput of the blockchain network needs to be improved.
- **Latency:** To create sufficient security for a bitcoin transaction block, it takes currently roughly 10 minutes to complete one transaction. To achieve effective security mechanism, more time has to be spent on a block, because it has to outweigh the cost of double spending attacks.
- **Size and Bandwith:** There is a limitation in the number of transactions that can be handled (on average 500 transaction in one block). If the blockchain needs to control more transactions, the size and bandwidth issues have to be solved.
- **Security:** The current blockchain has a possibility of a 51% attack . If this occurs, a single entity would have full control of the majority of the network's mining hash-rate and would be able to manipulate blockchain. To solve this issue, more research on security is necessary.
- **Versioning, Hard Forks, Multiple Chains:** A small chain that consists of a small number of nodes has a higher possibility of a 51% attack. Another issue emerges when chains are split for administrative or versioning purposes.
- **Usability:** The Bitcoin API is difficult to use. There is a need to develop a more developer and use friendly API for Blockchain.
- **Wasted Resources:** Unfortunately bitcoin mining wastes huge amounts of energy. The waste in bitcoin mining is caused by the "Proof-of-Work (PoW)" effort. There are some alternatives in industry fields, such as "Proof-of-Stake (PoS)". With PoW, the probability of mining a block depends on the work done by the miner. However with PoS, the resource that is compared is the amount of Bitcoin a miner holds. The issue with wasted resources needs to be solved to have more efficient mining in Blockchain.

Governance is another issue and future research subject. Governing a blockchain is a substantial obstacle. Even if a blockchain is permissionless, i.e. anyone can join and leave at any point in time, the core developers are making daily decisions on behalf of the other blockchain users. Therefore it is appropriate to understand whether Bitcoin is actually decentralized (Gervais et al., 2014).

During the past years, efforts has been made by some companies to prevent time-consuming activities such as IBM. In 2019, IBM announced a blockchain-based supply chain verification network, aptly named "Trust Your Supplier" (TYS). IBM said that TYS is "designed to eliminate manual time-consuming processes and help reduce the risk of fraud and errors, ultimately creating frictionless connectivity across supply chains and designed to improve supplier qualification, validation, onboarding and life cycle information management." (Chitkara, 2019).

It is widely accepted that the computational architecture of blockchain creates a wide range of potential uses. For instance, by providing an immutable, distributed ledger, it can help to facilitate not only peer-to-peer payments, but also manage records, track physical objects and transfer value via smart contracts, all without a third party or manual reconciliation. Besides energy needs, developments in computer processing power and networked computer systems have facilitated advances in blockchain applications, while the domination of smartphones has made digital wallets possible and increasingly relevant. Additionally,

there has been a proliferation of IoT (internet of things) and AI (artificial intelligence) applications that can automate bigdata collection and processing for use in blockchain platforms (Wef, 2018).

CONCLUSION

Today, it is clear that financial institutions will have to invest in fintech to avoid becoming obsolete. It is clear that a lot of fintech companies try to develop applications using blockchain technology. Blockchain technology currently revolutionizes the storing, management and transfer of value between digital identities in many economic sectors. Blockchain technology has been holding many promises for not only cryptocurrencies and the financial sector, but also for other industries such as insurance, energy, utilities, health care, intellectual properties. Blockchain is very likely to have a very strong impact on the digital economy and global e-commerce, because of this decentralized transactional model. Blockchain related interest and investment are so high, and the technology has shown itself to be capable of driving major change. The important thing is that blockchain can be programmed to record not only financial transactions, but anything of value. Blockchain is rapidly revolutionizing the global economy.

After a decade the first Bitcoin white paper, blockchain technology is now studied by academics, experts, companies and governments to find possible use cases for efficiency and these can possibly trigger the third industrial revolution. Blockchain is the kind of technological breakthrough that has the potential to make global changes. Blockchain technology, in all its forms, continues to evolve rapidly. It is obvious that blockchain technology future looks bright and very attractive in part because of the way governments, developers, firms and investors are investing big as they seek to spur innovations and applications. On the other hand, debate over blockchain's promise, as well as its limitations, is ongoing especially for sustainability. Experts trying to build new protocols, applications and more efficient cryptocurrencies especially in terms of energy consumption. The opportunities that blockchain offers need to be developed and governed wisely, with upfront and continual management of unintended consequences and downside risks. Blockchain for environmental sustainability and natural resources management use-cases are rapidly evolving and promising.

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KEY TERMS AND DEFINITIONS

Bitcoin: A decentralized digital currency without a central bank or single administrator that can be sent from user to user on the peer-to-peer bitcoin network without the need for intermediaries.

Blockchain: Technology: It is a decentralized, distributed and public digital ledger technology that is used to record transactions across many computers so that any involved record cannot be altered retroactively, without the alteration of all subsequent blocks.

Decentralization: The transfer of authority from central to local government. Decentralization is the process by which the activities of an organization, particularly those regarding planning and decision making, are distributed or delegated away from a central, authoritative location or group.

Digital Money: Any means of payment that exists purely in electronic form. Digital money is not tangible like a dollar bill or a coin. Digital money, also known as digital currency or crypto currency, is a new and upcoming way of storing value. Unlike traditional currency which can be transferred to paper money from a bank account, digital money is entirely digital with only a number as an indication of value. The currency is often used by utilizing a digital wallet that can be accessed from devices such as computers, smartphones, and tablets.

Digitization: The conversion of text, pictures, or sound into a digital form that can be processed by a computer. It is the process of converting information into a digital (i.e. computer-readable) format. Digitization essentially refers to taking analog information and encoding it into zeroes and ones so that computers can store, process, and transmit such information.

Distributed Ledger: A database that is consensually shared and synchronized across multiple sites, institutions or geographies. A distributed ledger (also called a shared ledger or distributed ledger technology or DLT) is a consensus of replicated, shared, and synchronized digital data and documents geographically spread across multiple sites, countries, or institutions.

Fintech: Computer programs and other technology used to support or enable banking and financial services. Fintech is the term used to refer to innovations in the financial and technology crossover space, and typically refers to companies or services that use technology to provide financial services to businesses or consumers.

Sustainability: The ability to be maintained at a certain rate or level and avoidance of the depletion of natural resources in order to maintain an ecological balance. Sustainability is a broad discipline, giving students and graduates insights into most aspects of the human world from business to technology to environment and the social sciences. Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs.

Chapter 7
Defining the Strategic Impact-Relation Map for the Innovative Investments Based on IT2 Fuzzy DEMATEL: Evidence From the European Tourism Sector

Hasan Dinçer
Istanbul Medipol University, Turkey

Serhat Yüksel
İstanbul Medipol University, Turkey

ABSTRACT

The purpose of the study is to construct the strategic impact-relation map for the innovative tourism investments. For this aim, a set of the criteria defining the innovative investment alternatives in the tourism industry is proposed for determining the possible impact and relationship between each other. Interval Type 2 DEMATEL method is applied to analyze the strategic priorities of the innovative investments and their influencing degrees in the European tourism industry. The findings show that luxury travel is the most important innovative tourism investment. Another important conclusion is that there is no influencing factor on making investment on educational visitors and medical services. On the other side, investment in shopping facilities and luxury travel influenced by all criteria. Hence, it is recommended that European tourism companies should mainly create new trends on the luxury consumption in order to improve tourism industry to contribute economic development.

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INTRODUCTION

Tourism industry has a crucial impact on the economic development of the countries by providing foreign currency and decreasing unemployment. Hence, most of these countries aim to take appropriate actions to gain competitive power (Mowforth and Munt, 2015). In this framework, tourism companies try to understand the expectations of the customers. In the last years, especially with the development of the technology, there is an increase in the number of travellers. Therefore, the companies provide new services to attract the attention of them. Ecological, educational and cultural tours are mainly developed for the tourism companies for this purpose (Pirselimoğlu Batman et al., 2016).

Tourism companies also make innovation to survive in such a competitive environment (Guttentag, 2015). The main reason is that they must develop innovative strategies to decrease the costs or increase quality. This innovation can be made for the product and services (Pikkemaat and Zehrer, 2016). On the other hand, there can be marketing innovation by offering a service or product that no one has previously offered. In addition to them, companies can make organizational innovation while developing and differentiating methods of work (Camisón et al., 2017).

Europe is an important region for the tourism industry because there are many historical places in these countries. Additionally, there are many countries suitable for sea holiday in European region. Hence, innovation is also significant for European tourism industry to be different from their competitors. For example, Sweden developed IceHotel to attract the attention of the visitors (Nordin, 2017). Furthermore, Greece increased the number of airlines which contributes to the development of the tourism industry (Fragoudaki and Giokas, 2016). In addition to them, European Council aimed to develop tourism policies that do not harm the environment (Hiltunen et al., 2016).

Nevertheless, understanding the most appropriate investment strategies play an essential role. Thus, the investment strategies can be affected from each other. In this framework, the quality of the applied method is also very important. The aim of this study is to define strategic impact relationship map for the innovative tourism investments. Within this scope, European tourism industry is taken into consideration. In the analysis process of this study, interval type-2 fuzzy DEMATEL approach is used. As a result, some investment strategies can be provided to improve this industry.

The main novelty of this study is that a method is proposed for measuring the impact-relation map with interval type-2 fuzzy DEMATEL approach. Because this method is firstly used in this study for tourism industry, this situation contributes to the originality. In addition to this issue, some innovative investment strategies are presented by analyzing lots of different academic studies in this framework. These strategies can be very helpful for both academicians to make further studies and practitioners in this area to develop appropriate strategies.

This study consists of five different sections. General information about the concept is given in this introduction section. The second section analyses important studies in this area. On the other hand, interval type-2 fuzzy logic and DEMATEL approach are identified in the third section. Moreover, analysis results are given in the fourth section. In the final section, recommendations to improve European tourism industry are explained.

LITERATURE REVIEW

European tourism industry was examined by lots of different researchers for various purposes. First of all, performance evaluation of European tourism industry was investigated. In this framework, Estol and Font (2016) focused on the evaluation and the structure of European tourism policy. They defined that European countries develop tourism policies with the aim of increasing internal demand. Also, Koutroulis et al. (2018) aimed to evaluate summer tourism in Europe. In this context, the vulnerability of summer tourism in different European countries is examined. They concluded that 2 °C increase in global warming affects these countries differently. For example, Greece and Cyprus are affected from this situation less than other countries because they can adopt different climate much easily. Gössling (2015), Styles et al. (2015), Morote et al. (2017) and Gabarda-Mallorquí et al. (2017) defined that the efficient use of water resources increases the performance of European tourism industry.

The success of European tourism industry in economic downturn also attracted the attentions of many different researchers. For instance, Gunter and Smeral (2017) conducted a study which looks at the performance of European tourism industry in stagnation period. They reached a conclusion that there is high income elasticity in the tourism industry of Europe. Therefore, they stated that European tourism industry was affected very negatively during the period of economic downturn. Similar to this study, Pappas and Apostolakis (2016), Tzanelli and Korstanje (2016), Haque (2016) and Antonakakis et al. (2015) also concluded that especially in 2008 global mortgage crisis, tourism industry of Europe was affected very negatively.

Additionally, the relationship between terrorism and tourism performance in Europe was also considered in the literature. Corbet et al. (2019) made a study to understand the impact of terrorism on European tourism industry. ARMA-GARCH model was used in the analysis process of this study. It is identified that terrorist attacks mainly decrease business travels. Parallel to this analysis, Buigut et al. (2017), Butnaru et al. (2018), Coca-Stefaniak and Morrison (2018), Smith and Amorim (2018) and Costa and Carvalho (2016) focused on this topic and mainly determined that there is a crucial decrease in the performance of European tourism industry when there is terrorist attack.

The future perspectives of European tourism industry were also evaluated in many different studies. Postma (2015) aims to discuss the scenarios of European countries with respect to the tourism industry. It is defined that the main weakness is creating strategies based on these scenarios. Additionally, Coccossis (2017), Oskam and Boswijk (2016) and Michopoulou et al. (2015) argued that there will be increase in the market share of European tourism industry in the future. In addition to these studies, Coccossis (2016), Richards (2016), Edgell Sr (2016), Auclair and Fairclough (2015) and Faby (2016) also identified that cultural tourism will have higher importance in the future for European region.

Moreover, some studies tried to find the ways to reach sustainable development in European tourism industry. Blancas et al. (2015) aimed to find important indicators in order to improve tourism industry in European region. They gave information that statistical information regarding tourism should be improved to have sustainable growth. Tudorache et al. (2017) explained that European Tourism Indicators System provides significant information for the improvement of this industry.On the other side, Stoffelen and Vanneste (2017), Mayer et al. (2019) and Colantonio (2017) determined that tourism industry contributes to economic development in Europe. Furthermore, Valentova and Vasko (2017) and Butnaru and Nita (2016) also showed that there is improvement in the tourism performance of the countries when they join European Union.

Environmental effects of European tourism industry were studied by many researchers. As an example, Paramati et al. (2017) made a Westerlund panel cointegration to understand whether tourism degrade environmental quality in Europe. They concluded that tourism increases CO2 emissions in Eastern EU. However, this situation is not the same for Western EU. Similar to this study, Dogan et al. (2017), Dogan and Arslan (2017), Robaina-Alves et al. (2016) and Gössling et al. (2015) also reached the same conclusion by using different methodologies. As a result of literature review, it is understood that European tourism industry was evaluated with many different purposes. However, a new study by using an original methodology, such as interval type-2 fuzzy logic makes contribution to the literature.

METHODOLOGY

$\tilde{A}$ refers to the type 2 fuzzy set and $\mu_{\tilde{A}(x,u)}$ gives information about the type-2 membership function. The details of them are demonstrated on the equation (1) (Dinçer and Yüksel, 2019).

$$\tilde{A}=\left\{\left((x,u),\mu_{\tilde{A}(x,u)}\right)|\forall_x\in X,\forall_u\in J_x\subseteq[0,1]\right\},\text{ or }\tilde{A}=\int_{x\in X}\int_{u\in J_x}\mu_{\tilde{A}}(x,u)/(x,u)J_x\subseteq[0,1] \quad (1)$$

In equation (1), $\int\int$ explains the union over all admissible *x* and *u*. On the other side, $\mu_{\tilde{A}}(x,u)$ can get value between 0 and 1. Also, $\int$ can be considered as £ in case of discrete universes. Interval type-2 fuzzy sets can be defined as in equation (2) if all $\mu_{\tilde{A}}(x,u)$ equals to 1 (Yüksel et al., 2019).

$$\tilde{A}=\int_{x\in X}\int_{u\in J_x}1/(x,u)J_x\subseteq[0,1] \quad (2)$$

The interval type-2 fuzzy set is given as $\tilde{A}_i$ whereas the upper and lower trapezoidal membership functions are demonstrated as $\tilde{A}_i^U$ and $\tilde{A}_i^L$. Equation (3) indicates the details of them (Li et al., 2016; Dinçer et al., 2019).

$$\tilde{A}_i=\left(\tilde{A}_i^U,\tilde{A}_i^L\right)=\left(\left(a_{i1}^U,a_{i2}^U,a_{i3}^U,a_{i4}^U;H_1\left(\tilde{A}_i^U\right),H_2\left(\tilde{A}_i^U\right)\right),\left(a_{i1}^L,a_{i2}^L,a_{i3}^L,a_{i4}^L;H_1\left(\tilde{A}_i^L\right),H_2\left(\tilde{A}_i^L\right)\right)\right) \quad (3)$$

In this equation, "," are the reference values of the interval type-2 fuzzy set. Moreover, equations (4)-(8) explain the arithmetic operations.

(4)

(5)

(6)

$$k\tilde{A}_1 = \left(k \times a_{11}^U, k \times a_{12}^U, k \times a_{13}^U, k \times a_{14}^U; H_1\left(\tilde{A}_1^U\right), H_2\left(\tilde{A}_1^U\right)\right), \left(k \times a_{11}^L, k \times a_{12}^L, k \times a_{13}^L, k \times a_{14}^L; H_1\left(\tilde{A}_1^L\right), H_2\left(\tilde{A}_1^L\right)\right) \tag{7}$$

$$\frac{\tilde{A}_1}{k} = \left(\frac{1}{k} \times a_{11}^U, \frac{1}{k} \times a_{12}^U, \frac{1}{k} \times a_{13}^U, \frac{1}{k} \times a_{14}^U; H_1\left(\tilde{A}_1^U\right), H_2\left(\tilde{A}_1^U\right)\right), \left(\frac{1}{k} \times a_{11}^L, \frac{1}{k} \times a_{12}^L, \frac{1}{k} \times a_{13}^L, \frac{1}{k} \times a_{14}^L; H_1\left(\tilde{A}_1^L\right), H_2\left(\tilde{A}_1^L\right)\right) \tag{8}$$

On the other hand, Geneva DEMATEL (decision making trial and evaluation laboratory) method aims to identify the interdependence between different factors (Dinçer and Yüksel, 2018). Therefore, it becomes possible to make causality analysis. Also, these factors can be weighted based on their significances by using DEMATEL approach. In the first step, the evaluations of the experts are obtained. After that, they are converted to the interval fuzzy sets with the help of linguistic evaluations (Yüksel et al., 2017). The second step includes the calculation of the initial direct-relation fuzzy matrix which is given on the equation (9) (Luthra et al., 2016).

$$\tilde{Z} = \begin{bmatrix} 0 & \tilde{z}_{12} & \cdots & \cdots & \tilde{z}_{1n} \\ \tilde{z}_{21} & 0 & \cdots & \cdots & \tilde{z}_{2n} \\ \vdots & \vdots & \ddots & \cdots & \cdots \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{z}_{n1} & \tilde{z}_{n2} & \cdots & \cdots & 0 \end{bmatrix} \tag{9}$$

Equation (10) also explains the calculation of average fuzzy scores.

$$\tilde{Z} = \frac{\tilde{Z}^1 + \tilde{Z}^2 + \tilde{Z}^3 + \ldots \tilde{Z}^n}{n} \tag{10}$$

In the third step, the pairwise matrix is normalized by considering the equations (11)-(13).

$$\tilde{X} = \begin{bmatrix} \tilde{x}_{11} & \tilde{x}_{12} & \cdots & \cdots & \tilde{x}_{1n} \\ \tilde{x}_{21} & \tilde{x}_{22} & \cdots & \cdots & \tilde{x}_{2n} \\ \vdots & \vdots & \ddots & \cdots & \cdots \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{x}_{n1} & \tilde{x}_{n2} & \cdots & \cdots & \tilde{x}_{nn} \end{bmatrix} \tag{11}$$

$$\tilde{x}_{ij} = \frac{\tilde{z}_{ij}}{r} = \left(\frac{Z_{a_{ij}}}{r}, \frac{Z_{b_{ij}}}{r}, \frac{Z_{c_{ij}}}{r}, \frac{Z_{d_{ij}}}{r}; H_1\left(z_{ij}^U\right), H_2\left(z_{ij}^U\right)\right), \left(\frac{Z_{e_{ij}}}{r}, \frac{Z_{f_{ij}}}{r}, \frac{Z_{g_{ij}}}{r}, \frac{Z_{h_{ij}}}{r}; H_1\left(z_{ij}^L\right), H_2\left(z_{ij}^L\right)\right) \tag{12}$$

$$r = max\left(max_{1\le i\le n}\sum_{j=1}^{n} Z_{d_{ij}}^{\cdot}, max_{1\le i\le n}\sum_{j=1}^{n} Z_{d_{ij}}^{\cdot} \right) \tag{13}$$

Additionally, in the fourth step, the total influence fuzzy matrix is constructed by using the equations (14)-(18).

$$X_a^{\cdot} = \begin{bmatrix} 0 & a'_{12} & \cdots & \cdots & a'_{1n} \\ a'_{21} & 0 & \cdots & \cdots & a'_{2n} \\ \vdots & \vdots & \ddots & \cdots & \cdots \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ a'_{n1} & a'_{n2} & \cdots & \cdots & 0 \end{bmatrix}, \ldots, X_h^{\cdot} = \begin{bmatrix} 0 & h'_{12} & \cdots & \cdots & h'_{1n} \\ h'_{21} & 0 & \cdots & \cdots & h'_{2n} \\ \vdots & \vdots & \ddots & \cdots & \cdots \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ h'_{n1} & h'_{n2} & \cdots & \cdots & 0 \end{bmatrix} \tag{14}$$

$$\tilde{T} = \lim_{k\to\infty} \tilde{X} + \tilde{X}^2 + \ldots + \tilde{X}^k \tag{15}$$

$$\tilde{T} = \begin{bmatrix} \tilde{t}_{11} & \tilde{t}_{12} & \cdots & \cdots & \tilde{t}_{1n} \\ \tilde{t}_{21} & \tilde{t}_{22} & \cdots & \cdots & \tilde{t}_{2n} \\ \vdots & \vdots & \ddots & \cdots & \cdots \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ \tilde{t}_{n1} & \tilde{t}_{n2} & \cdots & \cdots & \tilde{t}_{nn} \end{bmatrix} \tag{16}$$

$$\tilde{t}_{ij} = \left(a''_{ij}, b''_{ij}, c''_{ij}, d''_{ij}; H_1\left(\tilde{t}_{ij}^{\,U}\right), H_2\left(\tilde{t}_{ij}^{\,U}\right)\right), \left(e''_{ij}, f''_{ij}, g''_{ij}, h''_{ij}; H_1\left(\tilde{t}_{ij}^{\,L}\right), H_2\left(\tilde{t}_{ij}^{\,L}\right)\right) \tag{17}$$

$$\left[a''_{ij}\right] = X_a^{\cdot} \times \left(I - X_a^{\cdot}\right)^{-1}, \ldots, \left[h''_{ij}\right] = X_h^{\cdot} \times \left(I - X_h^{\cdot}\right)^{-1} \tag{18}$$

In the fifth step, the defuzzified total influence matrix is computed. In this process, equations (19)-(22) are taken into consideration.

$$Def_T = \frac{\frac{\left(u_U - l_U\right) + \left(^2{}_U \times m_{1U} - l_U\right) + \left(\pm_U \times m_{2U} - l_U\right)}{4} + l_U + \left[\frac{\left(u_L - l_L\right) + \left(^2{}_L \times m_{1L} - l_L\right) + \left(\pm_L \times m_{2L} - l_L\right)}{4} + l_L\right]}{2} \tag{19}$$

$$Def_T = T = \left[t_{ij}\right]_{n\times n},\ i, j = 1, 2, \ldots, n \tag{20}$$

$$\tilde{D}_i^{def} = r = \left[\sum_{j=1}^{n} t_{ij}\right]_{n\times 1} = \left(r_i\right)_{n\times 1} = \left(r_1,\ldots,r_i,\ldots,r_n\right) \tag{21}$$

$$\tilde{R}_i^{def} = y = \left[\sum_{i=1}^{n} t_{ij}\right]_{1\times n}^{'} = \left(y_j\right)_{1\times n}^{'} = \left(y_1,\ldots,y_i,\ldots,y_n\right) \tag{22}$$

In these equations, $\tilde{D}_i^{def}$ gives information about the sum of all vector rows. On the other side, $\tilde{R}_i^{def}$ indicates the sum of all vector columns (Vinodh et al., 2016). DEMATEL method was used by many different researchers in the literature. It can be seen that mainly this approach was considered in performance evaluation (Dinçer, Hacıoğlu and Yüksel, 2017; Dincer, Yüksel and Martinez, 2019a,b,c; Dinçer, Yüksel and Kartal, 2016). On the other side, it is also defined that Dinçer and Yüksel (2019), Dinçer, Yüksel and Pınarbaşı (2019) and Dinçer, Yuksel and Bozaykut-Buk (2018) made analysis in energy industry with the help of this approach. Financial crisis was also evaluated by using this model (Dinçer, Yüksel and Şenel, 2018; Dinçer et al., 2019). In addition to them, Dinçer, Yüksel and Çetiner (2019), Yüksel, Dinçer and Emir (2018) and Dinçer, Uzunkaya and Yüksel evaluated banking industry with DEMATEL method.

AN APPLICATION ON EUROPEAN TOURISM INDUSTRY

The interval type 2 fuzzy DEMATEL is applied for determining the relative importance of each criterion and influence degrees among the innovative tourism investments. Additionally, the impact and relation map is illustrated by using the degree of causality. Proposed model considers the problem of innovative investments for the European Tourism Industry. For this purpose, 8 criteria are defined for the strategic motives of the European Tourism Industry and 3 decision makers that are the experts in the field of the European Tourism are appointed. Thus, the linguistic evaluations on the innovative strategies are provided for the tourism investments by the experts. Table 1 represents the proposed innovative strategies for the European Tourism Industry.

The first criterion defines the extra discounts and tax-free goods for the retail customers. Another motive is related to the educational visitors that could increase the quantity of conferences academic meetings. The third innovative investment strategy focuses on the major multi-sport events that could be interested by many visitors. The strategies of luxury travel could increase the volume of trade by considering the new trends for the wealthy tourist. The cultural activities are another important strategy for the innovative tourism investments by familiarizing the traditional flavours and entertainments. International medical services provided by the hospitals and other institutions could be offered with the competitive prices for developing the health tourism. Another alternative strategy is to introduce the ecological areas that are the parts of cultural heritage and nature globally. The final alternative strategy is to widen the business in globe across the country.

Table 1. Selected motives for the innovative tourism investments

Criteria	Strategies	References
Shopping facilities (C1)	Providing the extra discounts and tax-free goods for the retail customers	Choi et al. (2016); Li et al. (2015); Suhartanto (2017); da Anunciação et al. (2018); Keswani (2019); Gutierrez (2018)
Educational visitors (C2)	Increasing the conferences and academic meetings throughout the year	Din (2018); McGladdery and Lubbe (2017); Sie et al. (2016); Caset et al. (2018); Chang et al. (2018); Madeira et al. (2019)
Sport events (C3)	Focusing on the major multi-sport events	Kim et al. (2015); Hinch and Holt (2017); Gibson (2017); Tasci et al. (2018); Priporas et al. (2018); Zarei et al. (2018)
Luxury travel (C4)	Creating the new trends on the luxury consumption	Buckley and Mossaz (2016); Gabor and Oltean (2019); Zhang and Tse (2018); Peng and Cheng (2019); Hung et al. (2018); Correia et al. (2019)
Cultural activities (C5)	Familiarizing the traditional flavours and entertainments	Smith (2015); Jovicic (2016); Torre and Scarborough (2017)
Medical services (C6)	Offering the competitive prices for the medical services with the multilingual staff	Han and Hyun (2015); Lunt et al. (2016); Fetscherin and Stephano (2016); Suess et al. (2018); Rydback and Hyder (2018); Gabor and Oltean (2019)
Ecological areas (C7)	Introducing the cultural heritage and natural areas globally	Nikolaeva et al. (2018); Ozturk et al. (2016); Diedrich and Aswani (2016)
Business density (C8)	Extending the doing business internationally across the country	Rogerson (2015); Guizzardi and Stacchini (2015); Page et al. (2017)

Table 2 presents the linguistic opinions with 9 point-scales and their fuzzy numbers based on IT2 for evaluating the innovative tourism investments in the Europe. Table 3 shows that the linguistic evaluations of 3 decision makers for the innovative tourism investments.

By using the scores converted into IT2 fuzzy numbers of each decision maker, the analysis is applied with the IT2 Fuzzy DEMATEL approach to measure the relative importance of innovative tourism strategies and to understand the possible impact and relationship degrees between the innovative

Table 2. Linguistic scales and interval type-2 trapezoidal fuzzy numbers for the criteria

Criteria	IT2TrFNs
Absolutely Low (AL)	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))
Very Low (VL)	((0.0075, 0.0075, 0.015, 0.0525;0.8), (0.0,0.0,0.02,0.07;1.0))
Low (L)	((0.0875, 0.12, 0.16, 0.1825;0.8), (0.04,0.10,0.18,0.23;1.0))
Medium Low (ML)	((0.2325, 0.255, 0.325, 0.3575;0.8), (0.17,0.22,0.36,0.42;1.0))
Medium (M)	((0.4025, 0.4525, 0.5375, 0.5675;0.8), (0.32,0.41,0.58,0.65;1.0))
Medium High (MH)	((0.65, 0.6725, 0.7575, 0.79;0.8), (0.58,0.63,0.80,0.86;1.0))
High (H)	((0.7825, 0.815, 0.885, 0.9075;0.8), (0.72,0.78,0.92,0.97;1.0))
Very High (VH)	((0.9475, 0.985, 0.9925, 0.9925;0.8), (0.93,0.98,1.0,1.0;1.0))
Absolutely High (AH)	((1.0, 1.0, 1.0, 1.0; 1.0), (1.0, 1.0, 1.0, 1.0; 1.0))

Source: Chen et al. (2013)

Table 3. Linguistic evaluations of decision makers on the criteria of innovative tourism investments

	C1			C2			C3			C4			C5			C6			C7			C8		
	DM1	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**	**DM1**	**DM2**	**DM3**
C1	-	-	-	ML	M	M	M	M	MH	H	MH	H	M	MH	M	L	M	M	ML	L	M	ML	ML	M
C2	MH	H	H	-	-	-	H	MH	MH	ML	M	ML	H	MH	MH	L	ML	L	H	VH	VH	L	L	ML
C3	H	VH	VH	L	ML	VL	-	-	-	H	VH	VH	H	MH	H	L	VL	L	VH	VH	VH	L	L	ML
C4	AH	VH	VH	L	VL	L	MH	M	H	-	-	-	H	MH	VH	M	ML	M	MH	H	H	VH	H	H
C5	H	VH	VH	L	VL	ML	M	ML	ML	MH	H	M	-	-	-	M	ML	L	AH	H	VH	M	ML	L
C6	MH	H	H	L	VL	L	M	M	ML	H	MH	H	MH	H	H	-	-	-	H	VH	MH	L	ML	L
C7	VH	VH	H	ML	M	ML	MH	H	VH	VH	VH	H	VH	VH	AH	ML	L	L	-	-	-	M	ML	L
C8	VH	AH	H	M	M	M	H	MH	MH	AH	VH	VH	MH	H	MH	M	M	ML	H	MH	MH	-	-	-

investments for the European Tourism Industry. For this purpose, first, the dependency degrees among the criteria are constructed by the average scores of decision makers and initial direct-relation matrix is provided as seen in Table 4.

The initial direct relation matrix has been normalized by the equations (11)-(13). The results are shown in Table 5.

Table 6 represents the total relation matrix with the equations (14)-(18).

The total relation matrix has been defuzzified by the formulas (19). Table 7 defines the results of the defuzzified values for the criteria.

The total importance and influence degrees of each criterion have been examined by the equations (20)-(22).

Table 4. Initial direct relation matrix for the criteria

	C1	**C2**	**C3**	**C4**
C1	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.35,0.39,0.47,0.50;0.80), (0.27,0.35,0.51,0.57;1.00))	((0.49,0.53,0.61,0.64;0.80), (0.41,0.48,0.65,0.72;1.00))	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))
C2	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.69,0.72,0.80,0.83;0.80), (0.63,0.68,0.84,0.90;1.00))	((0.29,0.32,0.40,0.43;0.80), (0.22,0.28,0.43,0.50;1.00))
C3	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))	((0.07,0.11,0.19,0.24;0.80), (0.00,0.00,0.00,0.00;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))
C4	((0.97,0.99,1.00,1.00;0.80), (0.95,0.99,1.00,1.00;1.00))	((0.03,0.07,0.13,0.18;0.80), (0.61,0.65,0.73,0.76;1.00))	((0.61,0.65,0.73,0.76; 0.80), (0.54,0.61,0.77,0.83;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))
C5	((0.89,0.93,0.96,0.96; 0.80), (0.86,0.91,0.97,0.99;1.00))	((0.07,0.11,0.19,0.24;0.80), (0.29,0.32,0.40,0.43;1.00))	((0.29,0.32,0.40,0.43;0.80), (0.22,0.28,0.43,0.50;1.00))	((0.61,0.65,0.73,0.76;0.80), (0.54,0.61,0.77,0.83;1.00))
C6	((0.74,0.77,0.84,0.87; 0.80), (0.67,0.73,0.88,0.93;1.00))	((0.03,0.07,0.13,0.18;0.80), (0.35,0.39,0.47,0.50;1.00))	((0.35,0.39,0.47,0.50;0.80), (0.27,0.35,0.51,0.57;1.00))	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))
C7	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))	((0.22,0.28,0.43,0.50;0.80), (0.79,0.82,0.88,0.90;1.00))	((0.79,0.82,0.88,0.90;0.80), (0.74,0.80,0.91,0.94;1.00))	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))
C8	((0.91,0.93,0.96,0.97;0.80), (0.88,0.92,0.97,0.99;1.00))	((0.32,0.41,0.58,0.65;0.80), (0.69,0.72,0.80,0.83;1.00))	((0.69,0.72,0.80,0.83;0.80), (0.63,0.68,0.84,0.90;1.00))	((0.97,0.99,1.00,1.00;0.80), (0.95,0.99,1.00,1.00;1.00))
	C5	C6	C7	C8
C1	((0.49,0.53,0.61,0.64;0.80), (0.41,0.48,0.65,0.72;1.00))	((0.30,0.34,0.41,0.44;0.80), (0.23,0.31,0.45,0.51;1.00))	((0.24,0.28,0.34,0.37;0.80), (0.18,0.24,0.37,0.43;1.00))	((0.29,0.32,0.40,0.43;0.80), (0.22,0.28,0.43,0.50;1.00))
C2	((0.69,0.72,0.80,0.83;0.80), (0.63,0.68,0.84,0.90;1.00))	((0.14,0.17,0.22,0.24;0.80), (0.08,0.14,0.24,0.29;1.00))	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))	((0.14,0.17,0.22,0.24;0.80), (0.13,0.21,0.36,0.44;1.00))
C3	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))	((0.06,0.08,0.11,0.14;0.80), (0.03,0.07,0.13,0.18;1.00))	((0.89,0.93,0.96,0.96;0.80), (0.86,0.91,0.97,0.99;1.00))	((0.14,0.17,0.22,0.24;0.80), (0.13,0.21,0.36,0.44;1.00))
C4	((0.79,0.82,0.88,0.90;0.80), (0.74,0.80,0.91,0.94;1.00))	((0.35,0.39,0.47,0.50;0.80), (0.27,0.35,0.51,0.57;1.00))	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))	((0.84,0.87,0.92,0.94;0.80), (1.19,1.27,1.42,1.47;1.00))
C5	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.24,0.28,0.34,0.37;0.80), (0.18,0.24,0.37,0.43;1.00))	((0.91,0.93,0.96,0.97;0.80), (0.88,0.92,0.97,0.99;1.00))	((0.24,0.28,0.34,0.37;0.80), (0.27,0.37,0.56,0.65;1.00))
C6	((0.74,0.77,0.84,0.87;0.80), (0.67,0.73,0.88,0.93;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.79,0.82,0.88,0.90;0.80), (0.74,0.80,0.91,0.94;1.00))	((0.14,0.17,0.22,0.24;0.80), (0.13,0.21,0.36,0.44;1.00))
C7	((0.97,0.99,1.00,1.00;0.80), (0.95,0.99,1.00,1.00;1.00))	((0.14,0.17,0.22,0.24;0.80), (0.08,0.14,0.24,0.29;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.24,0.28,0.34,0.37;0.80), (0.27,0.37,0.56,0.65;1.00))
C8	((0.69,0.72,0.80,0.83;0.80), (0.63,0.68,0.84,0.90;1.00))	((0.35,0.39,0.47,0.50;0.80), (0.27,0.35,0.51,0.57;1.00))	((0.69,0.72,0.80,0.83;0.80), (0.63,0.68,0.84,0.90;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))

Table 5. Normalized initial direct relation matrix

	C1	**C2**	**C3**	**C4**
C1	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.06,0.07,0.08,0.09;0.80), (0.05,0.06,0.08,0.10;1.00))	((0.09,0.10,0.11,0.12;0.80), (0.07,0.09,0.12,0.13;1.00))	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))
C2	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.13,0.13,0.15,0.15;0.80), (0.11,0.12,0.15,0.16;1.00))	((0.05,0.06,0.07,0.08;0.80), (0.04,0.05,0.08,0.09;1.00))
C3	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.02,0.02,0.03,0.04;0.80), (0.01,0.02,0.03,0.04;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))
C4	((0.18,0.18,0.18,0.18;0.80), (0.17,0.18,0.18,0.18;1.00))	((0.01,0.01,0.02,0.03;0.80), (0.00,0.01,0.02,0.03;1.00))	((0.11,0.12,0.13,0.14;0.80), (0.10,0.11,0.14,0.15;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))
C5	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.02,0.02,0.03,0.04;0.80), (0.01,0.02,0.03,0.04;1.00))	((0.05,0.06,0.07,0.08;0.80), (0.04,0.05,0.08,0.09;1.00))	((0.11,0.12,0.13,0.14;0.80), (0.10,0.11,0.14,0.15;1.00))
C6	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))	((0.01,0.01,0.02,0.03;0.80), (0.00,0.01,0.02,0.03;1.00))	((0.06,0.07,0.08,0.09;0.80), (0.05,0.06,0.09,0.10;1.00))	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))
C7	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.05,0.06,0.07,0.08;0.80), (0.04,0.05,0.08,0.09;1.00))	((0.14,0.15,0.16,0.16;0.80), (0.13,0.14,0.16,0.17;1.00))	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))
C8	((0.17,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.07,0.08,0.10,0.10;0.80), (0.06,0.07,0.11,0.12;1.00))	((0.13,0.13,0.15,0.15;0.80), (0.11,0.12,0.15,0.16;1.00))	((0.18,0.18,0.18,0.18;0.80), (0.17,0.18,0.18,0.18;1.00))
	C5	C6	C7	C8
C1	((0.09,0.10,0.11,0.12;0.80), (0.07,0.09,0.12,0.13;1.00))	((0.05,0.06,0.07,0.08;0.80), (0.04,0.06,0.08,0.09;1.00))	((0.04,0.05,0.06,0.07;0.80), (0.03,0.04,0.07,0.08;1.00))	((0.05,0.06,0.07,0.08;0.80), (0.06,0.08,0.12,0.14;1.00))
C2	((0.13,0.13,0.15,0.15;0.80), (0.11,0.12,0.15,0.16;1.00))	((0.02,0.03,0.04,0.04;0.80), (0.02,0.03,0.04,0.05;1.00))	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.02,0.03,0.04,0.04;0.80), (0.02,0.04,0.07,0.08;1.00))
C3	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))	((0.01,0.01,0.02,0.03;0.80), (0.00,0.01,0.02,0.03;1.00))	((0.16,0.17,0.17,0.17;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.02,0.03,0.04,0.04;0.80), (0.02,0.04,0.07,0.08;1.00))
C4	((0.14,0.15,0.16,0.16;0.80), (0.13,0.14,0.16,0.17;1.00))	((0.06,0.07,0.08,0.09;0.80), (0.05,0.06,0.09,0.10;1.00))	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))	((0.15,0.16,0.17,0.17;0.80), (0.21,0.23,0.26,0.27;1.00))
C5	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.04,0.05,0.06,0.07;0.80), (0.03,0.04,0.07,0.08;1.00))	((0.17,0.17,0.17,0.18;0.80), (0.16,0.17,0.18,0.18;1.00))	((0.04,0.05,0.06,0.07;0.80), (0.05,0.07,0.10,0.12;1.00))
C6	((0.13,0.14,0.15,0.16;0.80), (0.12,0.13,0.16,0.17;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.14,0.15,0.16,0.16;0.80), (0.13,0.14,0.16,0.17;1.00))	((0.02,0.03,0.04,0.04;0.80), (0.02,0.04,0.07,0.08;1.00))
C7	((0.18,0.18,0.18,0.18;0.80), (0.17,0.18,0.18,0.18;1.00))	((0.02,0.03,0.04,0.04;0.80), (0.02,0.03,0.04,0.05;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))	((0.04,0.05,0.06,0.07;0.80), (0.05,0.07,0.10,0.12;1.00))
C8	((0.13,0.13,0.15,0.15;0.80), (0.11,0.12,0.15,0.16;1.00))	((0.06,0.07,0.08,0.09;0.80), (0.05,0.06,0.09,0.10;1.00))	((0.13,0.13,0.15,0.15;0.80), (0.11,0.12,0.15,0.16;1.00))	((0.0,0.0,0.0,0.0;1.0), (0.0,0.0,0.0,0.0;1.0))

According to Table 8, C4 is the most important strategy in the innovative tourism investment while C2 has the weakest importance. However, C2 is the most influencing factor among the criteria as C1 is the most influenced strategy. Accordingly, the impact and relation map could be provided by considering the averaged values of the defuzzified matrix. For that, higher values than the average scores have been selected to determine the possible impact among the criteria. The results show that there is no influencing factor on C2 and C6 whereas C1 and C4 is influenced by the all criteria.

Table 6. Total relation matrix

	C1	C2	C3	C4
C1	((0.23,0.30,0.48,0.59;0.80), (0.17,0.28,0.88,1.96;1.00))	((0.11,0.15,0.23,0.29;0.80), (0.08,0.13,0.41,0.92;1.00))	((0.23,0.29,0.45,0.55;0.80), (0.17,0.26,0.78,1.69;1.00))	((0.32,0.38,0.56,0.67;0.80), (0.26,0.36,0.95,1.97;1.00))
C2	((0.39,0.46,0.66,0.78;0.80), (0.32,0.44,1.07,2.17;1.00))	((0.07,0.10,0.18,0.23;0.80), (0.04,0.08,0.34,0.86;1.00))	((0.29,0.35,0.52,0.62;0.80), (0.23,0.32,0.85,1.77;1.00))	((0.29,0.36,0.55,0.66;0.80), (0.22,0.33,0.93,1.98;1.00))
C3	((0.43,0.51,0.69,0.80;0.80), (0.37,0.49,1.09,2.15;1.00))	((0.09,0.12,0.21,0.27;0.80), (0.06,0.11,0.38,0.89;1.00))	((0.19,0.24,0.39,0.49;0.80), (0.14,0.23,0.72,1.61;1.00))	((0.40,0.46,0.64,0.74;0.80), (0.34,0.45,1.02,2.02;1.00))
C4	((0.49,0.57,0.78,0.91;0.80), (0.44,0.58,1.31,2.60;1.00))	((0.10,0.14,0.23,0.30;0.80), (0.07,0.13,0.46,1.07;1.00))	((0.32,0.39,0.57,0.69;0.80), (0.27,0.38,1.01,2.10;1.00))	((0.30,0.37,0.57,0.69;0.80), (0.26,0.38,1.07,2.29;1.00))
C5	((0.40,0.47,0.65,0.76;0.80), (0.34,0.45,1.05,2.11;1.00))	((0.09,0.12,0.20,0.26;0.80), (0.06,0.10,0.37,0.87;1.00))	((0.22,0.28,0.44,0.53;0.80), (0.16,0.25,0.76,1.66;1.00))	((0.33,0.39,0.57,0.68;0.80), (0.27,0.37,0.95,1.96;1.00))
C6	((0.39,0.47,0.67,0.79;0.80), (0.32,0.44,1.08,2.20;1.00))	((0.08,0.11,0.20,0.26;0.80), (0.05,0.10,0.37,0.90;1.00))	((0.24,0.30,0.47,0.57;0.80), (0.17,0.27,0.80,1.75;1.00))	((0.36,0.43,0.62,0.73;0.80), (0.29,0.40,1.01,2.07;1.00))
C7	((0.46,0.55,0.74,0.86;0.80), (0.40,0.53,1.20,2.36;1.00))	((0.13,0.16,0.26,0.33;0.80), (0.09,0.15,0.46,1.02;1.00))	((0.34,0.40,0.57,0.68;0.80), (0.28,0.38,0.94,1.93;1.00))	((0.42,0.50,0.68,0.80;0.80), (0.36,0.48,1.11,2.22;1.00))
C8	((0.50,0.59,0.82,0.96;0.80), (0.42,0.56,1.29,2.56;1.00))	((0.16,0.20,0.31,0.39;0.80), (0.11,0.18,0.51,1.12;1.00))	((0.35,0.42,0.62,0.74;0.80), (0.28,0.38,1.00,2.08;1.00))	((0.47,0.55,0.76,0.89;0.80), (0.39,0.52,1.20,2.41;1.00))
	C5	C6	C7	C8
C1	((0.27,0.34,0.52,0.63;0.80), (0.21,0.31,0.90,1.93;1.00))	((0.12,0.15,0.25,0.31;0.80), (0.08,0.14,0.44,1.00;1.00))	((0.23,0.29,0.47,0.58;0.80), (0.17,0.27,0.83,1.82;1.00))	((0.15,0.18,0.30,0.37;0.80), (0.15,0.24,0.75,1.66;1.00))
C2	((0.34,0.41,0.60,0.71;0.80), (0.27,0.38,0.98,2.02;1.00))	((0.10,0.14,0.24,0.30;0.80), (0.06,0.12,0.43,1.00;1.00))	((0.36,0.43,0.60,0.71;0.80), (0.30,0.40,0.96,1.96;1.00))	((0.13,0.17,0.29,0.36;0.80), (0.12,0.22,0.73,1.66;1.00))
C3	((0.36,0.43,0.61,0.72;0.80), (0.30,0.40,0.98,1.99;1.00))	((0.10,0.13,0.23,0.29;0.80), (0.06,0.12,0.41,0.97;1.00))	((0.37,0.44,0.60,0.71;0.80), (0.31,0.42,0.96,1.93;1.00))	((0.15,0.19,0.30,0.37;0.80), (0.15,0.25,0.75,1.65;1.00))
C4	((0.41,0.48,0.69,0.82;0.80), (0.35,0.48,1.19,2.41;1.00))	((0.16,0.20,0.32,0.39;0.80), (0.11,0.19,0.57,1.24;1.00))	((0.39,0.46,0.66,0.79;0.80), (0.33,0.45,1.14,2.33;1.00))	((0.27,0.32,0.45,0.53;0.80), (0.34,0.45,1.06,2.14;1.00))
C5	((0.22,0.28,0.44,0.55;0.80), (0.16,0.26,0.81,1.81;1.00))	((0.12,0.15,0.25,0.31;0.80), (0.08,0.14,0.44,0.99;1.00))	((0.35,0.41,0.57,0.68;0.80), (0.29,0.39,0.93,1.89;1.00))	((0.15,0.19,0.30,0.37;0.80), (0.15,0.25,0.75,1.64;1.00))
C6	((0.35,0.42,0.61,0.72;0.80), (0.28,0.39,0.99,2.05;1.00))	((0.08,0.11,0.20,0.27;0.80), (0.05,0.10,0.39,0.96;1.00))	((0.35,0.41,0.59,0.70;0.80), (0.28,0.38,0.96,1.98;1.00))	((0.14,0.18,0.30,0.37;0.80), (0.14,0.23,0.75,1.69;1.00))
C7	((0.42,0.49,0.68,0.79;0.80), (0.36,0.47,1.10,2.20;1.00))	((0.12,0.16,0.27,0.33;0.80), (0.08,0.14,0.48,1.09;1.00))	((0.26,0.33,0.51,0.62;0.80), (0.20,0.31,0.91,1.97;1.00))	((0.18,0.22,0.35,0.42;0.80), (0.19,0.29,0.85,1.84;1.00))
C8	((0.42,0.49,0.72,0.86;0.80), (0.33,0.45,1.16,2.37;1.00))	((0.16,0.21,0.33,0.41;0.80), (0.11,0.18,0.56,1.22;1.00))	((0.40,0.48,0.70,0.83;0.80), (0.32,0.44,1.12,2.29;1.00))	((0.15,0.19,0.32,0.41;0.80), (0.15,0.25,0.83,1.89;1.00))

SOLUTIONS AND RECOMMENDATIONS

The findings also show that there is no influencing factor on making investment on educational visitors and medical services. It defines that while visitors attend the conferences and academic meetings or demand medical services, other innovative strategies do not have any affect. On the other side, investment in shopping facilities and luxury travel influenced by all criteria. It is understood that all innovative tourism investment strategies, such as education, sport, medical services, cultural activities make a contribution to shopping and luxury consumption.

Table 7. Defuzzified total relation matrix

	C1	C2	C3	C4	C5	C6	C7	C8
C1	0.59	0.28	0.53	0.66	0.62	0.30	0.56	0.46
C2	0.76	0.23	0.60	0.64	0.69	0.29	0.69	0.45
C3	0.79	0.26	0.48	0.73	0.70	0.28	0.69	0.46
C4	0.93	0.30	0.69	0.72	0.82	0.38	0.79	0.67
C5	0.75	0.25	0.52	0.67	0.55	0.30	0.66	0.46
C6	0.77	0.25	0.55	0.71	0.70	0.26	0.68	0.46
C7	0.86	0.31	0.66	0.79	0.79	0.32	0.62	0.53
C8	0.93	0.36	0.71	0.87	0.82	0.39	0.79	0.51

FUTURE RESEARCH DIRECTIONS

In the future studies, a different methodology can be applied for this topic, such as interval type-2 fuzzy VIKOR to make comparison analysis.

CONCLUSION

In this study, it is aimed to identify strategic impact relationship map for the innovative tourism investments. In this framework, eight different investment strategies are developed by examining significant studies in the literature. In addition to this condition, interval type-2 fuzzy DEMATEL methodology is considered in the analysis process. The main reason of selecting DEMATEL approach in comparison with other similar techniques is that impact relationship analysis can be performed by using this approach.

According to the result of this analysis, it is defined that luxury travel is the most important innovative tourism investment. On the other side, increasing the conferences and academic meetings throughout the year has the lowest significance. This situation gives information that European tourism companies should mainly create new trends on the luxury consumption in order to improve tourism industry. Brenner

Table 8. Importance and influence degrees of the criteria

	R	y	r+y	r-y	Weights
C1	4.01	6.37	10.38	- 2.35	0.1407
C2	4.35	2.25	6.59	2.10	0.0894
C3	4.39	4.75	9.14	- 0.36	0.1240
C4	5.32	5.79	11.10	- 0.47	0.1505
C5	4.16	5.68	9.85	- 1.52	0.1335
C6	4.39	2.53	6.92	1.86	0.0938
C7	4.88	5.49	10.37	- 0.62	0.1406
C8	5.37	4.02	9.39	1.36	0.1274

and Aguilar (2002), Atwal and Williams (2017) and Bernard and Cook (2015) also evaluated similar topic in their studies and concluded that luxury tourism has an important influence on both sustainable tourism and macroeconomic development.

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KEY TERMS AND DEFINITIONS

DEMATEL: The decision-making trial and evaluation laboratory.
IT2: Interval Type 2.
VIKOR: VIseKriterijumska Optimizacija I Kompromisno Resenje.

Chapter 8
More Obstacles to the Growth of ESCOs in Turkey:
Stumble In the Midst of a Financial Distress

Esin Okay
Istanbul Commerce Unversity, Turkey

ABSTRACT

Sustainable and clean sources of energy is an issue of financial challenges for developing countries. Turkey has a considerable potential for a sustainable and cheap form of energy. As a developing country, Turkey implemented policies to improve renewables and energy efficiency in line with EU requirements. But there is incompetence of policy making and practice in which lack of familiarity with infrastructure investment and financing methods challenge renewable energy utilization in Turkey. The weak rule of law does not help to obtain culture, awareness, and consciousness of energy efficiency in Turkey. The enactment of raising awareness of energy saving projects and companies for reducing costs of energy efficiency should be the first priority of government. Beyond infrastructural problems, the key failure of ESCOs is lack of risk culture and poor risk management. Nowadays, the ongoing economic obstacles enhanced and ESCOs are facing financial distress and corporate debt restructuring which will affect the growth of energy savings in Turkey.

INTRODUCTION

Energy investment has a strong impact with country-level financial conditions. Sustainable investment opportunities and effective capital from private institutions, liquid capital markets, and access to domestic and foreign sources are hallmarks of a supportive investment environment. Investment decisions regarding energy must be made with an eye towards profitability but also by perceptions of risk and business factors. Recently some actors intended to shift their capital allocations to a different mix of fuels and technologies. This will merit a look at some of the financial and non-financial drivers (IEA, 2019a).

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Energy service companies (ESCOs) are the first driver for energy project development cutting down technical and performance risks associated with a project. ESCOs develop, design, build, and fund projects that save energy, reduce energy costs, and decrease operations and maintenance costs at their customers' facilities. The investments to achieve energy savings are financed on basis of a future lower energy bill (3E, 2015). Recently, interest in ESCOs has increased due to increasing energy costs and economic penalties attached to excessive energy usage and related emissions.

Sustainable Development Scenario supports an integrated strategy to achieve energy access, low carbon technologies, air quality and climate goals contributing to a broad transformation of global energy. Renewable energy technologies provide the main pathway to the provision of universal energy access. All economical models to build and improve efficiency are pursued, keeping overall demand in 2040 at today's level. The direct use of renewables – bioenergy, solar and geothermal heat – to provide heat and mobility grows high as the electrification of end-uses grows too (IEA, 2018).

Attitudes, preferences and intentions gradually change for the better on behalf of new technologies in global energy. Energy consumption has shifted broadly towards projects with shorter lead times, moderately reflecting investor preferences for better management of capital at risk amid uncertainties over the future direction of the energy system. Investment purchasing power has risen over time in some sectors. Adjusting for cost declines, renewable power investment is up 55% since 2010, and cost changes have damped the impact of less oil and gas spending since 2014 (IEA,2019a).

The aim of this study is to gain insights from the infrastructural problems in energy sector and financial services showing the status in Turkey and why energy investments and ESCOs are immature and undersized. The study has three main objectives. The first objective is to emphasize the importance of energy demand and energy alternatives in economy. In this context, global economies' energy strategy, and energy efficiency are presented in the background of the paper. In the second part, ESCOs within global aspect are asserted as the facilitators of the energy industry in the world to emphasize the issue. The third objective is to extend the chapter with the situation in Turkey showing the status and challenges regarding energy projects and ESCO market aside the energy potential. The section highlights the concerns on going in Turkey underlining the rigid facts of economic burdens and risks, financial distress and debt problems of ESCOs, and adoption problems regarding energy policy. The study concludes with the recommendations for legislative and financial risk management solutions in Turkey.

BACKGROUND

Energy continues to be an important and urgent topic of discussion whenever economies gather to speed up renewables or climate action. High energy consumption with huge carbon emissions still raises the threats of global warming and climate change. Therefore, energy is a non-stop hot issue having a strong impact on both economy and environment. Global economy still needs to obtain sustainable and clean sources of energy, which is an issue of financial challenges. On the other hand, developing countries more challenged by costs and risks face problems of energy sourcing and financing. But it is widely accepted that using the natural sources of renewable energy is cheap and clean. Therefore, developing economies must develop energy strategies based on renewable energy solutions.

Global economic concerns increase as the growth rate falls down by the high volatility in asset prices, uncertainty level and risks rise. Global growth is expected to remain at around 3.0% in 2019 and 2020, however the steady pace of expansion in the global economy masks an increase in downside risks that

could potentially exacerbate development challenges in many parts of the world, according to the World Economic Situation and Prospects 2019. The risks are intensified by the slowdown of global trade and investment (United Nations, 2019).

According to OECD, global growth is expected to slow down to 3.2% in 2019 and 3.4% in 2020, with downside risks continuing to build. Growth has been revised downwards in almost all G20 economies, especially consisting of large revisions in the euro area in both 2019 and 2020. The global expansion continues to lose momentum, amidst heightened policy uncertainty, persistent trade tensions and ongoing declines in business and consumer confidence. Therefore, policy uncertainty and lack of profitable investment opportunities weakened business confidence (OECD, 2019a).

After three years of decline, global energy investment reached over USD1.8 trillion in 2018. More consumption on oil, gas and coal supply was offset by lower spend on fossil-fuel based generation and renewable power. Efficiency spending was unchanged. Power still attracted the most investment, exceeding oil and gas for a third year in a row (IEA, 2019). The rise of the global energy intensity forces economies towards renewable energy solutions. The share of renewables in the power mix rises from one-quarter today to two-thirds in 2040; in the provision of heat it rises from 10% today to 25% and in transport it rises from 3.5% today to 19% (IEA,2018).

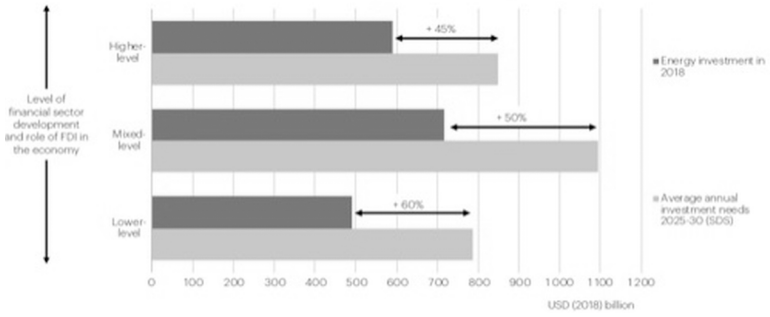
For instance, EU has set the target of making the transition to a competitive low-carbon economy within the next 40 years. This means that the EU needs to reduce its domestic emissions by at least 80% by 2050 compared to 1990. With the urban proportion of the world's population forecast to increase to 70% by 2050, cities will have to make a substantial contribution to achieving this ambitious goal (Okay, 2018).

There is a strong relation between income levels and energy investment. Nearly 90% of energy investment in 2018 was concentrated in high-and upper-middle income countries and regions. These areas also tend to benefit from relatively well-developed financial systems. High-income countries, with just over 15% of the global population, accounted for over 40% of energy investment in 2018. Investment in this group is down somewhat from five years ago, largely due to lower spending in Europe and Japan, but rose in 2018 with stronger spending in fuel supply and the power sector predominantly in the United States (IEA, 2019a).

Developed countries encourage scientific creativity increasing technology and innovation dependence, whereas developing countries face problems of energy sourcing due to costs and risks. There is a huge need to change energy investments for production of renewable energy and energy efficiency equipment in large scale, including local production of simple renewable energy equipment in developing countries. But many of the economies discovering the characteristics and benefits of renewables already started using the cheap and clean natural sources of energy (Okay, 2015).

According to Sustainable Development Scenario (SDS) of IEA (Figure 1) in 2018, one-third of energy investment was concentrated in areas with both well-developed financial systems and good access to foreign capital (higher- level). This category includes markets such as the United States, a number of European countries and Australia, where private credit, equity markets and foreign sources of capital all play a relatively strong role in the economy. Around 40% of investment was in economies with mixed conditions. Some large markets, such as China, have relatively well-developed domestic financial systems but lower levels of Foreign Direct Investment (FDI) in the economy. Others, such as Brazil and Mexico, have benefitted from rising shares of FDI in recent years but have relatively constrained domestic finance. Countries in Southeast Asia are highly mixed. Investment gaps are largest in areas currently with mixed or lower-level financial conditions, like Turkey i.e. those areas with relatively high capital constraints in their economies (IEA, 2019a).

Figure 1. Energy investment, classified by financial sector development and the role of foreign direct investment (FDI) in the economy



Source: IEA

In advanced economies, electricity demand growth is modest, but the investment requirement is still huge as the generation mix changes and infrastructure is upgraded (IEA, 2018). Greater uncertainty could add more costs significantly, even in the advanced economies, by raising investment risk premium in financial markets and the cost of capital for companies (OECD, 2019a). Lower-middle and low-income developing countries accounted for less than 15% of energy investment in 2018 despite containing well over 40% of the world's population. In recent years, the fastest investment growth within this group has come from India with rising power sector spending, while spending in sub-Saharan Africa has declined, mostly due to less investment in fuel supply (IEA, 2019a).

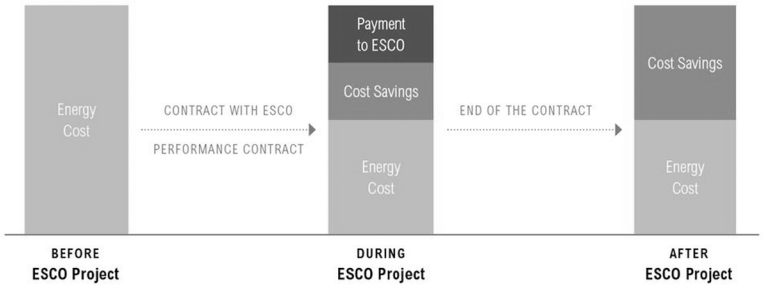
Financial stability risks and significant adjustment challenges from past financial market tensions continue to impede growth in many countries. A tighter policy stance remains necessary in those emerging-market economies, such as Argentina and Turkey, where concerns persist about the sustainability of fiscal or external positions, in order to retain investors' confidence. Nominal interest rates can go down as inflation moderates from its current high rates, but there is little scope for lower real interest rates. The priority in these economies is to undertake reforms that enhance the prospects for fiscal and financial sustainability in the medium term (OECD, 2019a).

ENERGY FINANCING: ESCOS IN THE WORLD

ESCOs have the ability to implement projects in buildings, industry and transport in both the private and public sectors whereas the majority of projects takes place in the non-residential buildings, followed by industry and with no projects in the transport sector. On average, ESCO projects are delivering energy savings upwards of 25% (IEA, 2019a). The cost of renewable energy derived from nature is decreasing continuously as countries ambitiously adopted national strategic targets like providing energy efficiency enhanced by the implementations of ESCOs all around the World (Okay, 2015).

There are two kinds of energy performance financing by ESCOs. The guaranteed savings contracts which is the most common type in United States, are characterized by an agreed minimum rate of savings to be met, and the difference between the current energy use and the new energy use levels is used to pay back the ESCO or the financial institution. Another popular type of EPC contract is the shared

Figure 2. Financial Portrait of Shared Savings Energy Performance Contracts by ESCOs



Source: World Resources Institute

savings contract (Figure 2) whereby energy cost savings are shared between the building owner and the ESCO. Generally, shared forms of contract are financed by the ESCO rather than by a third-party financial institution. Payments to the ESCO may be a fixed percentage of savings, a minimum fee plus a share of the savings, or a scaled fee that decreases over time as the ESCO recoups its investment (World Resources Institute, 2016).

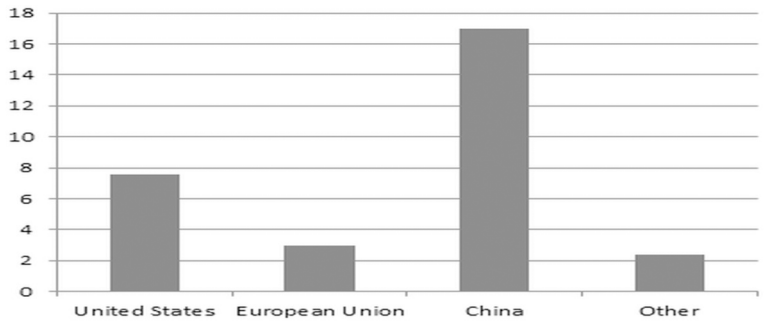
The guaranteed savings scheme - well- understood by all parties- is likely to function properly only in countries with a strong banking structure, high degree of familiarity with project financing and sufficient technical expertise. The guaranteed savings concept is difficult to use in introducing the ESCO concept in developing markets because it requires customers to assume investment repayment risk. The energy-user or the customer carries the credit risk. So the customer should be credit worthy. The shared savings concept is a good introductory model in developing markets because customers assume no financial risk. However, ESCOs should be credit worthy then because they will carry both performance and credit risk which might end up with debt problems especially small ESCOs (European Energy Efficiency Platform, 2019).

Moreover, ESCOs in many countries, mainly the developing economies have faced continuous challenges because of the long project development cycle and high financing costs, missing policy mechanisms that will promote the market with ESCO-friendly regulations and mismatch between the expectations of customers and ESCOs regarding the payment estimates. In that respect, governments need the technical assistance of global energy authorities and institutions for providing support to their local ESCOs (Kumar, 2014).

The ESCO market providing energy services and energy efficient equipment to end users still grow steadily. The global value of the ESCO market (by energy performance contract revenue) was nearly USD 30 billion in 2017, up 8% since 2016 (Figure 3). Much of this growth is occurring in China, the largest market by far (IEA, 2019a). The largest ESCO markets can be found in the United States (Figure 4) and China. In Asia, other successful examples include Japan, Thailand, and Malaysia (World Resources Institute, 2016).

Government policy remains a key driver of ESCO activity. In China, policy incentives have driven ESCO engagement in the private sector, while government procurement rules have been a barrier to further development in the public sector. In North America, public sector asset owners are able to obtain debt on favourable terms to finance ESCO contracts. In Europe, where the ESCO market is 10% of the global total, the European Commission recently clarified the terms under which an EPC can be accounted

Figure 3. Global ESCO Market Size (USD Billion)



Source: IEA

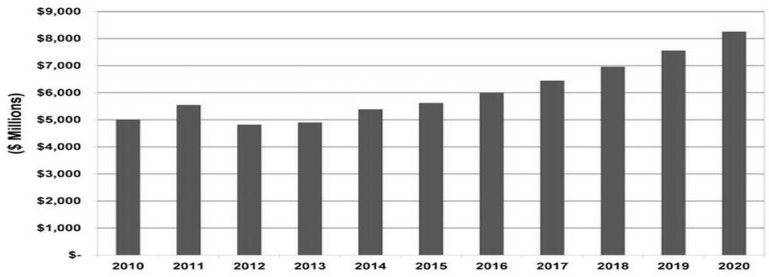
for off-balance sheet. The impact that these changes will have on the European ESCO market is still to be seen. Globally, nearly half of ESCO investment is for private sector customers. Most agreements between customers and ESCOs are underpinned by energy performance contracts that clarify ongoing payments and commit the ESCOs to installing equipment and guaranteeing savings (IEA, 2019a).

Risk management stand at a turning point when banks deal with energy projects. Third party financing is the most commonly used type for energy projects and it can be realized by a guaranteed saving contract. Country risk, credit risk and counterparty risk play a major role via projects with too high level of risk as for the case with energy projects. So, energy financers should have strong balance sheets. Energy financers in literature, are called ESCOs. ESCOs may finance, or assist in financing an energy project (including renewable and sustainable energy projects) by providing an energy-improvement (saving, efficiency, and conservation) guarantee (Akman, Okay, Okay, 2013).

The investments to achieve energy savings are financed on basis of a future lower energy bill. These investments are made by a third party (ESCO), not the initiating party. The SMEs sign the agreement with the ESCO for period of 10 years, for example. During this period of time, the SMEs pay a proportion of the energy savings to the ESCO. Often, a part of the energy saving is already attributed to the SMEs from the start (3E, 2015).

On the other hand, banks must have strong assets to take on huge liabilities of clients that have long-term projects. This is extremely a big risk that points to a considerably significant size-based balance

Figure 4. ESCO Market Forecast, United States (2018-2020)



Source: Environmental Leader

sheet to finance projects. Therefore, energy companies should be committed to risk management, as well. Energy projects should be managed with risk reduction methods like hedging instruments and venture capital. When energy companies need financial support to invest such risky projects banks analyze detailed financial statements before extending credit. Besides, banks should implement Basel II, and then Basel III (BIS, 2012). The banks in Turkey struggling to meet the demand of energy industry. Some Turkish banks, unfortunately low in number, with EBRD and World Bank together created initiation to build programmes for energy finance (Okay, 2017).

The literature on ESCOs is scarce though but surveys help in understanding mechanisms and country experiences of these companies by Bertoldi, Boza-Kiss (2017), Hannon, Ronan (2015), Stuart et al (2014), Niko, Lasse (2013), Kostka, Shin (2013), Jensen, Nielsen, Hansen (2013), Fang, Miller, Yeh (2012), Limaye, Limaye (2011), Soroye, Nilsson (2010), Okay, Okay, Akman (2008), Vine (2005).

On the other hand, there are studies pinpointing the concerns and difficulties regarding the ESCOs. Studies mentioning key barriers for ESCOs by Panev et al (2018), Okay (2018), Dursun, Bertoldi (2015), Kostka, Shin (2013), Garbuzova-Schlifter, Madlener (2013), Ding (2013), Akman, Okay, Okay (2013), Okay, Okay, Akman (2012), Ellis (2010), Kleindorfer (2011) and the failure of ESCOs by Kumar (2014) were listed.

Indeed, the studies to highlight the challenges affecting the ESCOs are scarce not enough for providing the awareness to remove the barriers. The scarcity in literature depends on generally the future development of ESCOs and energy projects regarding policy making, awareness, financing and risks. So there is time and need for new research developing and identifying the essential solutions that will frame a sound ESCO market in the world.

CURRENT STATE OF ENERGY IN TURKEY

Turkey as a developing country implemented policies to improve renewables and energy efficiency in line with EU requirements. Fortunately or not, Turkey does not have enough conventional energy but very large potential of renewable energy resources. The indistinct start of energy savings market and the risks of financing huge energy projects still preserve caution that Turkey needs to depend on investing in the cheapest forms of creative energy solutions (Okay, 2015).

Turkey's reliance on natural gas use has grown along with rising oil and gas imports, leaving the Turkish economy increasingly exposed to the volatility in oil and gas prices. Turkey aims to promote sustainable economic growth - the IEA urges the government to set a longer term energy policy agenda for 2030. However, owing to declining global liquefied natural gas prices, Turkey now has an opportunity to reduce its single supplier dependence, build a competitive gas market, and move ahead with its plans to create a regional gas hub (IEA, 2016).

Turkey's power sector reforms have attracted private investment and fostered economic growth and energy access. Integration into a regional gas and electricity trade framework is moving along as a result of the first interconnection of Turkey with the European electricity grid and the construction of the Trans-Anatolian Natural Gas Pipeline that will deliver gas from the Caspian to Turkey and the European Union.

In that context, the IEA urges Turkey to complete the liberalisation of its electricity and gas markets in order to attract critically needed investment. The review also notes that Turkey should set up independent transmission system operators, competitive wholesale markets, and foster resilient and modern gas and electricity infrastructure (IEA, 2019b).

Pillars by IEA for Turkish energy market (IEA, 2016).

1- strengthening the independence of the system operators and regulatory authorities;
2-abolishing market distortions in favour of market pricing;
3-continuing to invest in more flexible and modern gas and electricity infrastructure. These pillars are critical for securing stable and reliable electrical power supplies and ensuring sustainable economic growth, and ensuring much needed diversification, according to the IEA.

The latest enactment, National Energy Efficiency Action Plan (2017-2023) was prepared by Ministry of Energy and Natural Resources. Under the Action Plan, it is aimed to reduce the primary energy consumption of Turkey by 14% by 2023 through 55 actions defined in 6 categories namely buildings and services, energy, transport, industry and technology, agriculture and cross-cutting (horizontal) areas during the period of 2017-2023. It is also projected to achieve savings 23.9 mtoe cumulatively by 2023 covering 10.9 billion USD of a forecasted investment. The cumulative savings by 2033 will be 30.2 billion USD at 2017 prices, where the effect of certain savings will continue through 2040. The average payback period for actions is 7 years (Turkish Ministry of Energy and Natural Resources, 2018).

ESCOs IN TURKEY

Issues and Challenges

Unfortunately, there are still concrete barriers against ESCO adoption in Turkey. This rough and odd situation can be explained by pinpointing the distrust of energy efficiency market. The word distrust here is to define the lack of information, training and cultural awareness that Turkey has as a general educational problem during implementations of policies on anything. At the same time, the oddness is the continuously stretched economical concerns in Turkey regarding the lack of incentives and solutions for financing huge energy investments.

Eventually, this long lasting situation in Turkey ends up with a poor energy market and distrust in ESCOs. In fact, there is a failure of understanding and that includes the financial institutions as well. Banks indeed do not trust ESCOs in Turkey. Financing process is not well understood by banks (Dursun, Bertoldi, 2015).

Efforts to develop and catalyse private sector funding for energy efficiency improvements in buildings, industry and transport are being made, for example under small an medium sized enterprises (SME) support, tax incentives and energy audit companies. Indeed, there is a lack of familiarity with energy efficiency projects. Private sector investors often associate energy efficiency projects with high financial and technical risks and poor financial returns. In addition, upfront transaction costs which may arise from energy audits and feasibility studies can discourage investors. These costs can be increased by a lack of experience among the ESCOs that would develop such projects. Studies are under way on how to create an ESCO market. Turkey is not part of the EU emissions trading system and has no white certificates (IEA, 2016).

At the same time, banks are not familiar with sustainable energy projects and have insufficient capacity to evaluate them. Most local banks have limited capacity and experience in identifying, evaluating, and processing energy efficiency and renewable energy projects. As a result, they offer few, if any,

financial products designed specifically to finance sustainable energy projects, and require substantial technical assistance to develop such products. Financial resources and dedicated lending facilities are scarce. Sustainable energy measures require long-term funding. In recent years financial institutions have had limited access to long-term financing, and in Turkey banks have traditionally relied on short-term financial products (EBRD, 2014).

Turkish ESCO market is a very small initial market. There is confusion about ESCO financing and much of is related to lack of experience (Langlois, 2017). ESCO market is accepted as a moderate one compared to Albania, Bosnia and Herzegovina, Kosovo, Moldova, Montenegro, Serbia, the former Yugoslav Republic of Macedonia, Belarus and Russia. But the performance is still going unchanged after 2015, as the cost pressures and the local economy's negative outlook enhanced (Panev et al., 2018).

There are some different aspects to be stressed regarding the funding of energy services and ESCOs in Turkey:

1. Lack of understanding for ESCO projects and studies
2. Lack of awareness of ESCO concept and activities both in the public and private sectors
3. Policy makers are focused on energy generation and supply rather than energy efficiency improvement
4. Taxation rules that discourage energy investment (Dursun, Bertoldi, 2015).
5. Lack of energy efficiency funds for funding energy services and ESCOs
6. Lack of state incentives for EE and ESCO
7. Very high interest rate for EE loans provided by commercial banks
8. Lack of investment portfolio for EE including energy services by commercial banks
9. Lack of know how in preparation and evaluation of EE projects implemented on basis of EPC
10. High inflation rate and exchange rate instability (Kleindorfer, 2011; Panev et al., 2018).

Turkish ESCOs in the Midst of Financial Distress and Debt Restructuring

Unfortunately, because of the global and market uncertainty, ESCOs in Turkey are quite underinsured. Credit ratings and expectations continued to fall since 2016. Rating institutions respectively announced negative reports about uncertainty and high risks, downgraded ratings and revised the outlook of Turkey to negative. Because of the economic developments ESCOs are affected and nowadays they are on the verge of income loss due to economic contraction and business interruptions since the currency crisis of 2018 in Turkey. It is clear by now that ESCOs in Turkey are obviously underprepared and vulnerable to economic and political uncertainty like the private sector.

After the results of 2018 financial shock, according to survey of economists Bloomberg expects that the Turkish economy shrinking 1.5% in 2019, the first annual contraction since 2009. Investments declined since the global financial crisis in 2009. Consumer confidence in May 2019 dropped to the lowest level since the records began in 2004 (Bloomberg, 2019b). OECD revised the expectations of economic contraction in Turkey from 1,8 to 2,6% for 2019 and growth from 3,2 to 1,6% for 2020. This is generally due to high fixed costs, illiquid assets, or revenues sensitive to economic downturns in Turkey after the currency turmoil of August 2018. OECD warns that Turkey should aim sound economic policies for regaining the confidence of economic units and especially foreign investors and obtaining credibility of financial markets and institutions. OECD underlines the importance of loan restructuring vehicles -if implemented correctly- that especially the highly strained energy loans will be the reference for reducing the tension on banks, offsetting financial contagion risks, and helping improve confidence.

Another crucial factor that OECD highlights is the central bank's independence and credibility in Turkey (OECD, 2019b).

The distress that energy companies face in Turkey may turn into a difficult financial situation for banks. $13 billion of non-performing energy loans matter both to energy sector and banks. It is stated that government presses banks to agree high-stakes bailout of bad energy loans. But banks do not agree so and want to extend this process as long as they could not to take the financial hit that would involve. Another plan is to separately inject $4.9 billion into state banks for bad energy loans. The Treasury hoped for an early summer deadline to detail these bailout plans, but several sources involved in discussions over the plans said that timeline appeared too ambitious (Reuters, 2019). And still, there is not an announced plan for restructuring.

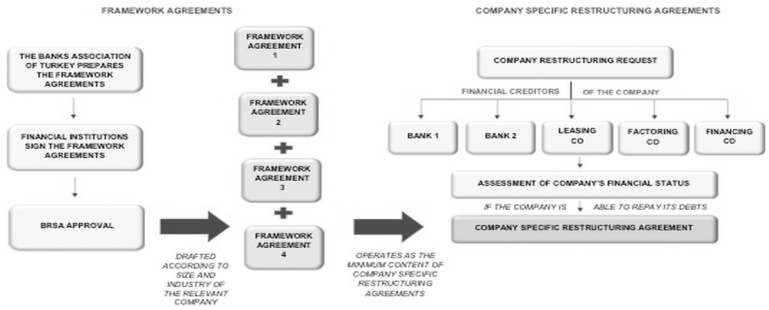
Indeed, banks are under pressure of government and central bank that push banks to go into credit expansion. Turkish government would like to provide a boost to the economy through faster credit growth by tweaking some reserve rules for banks (Bloomberg, 2019a). Although banks deny lending growth, government forces the banks to lend businesses for the sake of increasing the economic growth by using the reserve rules of central bank. For banks whose loan growth is between 10% and 20% (reference values), the reserve requirement ratios for Turkish lira liabilities in all maturity brackets excluding deposits and participation funds with 1 year or longer maturity (excluding deposits/participation funds obtained from banks abroad) and other liabilities with longer than 3 year maturity (including deposits/participation funds obtained from banks abroad), will be set at 2%. The reserve requirement ratios for other banks are left unchanged. Additionally, the current remuneration rate of 13% applied to Turkish lira-denominated required reserves is set at 15% for banks with a loan growth between the reference values and at 5% to others (Central Bank, 2019).

But banks, already suppressed by the tension of high non-performing loans resist the credit expansion. According to risk management rules, banks have the right to be risk averse to businesses as the credit risk ratings of companies in Turkey are really high. Because Turkish companies unfortunately do not obey the rules of risk management.

Who can have guarantee that the new credit campaign will not turn into a financial turmoil by non-performing loans. It is a critical question when stakes are high. A credit expansion and the likelihood of a high level of credit risk are not easy to be managed by banks under such conditions of economy regarding recession and high uncertainty that pump debts and lower earnings. So not surprisingly, banks can fear to lend while economic units hold back investment and indeed run away to pay back loans. Bad debts are exactly and will be an unacceptable financial threat to banks. At the same time, the issue is against the risk management rules of BASEL that Turkish banks obey under the control of Banking Regulation and Supervision Agency. According to the Banks Association of Turkey Risk Center, the number of non-performing loans with unpaid credit cards rise monthly and yearly from 2018 to 2019 (Banks Association of Turkey, 2019).

Besides, the global lending is not fair for banks as the credit ratings of Turkish banks dropped several times in two years' time which diminishes the chance of syndication credits that they need. Lastly Fitch downgraded 14 Turkish banks' credit score to negative. Especially, the downgrades of the 12 foreign-owned Turkish banks' foreign currency Issuer Default Ratings (IDRs) were revised from from 'BB- to 'B+'. The agency has also downgraded the long-term local currency IDRs of 22 banks and their subsidiaries. The outlooks on all banks' long-term IDRs are negative. These downgrades reflect an increased risk of government intervention in the banking sector in case of a marked deterioration in Turkey's external finances. Besides, Fitch highlights the dismissal of Turkey's central bank governor

Figure 5. Financial Debt Restructuring Roadmap for Turkish Companies



Source: Mondag

that heightens doubts about the authorities' tolerance for a period of sustained below-trend growth and disinflation which deteriorate institutional independence and economic policy coherence and credibility (Fitch, 2019).

Therefore, OECD expects a tighter policy stance in Turkey where concerns persist about the sustainability of fiscal or external positions, in order to retain investors' confidence. Nominal interest rates can go down as inflation moderates from its current high rates, but there is little scope for lower real interest rates. The priority in Turkey is to undertake reforms that enhance the prospects for fiscal and financial sustainability in the medium term (OECD, 2019a).

The Banking Regulation and Supervision Agency of Turkey (BRSA) has recently announced a broad restructuring program in relation to the debts of companies owed to the Turkish financial creditors. BRSA's recent Regulation on the Restructuring of Debts Owed to the Financial Sector aims to pave the way for companies to initiate a general restructuring of their financial debts and ensure coordination of the Turkish financial institutions in the restructuring of these debts. The restructuring is subject to the ability of the company to repay its debts following restructuring. If the financial status of the company does not meet this condition, the financial debts of that company cannot be restructured. Although not clearly expressed in the regulation, if the two-thirds of the financial creditors in terms of debt-size approve the restructuring, the BRSA requires the rest of the financial creditors to participate in the restructuring (Mondag, 2018).

Lastly BRSA required Turkish banks to write off $1.9 billion bad energy loans to be classified as non-performing loans. After a reclassification, this would add 40 basis points to the industry's NPL ratio, taking it to 5%, lower the capital adequacy ratio of the banking sector by 2 percentage points to 16.22%, and reduce the average return on equity by 4 percentage points to 8.6% (Bloomberg, 2019c).

SOLUTIONS AND RECOMMENDATIONS

Businesses exposed to energy are increasingly challenged by high prices, competitive economies, volatile markets, and costly complex regulations and obligations. Rapid changes regarding the energy market require additional emphasis on risk strategy, analytics, reporting, systems, and governance mainly called as energy risk management (KPMG, 2016).

Risk management is the identification and evaluation of the risks regarding the market or sector. Any financial company that looks like, acts like, or sounds like banks operate with the principles of risk management. Energy companies increasingly revolve around the management of portfolio risk (Timera Energy, 2014).

Thus, that's particularly what counterparties like ESCOs and banks should do as for maintaining a solid environment for energy investment projects. Turkish energy industry needs strategies to manage threats to withhold the maximization of opportunities in energy market.

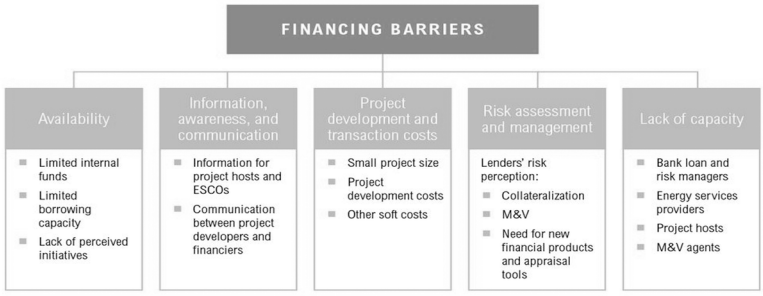
In respect, there are some financial methods to manage market risks for energy projects like renewables and energy savings.

1- Physical PPA, a bilateral commercial contract where a counterparty purchases at a set price. Physical PPAs are common in both competitive and regulated market structures (though the terms and rules can differ greatly) with the duration of contracts for solar PV and wind plants typically ranging from 10-25 years.
2- Financial PPA (i.e. corporate/synthetic/virtual PPA and contract-for-differences) a bilateral financial contract where a counterparty agrees to a fixed purchase price, but does not take physical delivery. Financial PPAs are used in the United States, Europe and other power systems where third-parties transact and are often coupled with the sale of renewable certificates or guarantees of origin.
3- Financial hedge, a bilateral financial contract where a counterparty provides fixed payments in exchange for a variable power price based on a predetermined settlement point. Bank hedges of up to 12-13 years have been used in the United States.
4- Proxy revenue swap, a bilateral financial contract where a counterparty provides a hedge against variable project revenues from uncertain production volume, timing of generation and electricity prices. 5-10 year swaps have been used in the United States and Australia.
5- Forward contracts, standardized financial contracts for electricity traded on market exchanges for settlement at a future date, involving fewer transaction costs than bilateral options. Where available, electricity forward contracts are traded liquidly usually only 1-2 years ahead, but other commodities (e.g. gas) have liquidity further into the future (IEA, 2019a).

Although Turkey has a considerable renewable energy potential, there are important issues seen as challenges against the development of a solid energy market. Here are some legislative solutions for overcoming barriers and the related investment challenges in energy projects:

1. Development of a legal framework and accounting rules that allows municipalities multi-year[1] budgeting and to establish long-term contracts with ESCOs.
2. Reclassifying investments as utility services, where long-term contracts are implicitly allowed
3. Changes of budgeting rules for EE and other cost-saving measures
4. Introduction of municipal fiscal decentralization and increasing of revenue sources for municipalities
5. Creation of energy efficiency revolving funds for financing EE measures in municipalities
6. Allowing municipalities greater autonomy in borrowing without Ministry of Finance approval
7. Integration of municipalities as privileged beneficiaries of national EE Fund schemes
8. Introduction of energy accounting and energy management systems and appointment of energy managers
9. Bundling of public facilities at municipal level and standardization of documentation and procedures

Figure 6. Barriers in Financing Energy



Source: World Resources Institute

10. Preparation and implementation of Local (Municipal) Energy Efficiency Action Plans, building renovation strategies for buildings owned by municipalities (Panev et al, 2018).
11. Energy research and development should be supported by policymakers
12. ESCO training and certification should be standardized (Dursun, Bertoldi, 2015).
13. Technological reliability and availability of convincing prototypes
14. Feasibility of energy efficiency without undue disruptions or risks (Kleindorfer, 2011).

FUTURE RESEARCH DIRECTIONS

Future energy studies will be shaped primarily by financial crises and risks, economic concerns, rising debts of governments, increased energy demand and prices, increased carbon emissions and climate change effects (Liehr, 2010). Enabling flexibility through well-functioning power markets will be important to drive forward the transition to renewables in a cost-effective way. Countries will benefit from more closely integrated power systems and sectors to increase access to flexible solutions. Both consumers and producers also need the right incentives with power prices that reflect emission costs and the actual demand in the power system at any given time. This can enable a rapid renewable deployment and electrification towards 2040, resulting in a cleaner energy world consistent with a 2 degree pathway (Statkraft, 2018).

Achieving a low carbon economy involves tackling uncertainty and ambiguity about the future energy supply, energy mix, energy use and efficiency and working out how to address behavioural change and adaption. Universities have a critical role to play in meeting these challenges and are key energy stakeholders. Universities build capacity through the development of new knowledge, new understanding and new insights, thereby providing effective solutions to complex problems. They also enable a regular supply of highly educated and skilled people who develop and implement energy and climate solutions (European University Association 2017). Indeed, there are still constraints remaining unsolved, like the high complexity of energy projects, lack of trust that accompany with a cultural barrier persisting between customers and ESCOs (European Energy Service Initiative, 2017).

At the same time, universities can collaborate with policy makers and authorities for developing effective methods of risk identification and evaluation in order to help sound and vast opportunities for future energy market. Financing barriers (Figure 6) are the main research drive for the sake of sustain-

able energy investments. Energy risk management needs more awareness, education and training in the world. Therefore, universities have a lot to do for the future of global energy.

Financial risk management options can work alongside policies to increase the flow of bankable renewables projects (IEA, 2019). Risk is the greatest obstacle to investment by financial institutions. Risk can come from many sources. In many markets, there is limited awareness of what mechanisms or methodologies can be used to measure and verify savings after project implementation. This lack of standardization may contribute to the view held by many potential investors that energy efficiency is a risky investment. In the future, energy world needs new financial products and appraisal tools in order to raise funds and borrowing capacity. Financial institutions and customers need more incentives. Policy makers should coordinate a better standardization and good energy system for every stakeholder (World Resources Institute, 2016). If there is no change in policies from today, this leads to increasing strains on almost all aspects of energy security. The actions taken by governments will be decisive in determining which path is followed whether good or not (IEA, 2018).

Moreover, the studies to highlight the challenges affecting the energy world are scarce not enough for providing the awareness to remove the barriers. The scarcity in literature depends on generally the future development of ESCOs and energy projects regarding policy making, awareness, financing and risks. So, there is time and need for new research developing and identifying the essential solutions that will frame a sound ESCO market in the world. New and improved technologies will be needed, which will help to lower costs and risks and enhance benefits help us to reach a low carbon society (European University Association 2017).

IEA declares that new ways of sourcing energy are also visible at local level, as digitalization and increasingly cost-effective renewable energy technologies will enable distributed and community-based models of energy provision to gain ground (IEA, 2018). The need for flexible solutions increases significantly with the growing share of intermittent generation. There will be major differences at a national level. Countries with a high share of solar power will require more short-term flexibility within a 24 hour period. A high level of competition is expected between many different solutions that can be adopted. For instance, countries with a high share of wind power will require more long term flexibility lasting up to two weeks. There are fewer solutions to solve the long-term flexibility requirement (Statkraft, 2018).

Therefore, renewables integration, energy efficiency, smart grids and energy systems will be the technologically important areas of energy research and innovation in the future (European University Association 2017). The convergence of new and cheaper renewable energy technologies, digital applications and the rising role of electricity is a crucial drive for change in order to achieve many of the sustainable development goals in the world (IEA, 2018).

CONCLUSION

Turkey has been slow in adopting the energy market and standards. Education, training and cultural awareness play an important role on developing sensitivity to implement and embrace the rules and regulations. Unfortunately, cultural understanding is crucially low in Turkey for the adoption of energy efficiency and low carbon economy. At the same time, there are still remaining barriers in Turkey like financial instability, uncertainty and unstable investment environment incompetent factors for long-term sustainable energy projects. Besides, Turkey is facing a severe economic difficulty ongoing for a year that affects the energy companies. Energy companies have debts that need restructuring. As this finan-

cial situation and payment difficulties continue the credibility of energy market decrease detoriating the investment environment.

Meanwhile, Turkish banks that still continue to act strictly risk averse do not let credit expansion as the nonperforming loans increase in the energy sector. Furthermore, energy costs make it harder even for reaching a sustainable energy market. The setback composition of the future energy investments and Turkish ESCO market is a bit complicated made up of macro-economic, micro-economic and financial risks coming through both domestic and global means.

Turkey still needs concrete attempts to promote policy stability and training in energy but before then that, has to diminish the economic burden on energy companies and sweep away the uncertainty on investment picture for the sake of future energy. Therefore, Turkey should take the necessary steps in order to provide a robust system against economic burdens and financial distress maintaining a stable environment both for the energy market and financial services.

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KEY TERMS AND DEFINITIONS

Corporate Financial Distress: It is a term or a condition in which a company is unable to meet its financial obligations. It leads to bankruptcy if the financial inability is not relieved.

Debt Restructuring: It is a process that allows a company facing financial distress, debt crisis, and cash flow problems to reduce and renegotiate its delinquent debts to improve or restore liquidity so that the company can continue its operations.

Energy Efficiency: Low cost and effective energy solutions and reductions of carbon ensuring a safe, reliable, affordable and sustainable energy system.

Energy Finance: Financial solutions for renewable energy, efficient energy projects and technologies in the energy market.

Energy Risk Management: Risk management concerning companies in energy sector and mainly the ESCOs that majorly work for energy industry mitigating the risks revolving in energy efficiency projects.

Energy Saving Contracts: A partnership between an agency and an ESCO. ESPC means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored during the whole term of the contract, where investments (work, supply or service) in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings.

Energy Saving Solutions: Low cost and effective energy solutions and reductions of carbon.

ESCO: Energy service company that guarantees energy savings and solutions including retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.

Turkey: Turkey is a country located between Europe and Asia.

ENDNOTE

[1] With multi-year budgeting, municipalities can enter into multi-year contracts, since they would not be allowed to commit future funding that has not yet been appropriated. The introduction of 3–5 year budget planning, such as under the medium-term expenditure framework (MTEF), can help reconcile multiyear obligations within the annual budget envelope, provided that the budget planning process is sufficiently robust (Panev et al, 2018).

Chapter 9
Predicting the Role of Islamic Banking on Sustainable Economic Development:
An Analysis for Turkey With ARIMA Model

Serkan Eti
https://orcid.org/0000-0002-4791-4091
Istanbul Medipol University, Turkey

Hakan Kalkavan
https://orcid.org/0000-0003-4482-0505
Istanbul Medipol University, Turkey

Hasan Dinçer
Istanbul Medipol University, Turkey

Serhat Yüksel
Istanbul Medipol University, Turkey

ABSTRACT

This chapter aims to predict the future of Islamic banking in Turkey. Three different Islamic banks operating in Turkey were taken to the scope of review. Within this framework, six different variables that are important for the banking sector have been identified. The data of these variables in the 2010-2018 period were analyzed by ARIMA method, and six different models were established. As a result, it is predicted that Islamic banking will grow in the future, and its profitability will increase. However, the ratio of non-performing loans is expected to increase, and capital is expected to decrease. Therefore, Islamic banks should be more cautious in this growth process. In this context, it is important to conduct an effective credibility analysis of customers to be loaned. This situation has a contributing effect on the sustainable economic development of the country.

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INTRODUCTION

Economic growth is one of the most important goals of a country. In an economically developing country, both trade is developing and new business opportunities are emerging. As a result, the profitability of the companies will increase (Afonso and Aubyn, 2019; Raju et al., 2020). In addition, the unemployment rate in the country will decrease. In summary, the quality of life of people living in the country will improve. Therefore, almost all countries are developing strategies to increase their economic growth (Dean et al., 2019; Pao and Chen, 2019; Roudi et al., 2019). For example, some of them give importance to technological infrastructure and research and development activities, while others try to attract the attention of foreign investors (Dinçer et al., 2019a).

The most important issue in this process is to ensure the efficiency and continuity of economic growth. If a country is growing economically, and this is not reflected in the citizens, economic growth in that country is ineffective (Ahmed et al., 2019; Klofsten et al., 2019). Therefore, it is important to ensure economic equality in the country. On the other hand, economic growth also needs to be continuous. In this context, while the country is growing economically, this situation should be provided by investments (Mardani et al., 2019; Arifovic et al., 2019; Klimek et al., 2019). In this way, the economic development of the country will be healthier (Dinçer et al., 2018a; Kalkavan and Ersin, 2019). In other words, it is important that a country grows more slowly and moderately rather than fast but unhealthy.

Another condition for countries to have sustainable economic growth is that they have efficient financial markets. In financial markets, those who have funds and those who need funds can come together. Those in need of funds can easily meet these needs through financial markets (Bekaert and Mehl, 2019; Buss and Dumas, 2019; Dinçer and Yüksel, 2018a). Thus, the amount of investment in the country increases significantly. Moreover, this situation will contribute to the decrease in the unemployment rate as it will create new employment opportunities in the country. In addition, those who have funds will also have the opportunity to earn income through financial markets (Hong et al., 2019; Zou and Deng, 2019; Huang et al., 2019). Based on these issues, the effective functioning of the financial markets in a country will help the economic development of the country.

There are many different players in a country's financial system. As mentioned in the previous paragraphs, those who own and need funds are the most important players in this system. In addition, the state is an important player in the financial system (Graydon et al., 2019; Dinçer and Yüksel, 2019). Government regulations and the control of the parties' compliance with these regulations will make a significant contribution to the effective functioning of the financial system. In other words, in order for the financial system to function effectively, the state assumes the role of trust mechanism (Bendickson and Chandler, 2019; Dinçer et al., 2019g). The parties that rely on the legal regulations in the country will play an active role in the financial system and this will contribute to the development of the national economy.

Another institution that has an important role in the financial system is the banks. Banks borrow these funds from individuals or institutions that own the money. Banks make interest payments to the counterparty for the deposits they collect when they are due. On the other hand, banks give these deposits as loans to the persons or institutions in need. They receive extra interest from the counterparty for these loans. As can be seen from these explanations, banks play a key role in the efficient functioning of the financial system (Dinçer et al., 2019b,c,d,e,f,h). In other words, in order for a country to have sustainable economic growth, it must first increase the efficiency of the banking sector.

The first condition for the effective functioning of the banking system is that individuals and institutions invest their money in banks in a sense of trust. But some groups in the country are reluctant to invest their money in banks for a number of reasons (Dinçer and Yüksel, 2018b). This situation adversely affects the efficiency of the banking system. For example, interest income is banned in the Islamic religion. Therefore, those who are sensitive to these rules will not invest their money in banks. This will lead to a decrease in the amount of liquid money in the financial system. As a result, the effectiveness of the system will be adversely affected.

The Islamic banking system is a system in which banking activities should be carried out in accordance with the rules specified in the Islamic religion. This system has some differences compared to the traditional banking system. First, the prohibition of interest in Islamic religion does not exist in Islamic banking. In this system, customers deposit their money into the bank and wait until the agreed maturity. When the maturity date is reached, Islamic banks pay dividends to these depositors by taking into account the profit amount they obtain. In other words, customers do not know how much income they will earn on the date they deposit their money to Islamic banks (Ersin and Duran, 2017; Ersin and Yıldırım, 2015; Ersin and Yıldırım, 2016).

As can be seen from the definitions above, the Islamic banking system plays an important role in bringing the funds of people who are sensitive to Islamic religion to the financial system. This will contribute to the increase of liquid money in the financial system. As a result, the economy of the country will develop positively. Therefore, it is accepted that the effectiveness of the Islamic banking system makes a significant contribution to the continuity of the economic development of the country. This issue has been emphasized by many researchers in the literature (Caporale and Helmi, 2018; Gazdar et al., 2018). Therefore, for the economic development of the countries, the Islamic banking system needs to be effective especially in Muslim countries (Dinçer et al., 2019i).

In this study, it is aimed to estimate the future conditions of the Islamic banking system in Turkey. Within this framework, 6 different variables that are important for the banking sector have been identified. In addition, three different banks active in Islamic banking system in Turkey, were included in the study. The quarterly data for the period between 2010 and 2018 is used. These data were analyzed by ARIMA method and 6 different models were established. Estimations for 2019 and 2020 have been made by taking these models into consideration.

This study consists of 4 different parts. In the introduction, economic growth, financial markets and Islamic banking concepts are discussed. In the second part of the study, detailed information about Islamic banking system is given. In this context, the definition of Islamic banking and details of the system in Turkey are explained. In the third part of the study, estimates were made for the future of the system in Turkey. The last section deals with analysis results and solution suggestions.

THE CONCEPT OF ISLAMIC BANKING

General Information About Islamic Banking

Islamic banking provides services to its customers free from interest which giving and receiving interest in all transactions is forbidden by Islamic religious rules and the Arabic word riba is used for interest/usury. That prohibition of interest is fundamentally the main difference between Islamic banking system and conventional banking system. Although Islam prohibited interest earning business, profit and rental

fees are regarded as legitimate earnings of trade. Islamic banking system prohibits interest as well as investing in unlawful business according to Islamic law such as alcohol, pork, pornography and gambling etc. (Lewis and Algaoud, 2001).

In classical economic theory, the most common definition for interest/usury is cost for use of money. However, in Islam usury is forbidden but trading is allowed. Islam allows market forces and market economy. Private ownership is acceptable but restricted with balance of society. Unhealthy and unmoral products are allowed to be sold through to make money in secular capitalism and those who have economic power are able to make decisions without restrictions which cause imbalances in society like interest, gambling, speculative transactions can be wealth of in the hands of few. By contrast with profit maximization is limited by social and moral values in Islamic banking system. Islamic financing system's main roof is based on interest-free fundamentals completely. These fundamentals are not only for financing model, but also for entire economic, social, political and cultural life of the society. The rules and methods have been developed and spread by Islamic scholars` opinions which are dependent on main principles of Islam (Usmani, 2001).

The basic principles of the Islamic financing instruments system can be described as follows (Algaoud and Lewis, 2007; Mannan, 1986, Warde, 2010):

- Prohibition of riba
- Risk sharing
- Transactions should be free from gharar (speculation or unreasonable uncertainty)
- Prohibition of maysir (gambling)
- Business and investment should be halal (legal, permitted activities according to Sharia)
- Bank activities should be informed to business partners (transparency)
- All activities should be in proportion to Islamic principles, with a special advice board of Sharia

History and Progress of Islamic Banking

Until second half of 20th century, "Money Trusts" and "Islamic Business Partnerships" were used instead of activities of banking institutions in Islamic lands. However, history of interest-free banking in today's sense has been very short. Theoretical framework begins with the years of 1940`s. The structure was formed by relationship of interest-free banking with profit-sharing. The term of Islamic economy was started to be used first after 1945. Thoughts and writings of scholars such as Qureshi, Mevdudi, and Sadr have provided important contributions to the development of this model. Both theoretical and practical studies had a reasonable increase after the next period of initial studies. By 1955, the Pakistani Mohammed Uzair, made the first research in particularly in Islamic Banking. After the movement of ideas, first Islamic Bank under the name "MYT-Gamr" was founded in 1963 in Egypt. Ahmed Neccar was affected by principles of "social development banking" in the history of German economy and attempted to unify that system with Islamic economic system. The Bank had been able to continue until 1967. The bank was established for Egyptian peasant in order to provide them financial resources for agricultural and trading necessity. However, it was a small enterprise, it contained financial activities such as banking, commercial partnership, insurance, barter and leasing. Thereafter Islamic Development Bank was established in Jeddah in 1974, started activity in 1975 and it is the first established bank still continuing its activities (Iqbal and Molyneux, 2016; Nagaoka, 2012).

Table 1. Islamic Finance Sector (2017)

Sector	Billion (Usd)	Share (%)	Number of Institutions/Instruments
Islamic Banking	1721	71	505
Sukuk	426	17	2590 (outstanding)
Islamic Funds	110	4	1410 (outstanding)
Takaful	46	2	324
Other Islamic Financial Institutions	135	6	560
Total	**2438**	**100**	**1339**

Source: Thomson Reuters, 2018

A significant number of people didn't invest in conventional banks because of Islamic ban on interest-based bank system, and they often keep their savings in their hands rather than depositing them in the bank. With the Islamic banking, idle savings were brought into the economy. Pakistan, Iran, Saudi Arabia, Gulf Countries and partly Malaysia have been effective in the development of Islam banking. Furthermore, improvement of cultural, social and economic relationship among the Islamic countries and using surplus funds for economic revival is the one of the important factors to establish Islamic banks. The reasons for the emergence of Islamic banks are briefly religious, economic and social (Siddiqi, 2006; IFSB, 2018).

Religious Reasons: Interest and money trade are forbidden in Islam. Therefore, these have been the main factors of the establishment of interest-free banks.

Economic Reasons: As a result of funds of the rise in oil prices since the late 1970s, financial institutions such as Dubai Islamic Bank, Faisal Islamic Bank of Sudan, Faisal Islamic Bank of Egypt and Bahrain Islamic Bank went into operation within the framework of Islamic principles in order to make interest-free banking. First interest-free bank was established in Dubai in 1975 (Nagaoka, 2012).

Social Reasons: Interest-free banking system has been developed in least developed countries to eliminate the injustice and to integrate labor and capital into the system. In this system, capital owners gain and make loss only according to the rate of their capital and that prevents a capital flow among a particular well-of society like done in interest-based system. "Social state" approach would lead to the development of interest-free banking system in least developed countries and also all countries (Iqbal and Mirakhor, 1999).

Islamic Banking Market Overview in World and Turkey

Islamic finance sector consists of Islamic banking, Sukuk, Islamic funds, Takaful and other Islamic financial institutions (investment corporations, micro-finance establishments etc.) altogether five sub-sectors.

As it is shown in the table, Islamic banking ranks first with the largest share of %71 in Islamic finance sector. Islamic banking has been accelerating its trend of growth under the great attention from the world especially in last decades. According to Islamic Finance Development Report conducted by Thomson Reuters, there are more than 500 institutions in about 43 countries operating on interest-free banking system. The total volume of those funds is about USD 1,72 trillion at the end of 2017.

Iran has the largest share in the interest-free financial system in the world with 463 billion dollars. Saudi Arabia is second with 371 billion and Malaysia is third with 165 billion dollars. These countries

Table 2. Shares of Global Islamic Banking Assets Across Countries (2017)

Country	Billion (USD)	Share (%)
Iran	463	34,4
Saudi Arabia	371	20,4
Malaysia	165	9,3
UAE	163	9,1
Qatar	90	6,1
Kuwait	87	6
Bahrain	75	5,1
Turkey	38	2,6

Source: Thomson Reuters, 2017; IFSB, 2018

are followed by Gulf countries such as Qatar, Kuwait and Bahrain respectively. Turkey is also considered one of the leading countries in this sector with 38 billion dollars. Dubai is critical to the Islamic banking sector in the Gulf region. Islamic banking attracts attention in Europe and in other developed countries. However Gulf countries have the most important share of interest-free banking, Islamic banking has being developing in the far Asia, especially in Malaysia, Indonesia, Bangladesh and Pakistan. Turkey is a fast growing country in Interest-free banking. Islamic banking is growing rapidly in Jordan, Lebanon, Sudan and Egypt, as well as in other North African countries. Central and South African countries also have good potential for interest-free banking, and many states in the region are interested in this issue (Erol et al., 2014; IFSB, 2018).

As a founding member of Islamic Development Bank, since 1975 In Turkey, Islamic banks has begun operations in 1985 and the number of institutions has increased to six in 1996. Over the next twenty years, the share of these institutions in the traditional banking sector was at most 3%. In 2006, the statute of Islamic banking institutions was changed and Special Financial Institutions became Participation Banks by regulations of law. Thus, participation banks have been allowed to finance real economic investments in line with the principles of interest-free banking according to Banking Regulation and Supervision Agency Law. Following this legal improvement, the share of Islamic banking in Turkish banking sector increased to 5.2% in 2009 (PBAT, 2009). As of 2019 there are six Islamic banks operating in Turkey; Albaraka-Türk, Kuveyt-Türk, Türkiye Finans, Ziraat Participation, Vakıf Participation and Emlak Participation (PBAT, 2019).

As quantified in the table, the share ratio of Participation Banking decreased slightly between 2013 and 2016. After 2018 with the participation of public based Islamic banks into the sector, Participation banking has started to grow again. The share of Islamic banking in Turkish banking sector has been around 5% for the last 15 years. It is clear that that ratio is insufficient for a country where the majority of its people are Muslims. This is an indication that Islamic banking activities and services are not performed adequately and effectively. Islamic banks should work on how to develop their partnership-based business units in order to support the real sector and train experts to provide quality services. In this way, it may be possible for them to enter into a socially more effective and sustainable development.

Table 3. Share of Islamic Banking in Turkish Banking Sector

Year	Total Assets	Share %
2014	104,073	5.2
2015	120,252	5.1
2016	132,874	4.9
2017	160,136	4.9
2018	206.806	5.3

Source: PBAT, 2018; BRSA, 2019

MAKING PREDICTION ABOUT THE ROLE OF ISLAMIC BANKING IN TURKEY

As mentioned earlier, Islamic banking has an important role to play in the development of the country's economy. Therefore, in order to ensure sustainability in economic growth, it is very important that the Islamic banking system plays a more effective and active role. In this study, estimates are made for the future of the Islamic banking system in Turkey. In the analysis process, ARIMA (Autoregressive Integrated Moving Average) model was used. The ARIMA model is a three-parameter (p, d, q) prediction model. In this context, p indicates the degree of autoregressive model (AR), d gives information about the degree of difference for stasis, and q shows the degree of moving average (MA). In determining these parameters, firstly, the stationary analysis is performed. In this way, d parameter in the model can be determined. The other two parameters of the ARIMA model, p and q, are identified with the help of the ACF (Autocorrelation Function) and PACF (Partial Autocorrelation Function) graphs. The ARIMA model is a frequently preferred approach in many areas of the literature (Nath et al., 2019; Dumitru and Gligor, 2019; Eti et al., 2019; Ordóñez et al., 2019; Domingos et al., 2019).

In order to achieve this aim, 6 different variables were used for the banking sector. Quarterly data for the mentioned variables in the period 2010-2018 is taken into consideration. Using these factors, 6 different ARIMA models were established. In addition, estimations were made for 2019 and 2020 by considering these models. In the analysis process, three Islamic banks operating in Turkey and the Islamic banking sector is considered average. Within this framework, 4 different models were established for each variable. In the analysis process, unit root tests were performed first. Then, p and q values were calculated by using ACF (Autocorrelation Function) and PACF (Partial Autocorrelation Function) graphs. Details of these issues are given in the Appendix of the study. On the other side, the prediction results of the analysis are given below for each variable.

Prediction for the Asset Size

In the first stage of the analysis process of the study, an estimation was made for the total assets of the banks. Total assets represent all assets owned by the bank. In this context, the current assets of banks and their future receivables are evaluated under this heading. This value provides information about the size of the bank. Therefore, the increase / decrease of this value includes information that the bank has grown or decreased (Kishan and Opiela, 2000). This value was estimated for 3 different Islamic banks in Turkey and the industry average. These estimation results are given in Table 4.

Table 4 gives information that it is expected to have higher size for these 3 Islamic banks. Similar to this situation, it is also obvious that Islamic banking in Turkey is expected to increase in the following two years.

Prediction for the Return on Assets (ROA)

The second variable considered in the analysis process is the return on assets. Return on assets shows how profitable a company is relative to its total assets. Banks collect deposits from those who have surplus funds and make these collected funds available to individuals and companies as loans. Therefore, these loans and receivables are included in the asset part of the balance sheet, since loans to customers represent banks' receivables. When this information is taken into consideration, return on asset indicates the extent to which banks made profit from these loans (Agusri et al., 2019; Kanter and Siagian, 2019). Estimates of future return on assets of Islamic banks and Islamic banking system in Turkey is given in Table 5.

As can be seen from Table 5, both the banks and the sector are expected to be more profitable in the future.

Prediction for the Bank Capital Amount

Capital refers to the money and goods placed by the founders of the company. Capital figures are important for banks in many respects. First of all, banks with high capital can increase their liquidity power and compensate for urgent deposit outflows during crisis and panic. On the other hand, having high capital may increase the credibility of banks (Schwert, 2018). Table 6 provides estimates of future capital figures for Islamic banks and the sector.

Table 4. Forecasting of Asset Size (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	44.621.035	45.774.578	46.744.078	47.796.447	48.811.503	49.843.359	50.867.651
Kuveyt Türk	78.068.432	79.986.485	81.904.539	83.822.592	85.740.645	87.658.699	89.576.752
Türkiye Finans	49.891.093	51.040.061	52.174.772	53.311.453	54.447.862	55.584.308	56.720.749
Islamic Banking (Average)	57.184.572	58.525.448	59.866.324	61.207.200	62.548.075	63.888.951	65.229.827

Table 5. Forecasting of Return on Asset (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	0,21	0,67	0,31	0,06	0,16	0,58	0,22
Kuveyt Türk	0,77	1,12	1,34	0,53	0,93	1,21	1,48
Türkiye Finans	0,16	0,49	0,84	0,21	0,08	0,40	0,73
Islamic Banking (Average)	0,44	0,71	0,82	0,21	0,44	0,74	0,83

Table 6. Forecasting of Bank Capital (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	7,61	7,68	7,97	8,09	8,17	8,24	8,28
Kuveyt Türk	7,07	6,94	6,81	6,68	6,54	6,41	6,28
Türkiye Finans	8,90	8,76	8,62	8,48	8,33	8,19	8,05
Islamic Banking (Average)	7,69	7,55	7,41	7,26	7,12	6,98	6,83

Table 6 states that Albaraka is expected to have higher capital in the future. On the other side, other 2 Islamic banks (Türkiye Finans and Kuveyt Türk) will have lower capital in the future. This situation is similar for Islamic banking average of Turkey.

Prediction for the Off-Balance Sheet Items

Off-balance sheet transactions include matters not directly included in the balance sheet but affecting the profitability of the bank. Banks' off-balance sheet transactions mainly consist of non-cash loans and derivative products. Non-cash loans include commitments and letter of credits. On the other hand, derivative products consist of forward, future, swap and option transactions. Derivatives can be used mainly by banks for hedging purposes. Especially in recent years, a significant increase has been observed in off-balance sheet transactions of banks (Oktar and Yüksel, 2016; Kuldeep et al., 2018). Islamic banking sector and estimates of off-balance sheet transactions for banks in Turkey are shown in Table 7.

Table 7 indicates that Islamic banks are expected to use more off-balance sheet items in the future. However, this situation is different for Türkiye Finans. These results provide an important information for Islamic banking sector of Turkey. Financial derivatives are not preferred by Islamic banks due to doubts about their compliance with Islam. Therefore, this increase expectation is mainly directed to non-cash loans.

Prediction for the Non-performing Loan Ratio (NPL)

Non-performing loans indicate loans that customers cannot pay to banks. The legal process starts with regard to the loans that cannot be paid by the customers within the periods specified in the laws. These loans may cause significant losses for banks. Therefore, it is important that banks take certain measures. In this context, the past payment performance of the loan requesting customers should be analyzed in

Table 7. Forecasting of Off-balance Sheet Items (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	0,62	0,01	0,25	1,77	2,15	1,54	1,90
Kuveyt Türk	0,95	0,71	0,68	2,07	2,35	2,05	2,25
Türkiye Finans	0,23	0,31	0,37	0,56	0,76	0,16	0,18
Islamic Banking (Average)	0,64	0,13	0,15	1,64	2,05	1,48	1,60

detail. In addition, the payment performance of the credit customers should be periodically controlled (Anastasiou et al., 2019; Dinçer et al., 2018b). On the other hand, not concentrating on a single sector while giving credit is one of the important measures that can be taken in this regard. Estimated results of the nonperforming loans for Islamic banks in Turkey in future were shared in Table 8.

Table 8 explains that nonperforming loans ratio is expected to increase for both Islamic banks and Islamic banking average in Turkey in two years period.

Prediction for the Liquidity Position

Liquidity is a vital issue for banks. The importance of this issue has been understood in recent financial crises. These crises have had an impact not only in developing countries but also in developed economies. It is seen that the banks, which do not have profitability problems in the related crises, also have problems due to the liquidity problem. Therefore, banks are required to periodically check their liquidity position (Jiang et al., 2019). Table 9 estimates the future liquidity situation of Islamic banks in Turkey.

Table 9 demonstrates that there is not an important change in the liquidity position of Islamic banks in Turkey.

SOLUTIONS AND RECOMMENDATIONS

The results of the study indicate that Islamic banks in Turkey will have higher size and become more profitable. On the other side, it is also concluded that nonperforming loans and capital amount are expected to be lower. This issue explains that Islamic banks should be very careful in this growing process. In other words, these banks should evaluate the credibility of the customers very effectively while giving credits.

Table 8. Forecasting of Non-performing Loan Ratio (NPL) (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	7,62	7,72	7,81	7,91	8,01	8,10	8,20
Kuveyt Türk	2,92	2,95	2,98	3,01	3,04	3,06	3,08
Türkiye Finans	5,72	5,81	5,87	5,92	5,97	6,02	6,07
Islamic Banking (Average)	5,24	5,26	5,28	5,30	5,32	5,34	5,36

Table 9. Forecasting of Liquidity (2019-2020)

Banks	2019-2	2019-3	2019-4	2020-1	2020-2	2020-3	2020-4
Albaraka	93,88	93,88	93,88	93,88	93,88	93,89	93,89
Kuveyt Türk	84,18	83,79	83,39	83,00	82,61	82,22	81,83
Türkiye Finans	111,69	112,02	112,35	112,68	113,01	113,34	113,67
Islamic Banking (Average)	97,28	98,99	99,76	100,10	100,25	100,32	100,35

FUTURE RESEARCH DIRECTIONS

This study focused on the future of Islamic banking in Turkey. In order to achieve this aim, models have been established using ARIMA method. In future studies, it will be possible to make a comparative analysis using a different method. On the other hand, it was concluded that conducting this study on traditional banks will also contribute to the literature.

CONCLUSION

In this study, the future status of Islamic banking in Turkey has tried to forecast. For this purpose, 3 different Islamic banks (Albaraka, Kuveyt Türk, Türkiye Finans) and sector averages are taken into consideration. Six different variables (total assets, return on assets, capital, off-balance sheet items, nonperforming loans, liquidity) were determined for the banking sector. The stubble data for these variables were made using the quarterly data for the period 2010-2018. In this process, considering the ARIMA method, a separate model was established for each variable. Then, considering these models, future predictions were made.

According to the results, it is expected that the size of the Islamic banks will increase in two years period. Another important point is that, both the banks and the sector are expected to be more profitable in the future. On the other side, with respect to the capital amount, Albaraka is expected to have higher amount in the future whereas other 2 Islamic banks (Türkiye Finans and Kuveyt Türk) and Islamic banking average of Turkey will be lower. Moreover, it is also expected that more off-balance sheet items will be used in the future. However, nonperforming loans ratio is expected to increase for both Islamic banks and Islamic banking average in Turkey in two years period. The final significant point is that there is not an important change in the liquidity position of Islamic banks in Turkey.

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KEY TERMS AND DEFINITIONS

ACF: Autocorrelation Function.
ARIMA: Autoregressive Integrated Moving Average.
BRSA: Banking Regulation and Supervision Agency.
NPL: Nonperforming Loans.
PACF: Partial Autocorrelation Function.
UAE: United Arab Emirates.
USD: American Dollar.

APPENDIX

Table 10. ADF Unit Root Test Results of Asset Size

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.9918	0.0000	-	1
Kuveyt Türk	0.9998	0.0010	-	1
Türkiye Finans	0.8838	0.0000	-	1
Islamic Banking (Average)	0.9906	0.0000	-	1

Table 11. The Details of ARIMA Models of Asset Size

Banks	p	d	q	R^2
Albaraka	1	1	1	0,987
Kuveyt Türk	0	1	0	0,989
Türkiye Finans	1	1	1	0,935
Islamic Banking (Average)	0	1	0	0,983

Table 12. ADF Unit Root Test Results of Return on Asset

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.8611	0.0001	-	1
Kuveyt Türk	0.1385	0.7144	0.0000	2
Türkiye Finans	0.6635	0.0153	-	1
Islamic Banking (Average)	0.6319	0.1354	0.0001	2

Table 13. The Details of ARIMA Models of Return on Asset

Banks	p	d	q	R^2
Albaraka	3	1	4	0,721
Kuveyt Türk	3	2	10	0,275
Türkiye Finans	3	1	5	0,750
Islamic Banking (Average)	3	2	10	0,408

Table 14. ADF Unit Root Test Results of Bank Capital

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.0238	-	-	0
Kuveyt Türk	0.5217	0.0000	-	1
Türkiye Finans	0.2576	0.0000	-	1
Islamic Banking (Average)	0.3366	0.0000	-	1

Table 15. The Details of ARIMA Models of Bank Capital

Banks	p	d	q	R^2
Albaraka	1	0	7	0,445
Kuveyt Türk	0	1	0	0,823
Türkiye Finans	0	1	0	0,835
Islamic Banking (Average)	2	1	2	0,839

Table 16. ADF Unit Root Test Results of Off-balance Sheet Items

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.9687	0.9723	0.0001	2
Kuveyt Türk	0.9991	0.9978	0.0001	2
Türkiye Finans	0.9783	0.8870	0.0001	2
Islamic Banking (Average)	0.9845	0.8003	0.0000	2

Table 17. The Details of ARIMA Models of Off-balance Sheet Items

Banks	p	d	q	R^2
Albaraka	2	2	11	0,475
Kuveyt Türk	2	2	11	0,541
Türkiye Finans	2	2	11	0,399
Islamic Banking (Average)	2	2	11	0,477

Table 18. ADF Unit Root Test Results of Non-performing Loan Ratio (NPL)

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.9952	0.0090	-	1
Kuveyt Türk	0.0088	-		0
Türkiye Finans	0.9285	0.0000	-	1
Islamic Banking (Average)	0.9097	0.0049	-	1

Table 19. The Details of ARIMA Models of Non-performing Loan Ratio (NPL)

Banks	p	d	q	R^2
Albaraka	1	1	1	0,931
Kuveyt Türk	1	0	2	0,627
Türkiye Finans	1	1	2	0,936
Islamic Banking (Average)	0	1	0	0,889

Table 20. ADF Unit Root Test Results of Liquidity

Banks	P Values			d Value Results
	Level Value	First Difference	Second Difference	
Albaraka	0.0030	-	-	0
Kuveyt Türk	0.0554	0.0006	-	1
Türkiye Finans	0.1469	0.0019	-	1
Islamic Banking (Average)	0.0451	-	-	0

Table 21. The Details of ARIMA Models of Liquidity

Banks	p	d	q	R^2
Albaraka	1	0	2	0,222
Kuveyt Türk	0	1	0	0,049
Türkiye Finans	0	1	0	0,643
Islamic Banking (Average)	1	0	2	0,417

Chapter 10
Sustainable Leadership as a Vector of the Circular Economy

Hermes de Andrade Júnior
https://orcid.org/0000-0002-3667-1354
University of Vigo, Pontevedra, Spain

Tamar Prouse de Andrade
University of Vigo, Pontevedra, Spain

Antonio Palma Rosinha
IPAM, Institute of Higher Military Studies, Lisbon, Portugal

ABSTRACT

Formal leaders do not act alone but interact with all those around them and the results of a company are no longer focused solely on financial indicators. A sustainable leader must create a conducive environment for business development in a balanced way with nature and society. In this conceptual chapter, the authors aim to (1) present sustainable leadership by relating the characteristics of a leader to sustainability; (2) consider that the role of this type of leadership is fundamental to the construction of a truly sustainable meaning, since it links government, people, and companies in a sustainable meta-organization dynamics and green supply chain thus contributes to the circular economy. Government, businesses, and consumers must be aligned. The followers of truly sustainable leadership play a decisive role in influencing other leaders, people, organisations, and results.

INTRODUCTION

Practically every economic activity has a negative environmental impact, so many companies are currently investing in communication and marketing to show that they are socially and ecologically sustainable. But it is not fair.

A sustainable leader must create an environment conducive to the development of business in a balanced way with nature and society. One way to lead is to recognize the strengths and weaknesses and

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to have the support of qualified people to manage each area. Among the challenges are presenting innovative products, practicing actions that improve the life of communities and seek the engagement of people - actions that integrate the tripod of sustainability (environmental, social and economic).

Seeking the development of the organisations, employees and society are the main attributes of sustainable leadership. The concept follows the principle of power distribution and also prioritizes care with the environment, so that the activities developed do not threaten the well-being of future generations.

Without using the word sustainability, Fritjof Capra (1982) already describes this concept in his book *The Turning Point*. In this work, Capra presents the conception or systemic view of the world and an ecological perspective contrasted with fragmentary system that supports the modern world of the late twentieth and early twenty-first centuries. Capra highlights the obsession of capitalist society for growth, investing in heavy technology, stimulating wasteful consumption and rapid exploitation of natural resources. These would be some of the factors responsible for causing disasters and natural catastrophes of repercussion in the social world, besides the systemic problems in the economic, political, and so on. In the logic adopted by Capra, any concept of sustainability would be directly linked to that of the complex web of interdependencies, with the capacity for transformation (inherent in nature) applied to human culture.

This is our touch used to show the interdependence of phenomena that are often mediated and forced by a monoculture of consumption and unsustainable consequences, as to the abundance of resources used without reverse logistics, without need and consequently wastes.

Social responsibility and sustainability must permeate the decisions of the new business leader profile. In times of excessive consumption and scarcity of natural resources, the great challenge worldwide is to combine development with the preservation of biodiversity and the environment.

In addition, it is necessary to implement the change process by establishing vision and mission related to sustainability; measuring performance based on specific goals - such as effluent treatment, pollution and greenhouse gas mitigation, water and light management; align strategies and goals with all operational units; involve suppliers in green strategy; communicate the results and the evolution through a report of sustainability and communication channels of the corporation; to educate the stakeholders (stakeholders), among other attributions.

We aim to (i) present sustainable leadership by relating the characteristics of a leader to sustainability; (ii) consider that the role of this type of leadership is fundamental to the construction of a truly sustainable meaning, since it links government, people and companies in a sustainable meta-organization dynamics and green supply chain thus contributes to the circular economy.

THE LEADERSHIP COMPLEX

Trying to obtain a more accurate picture of the true nature of leadership, the extant research on leaders has ignored the most appropriate ontological locus for leadership, which rests in the relationship between the leader-team dyad and the processes that explain how it emerges (Antonakis, Fenley & Liechti, 2011).

LEADERSHIP CONCEPTS

Leadership can be defined as the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organisations of which they are members (House et al., 1999).

Vieira (2002) argues that leadership is defined as a process of influencing human behaviour that goes beyond the use of official authority, in order to achieve the purposes, goals, and objectives defined and provided by the appointed organizational leader.

Most concepts define leadership as an influence process or ability, which one member of a group exerts over other members to achieve certain goals by eliciting motivation. Therefore, leaders are the main source of influence for processes and tasks, dominating the decision-making process and playing a key role in defining the strategy, dynamics, motivation and identity of a work group. This single leader perspective views leadership as a specialized function that cannot be shared without jeopardizing group effectiveness (Ensley, Pearson & Pearce, 2013).

A dynamic, interdisciplinary and inclusive process, leadership cannot be separated from the core functions of organisations. Reality may have forced leaders to adapt to the changes brought about by globalization, but leadership theories have been slower to do so.

Recent research based on previous studies stresses the need to redefine leadership. The traditional image of the leader as a hero is slowly being replaced by a different image, that of a collective group of people who exert influence through formal and informal relationships between individuals (Yukl, 1999; Chrobot-Mason, Gerbasi & Cullen-Lester, 2016).

LEADERSHIP CHARACTERISTICS

We are faced with a paradigm shift in leadership, which is becoming the purview of the collective rather than the individual both in formal and informal relationships (Carter et al., 2015). These new leadership practices are referred to in different ways, such as distributed leadership, shared leadership, relational leadership, polarized leadership, and collective leadership.

These approaches acknowledge that, as collective systems, organizations are complex relational systems and that leadership stems from interdependent interactions and connections that intertwine to form larger structural patterns. Although leader-follower relationships are already addressed in traditional and contemporary leadership approaches (for example, transformational leadership), what distinguishes this approach is the acknowledgment that teams, organisations, coalitions, communities, networks, and systems carry out their leadership roles and activities through distributed processes and collective social behaviors that change over time.

The macro component of an organization's leadership can be depicted as a tripartite representation, according to variables that describe collective leadership as concentration (people), roles, and time (Contractor et al., 2012).

Role concentration is the degree of leadership distribution from one individual to multiple individuals, with each role corresponding to a function – Navigator – Engineer – Social Integrator – Liaison (Carson & Tesluk, 2007).

Role modelling refers to a person's ability to lead by example, displaying effective ethical and behavioural patterns through social learning processes and becoming an ideal prototype for all members of an

organization, who is capable of activating collective identities and goals (De Cremer & van Knippenberg, 2002). Delegation is defined as the transfer of power and competencies and is expanded through the practice of shared leadership (Pearce, 2004).

In this networked environment, influence involves using techniques that appeal to reason, emotions, or values to gain the commitment of the group and the support of supervisors, as well as to negotiate and interact effectively with the members of the local population. The dispersed and fluid nature of operations requires the ability to analyze problems systematically and to act decisively without outside guidance or advice.

Decision making involves detecting, perceiving, and understanding the elements of the environment and projecting future states or events. Finally, support consists of displaying respect, sociability, individual consideration, and empathy (Hannah, Jennings & Nobel, 2010).

An example of its applicability to the field of economics is how reality and realism remake the tense environment of data collection in loco. Concern over the repercussions of the news represents a challenge for professionals, who are easily criticized for decisions and attitudes that are perceived as wrong and unethical, or that are uncomfortable to some audiences, who are increasingly aware of their identity.

We have accounted for cognitive and affective attributes as well as self-regulation processes. Cognitive and affective attributes include different forms of courage, such as physical, moral, and social courage (confronting a supervisor or colleague) and psychological courage (testing a new skill and running the risk of failing) (Hannah, Jennings & Nobel, 2010).

We have also considered the cognitive styles associated with resilience, which is defined as the ability to find meaning and purpose in potentially stressful events, turning them into opportunities for personal growth. We have also encountered concepts related to psychological states, such as hope, optimism, resilience, and confidence.

Self-confidence in the ability to perform leadership tasks was found to be a key factor. The positive emotional demonstration, or positive affectivity, as opposed to negative affectivity, is crucial for leaders who seek to elicit energetic and positive emotional responses, provide stress-relief resources, and rally the team (Rosinha et al., 2016).

Similarly, a high level of emotional self-regulation is considered a key attribute in maintaining a positive attitude under stress. Several self-regulation attributes have been identified, such as the ability to process large amounts of information, which implies "thinking about thinking" or monitoring and controlling one's own cognitive processes. Another critical factor of self-regulation is that, in order to remain effective, leaders must have a "genuine and visceral motivation to lead" (Hannah, Jennings, & Nobel, 2010, p.436). The motivation to lead others can come from multiple sources, such as seeing oneself as a leader (identity-based), social or normative motives, or the result of a calculated cost-benefit analysis.

SUSTAINABILITY AND SUSTAINABLE DEVELOPMENT (SD)

The term sustainability is widely used but little explained. It is conceptually misunderstood and regarded as a fashion accessory (Hasna, 2010) or a matter of common sense (Moldan et al., 2012). The concept is inconsistently interpreted and ambiguously applied, and reveals an incomplete perception of the issues of poverty, environmental degradation, and the role of economic growth (Mori & Christodoulou, 2012).

What we now call Sustainable Development (SD) has evolved as an integrating concept, an umbrella under which a set of interrelated issues is uniquely organized. It is a variable process of change with

sustainability as its ultimate goal. In the same context, sustainability is the ability of a human, natural or mixed system to resist or adapt to endogenous or exogenous changes for an indefinite period, represented as a goal or end point (Hove, 2004). Therefore, to achieve sustainability, SD is usually necessary. The SD concept remains contested because of the different positions taken in relation to what can be considered fair (Todorov & Marinova, 2011). Thus, the SD concept can be considered as ambiguous as sustainability concept.

It does not explicitly embrace future thinking, and almost all published definitions of the SD concept are based on principles of sustainability, e.g. long-term perspective, the key importance of local conditions, and understanding the nonlinear evolution of environmental and human systems (Moldan et al., 2012) because the term sustainability comes from renewable resources and has become the main motto of the ecological movement.

This sense of the concept refers to the existence of the ecological conditions required to support human life at a specific level of welfare through future generations, which is ecological sustainability, not sustainable development.

According to Ayres (2008), sustainability is a normative concept about how humans should act in relation to nature, and how they are responsible for each other and for future generations.

Lester Brown, founder of the Wordwatch Institute, has defined a sustainable society as capable of satisfying its needs without compromising the chances of survival of future generations with procedural proprieties which, in addition to continuing to exist over time, prove itself capable of: (a) positive quality, (b) to present, in the shortest possible time, maintenance autonomy (rely on its own strengths), (c) to belong symbiotically to a network of sustainable collaborators and (d) to promote the dissipation of strategies and results, to the detriment of any kind of concentration and / or centrality, in view of the harmony of society-nature relations (Brown, 1981).

Often, sustainability is seen on two different levels: weak sustainability or strong sustainability. Weak sustainability can be interpreted as the extension of economic well-being (Neumayer, 2003) where the economic capital produced by current generations can compensate for losses of natural capital for future generations (Fiorino, 2011).

In weak sustainability, the value of natural capital is required to be preserved, for example in the case of non-renewable resources, extraction is compensated for by an investment in substitute renewable resources of equivalent value (e.g. wind farms to replace fossil fuels in the generation of electric energy).

In contrast, strong sustainability is a paradigm of non-substitution, in which there are natural systems that can not be eroded or destroyed without compromising the interests of future generations (Fiorino, 2011). In strong sustainability it is required that part of the total natural capital be preserved in physical terms, so that its functions remain intact (Cf. Sartori, Latrônico & Campos, 2014).

In the way we see in this study, the sustainability paradigm also postulates the preservation of diversity in its broadest sense, sociodiversity, in addition to biodiversity, that is, the maintenance of the system of values, practices and symbols of identity that allows social reproduction and ensures national integration through the ages.

This includes, of course, the promotion of the constitutional rights of minorities and their incorporation into concrete policies of multilingual education, territorial demarcation and autonomy, religiosity, community health, digital inclusion, and so on. (Viana, Silva & Diniz, 2001).

The political foundation of sustainability is closely linked to the process of deepening democracy and building citizenship. This is summarized, at the macro level, to the democratization of society and, at the micro level, to the democratization of the state. The first of these goals presupposes the strengthening

of social and community organisations, the redistribution of assets and information to the subordinate sectors, the increase of the analysis capacity of their organizations and the capacity for decision making. The second is the opening of the state apparatus to citizen control, the reform of political parties and electoral processes, and the incorporation of the concept of political responsibility in public activity (Viana, Silva & Diniz, 2001).

Especially in peripheral countries and with serious problems of poverty, inequality and exclusion, the social foundations of sustainability postulate distributive justice as the basic criterion of public policy in the case of goods and services and the universalization of coverage in the case of global policies of education, health, housing, and social security. The same applies, also in relation to social sustainability, to the criteria of gender equality, recognizing the full incorporation of women in economic (market), political (voting) and social (welfare) citizenship as a value in itself even, that is, therefore, placed above economic considerations.

Being sustainable means acknowledging that reality is a continuous, systemic, non-linear process in which relationships (social, natural, and socioenvironmental) occur both simultaneously and subsequently, and that each party inevitably has responsibilities in the process, as the pattern in nature is a network of interdependencies between beings and resources coexisting in a given environment. Other definitions of sustenance, such as to bear, to nourish, or to fortify, also mean to maintain, provided they are being used correctly.

MODELLING SUSTAINABLE LEADERSHIP

Andy Hargreaves and Dean Fink are pioneers in pursuing a sustainable leadership model. Their studies published in the book Sustainable Leadership show that the key ideas for change and long-term continuity are: leadership, sustainable leadership, and leadership succession.

They emphatically affirm that sustainable leadership *(i)* is important if it spreads and persists in the test of time and also functions as a shared responsibility that does not unduly deplete human or financial resources or that takes care of and avoids causing harm to the environment educational and community environment; *(ii)* has an activist commitment to the forces that affect it and builds an environment of organizational diversity that fosters the cross-fertilization of good ideas and successful practices in shared learning and development communities.

Hargreaves and Fink's survey of schools in North America indicated that leaders who are doing good school work should remain in office for at least five years: "If they want their improvements to survive after their exit, leaders should be anticipating fewer successions at any point in their careers, ensuring that the effects of their leadership will persist" (Hargreaves & Fink, 2007, p.61).

Here, there is a vision of sustainable leadership for schools and educational managers, but we adapt and contextualize this study with the aim of suggesting a sustainable leadership model that is applied macro and microscopically in companies and in society. We understand that the model begins with individual action and ends with the organizational environment.

Reinforcing this possibility, Ulrich (2014) advocates the sustainability of leadership as a long-term and ongoing commitment to changing people's behavior and creating a culture of leadership enhancement that can bring everyone together within a company.

Bendell, Sutherland, & Little (2017) established, after a long review of the literature to contribute a critical social theory, what or how unsustainable for leadership is. The seven unsustainabilities of

leadership are: (1) ignoring purpose or assuming the primary purpose to be the benefit of an employer; (2) assuming or believing a senior role holder to be most salient to organisational or social change; (3) ignoring the political and moral aspects of an exclusive focus on enhancing the agency of senior role holders; (4) assuming that "leader" is a continuing quality of a person rather than a label; (5) assuming that the value of an individual lies mostly in their confidence in their distinctiveness; (6) assuming that leadership development is about learning more rather than about unlearning; and (7) believing that material progress is always possible and best (p.433).

Finding this inconsistency, they "prepare the conceptual ground for the development of new approaches to sustainable leadership research, practice and education" (p. 433).

WEIGHTS ON OPPORTUNITIES FOR THE CIRCULAR ECONOMY

The traditional economy model is antagonistic, and it fails the sense of humanity and sustainable values in *three* important considerations. Next, we will elaborate for each of them.

First, the educational model based on capitalist economies tends to generate and lead people to individualistic attitudes and leads them to believe that organizations can solve personal problems or facilitate their life prospects without people participating directly in the process of reversibility of environmental damage, symbolizing sustainable development without co-responsibility. By the way, the very ambiguity of sustainable development leads us to the bankruptcy of this model.

The Stockholm Conference, held in 1972, is considered the starting point of discussions on environmental education. The World Plan of Action was designed at that conference and, in particular, it was recommended that an international environmental education program should be established. Conference recommendation 96 recognized the development of environmental education as a critical element in combating the world's environmental crisis.

The first conference on Environmental Education (EA) organized by UNESCO in collaboration with UNEP was held in Tbilisi (USSR, 1977). It became known as the culmination of the first phase of the International Environmental Education Program (PIEA) initiated in 1975 by UNESCO / UNEP (Belgrade, 1975) with activities in Africa, the United States, Asia, Europe and Latin America. It contributed to clarifying the nature of environmental education, defining its objectives and characteristics, as well as relevant strategies at the national and international levels.

Based on the actions of several governmental and non-governmental organizations, the discussion on Environment and Development came to be considered together, taking into account the importance of education for the implementation of new development strategies and environmental projects.

Meetings and agreements have evolved. Now, the ecological concern would consider understanding the complex nature of the environment and contemplate the interdependence between the various elements that shape it in the sociopolitical, economic, cultural, historical, psychological and biophysical dimensions (Leff, 2000; Leff, 2001).

In this healthy mobilization for feasibility studies to educate with sustainability, a study sought to present ways to sustainable solutions, characterizing possible unfolding of environmental activism and categorizing four major streams of environmental education activities: (1) conservationist; (2) outdoor education, (3) environmental management and (4) ecological economics (Sorrentino, Trajber, & Braga, 1995).

The first stream would be more present in the countries of the first world and is characterized by the concern of many ecologists with the environmental problems and the reflections on the causes and consequences of the environmental degradation and the engagement in environmental management movements. It provokes discussions about the impacts on nature caused by development models. The second stream mentioned concerns the adherents of naturalism, characterized by outdoor walks, extreme sports, caving, ecotourism, mountaineering, and scouting. This approach treats nature as a "sanctuary", dissociating environmental problems from social, economic, and political problems. The third stream categorized current has the oldest roots in Latin America, due to democratic disputes and the history of resistance to authoritarian regimes. The discussion of the environmental management approach is in the struggle against pollution and all the problems resulting from the predatory form of exploitation of the environment and of the human being. This type of approach also suggests community participation in the management of public spaces and in the choice of forms of future use of resources. Finally, the fourth stream is related to the focus of the ecological economy, which gives the tone of the environmental movement and, consequently, environmental education associated with sustainable development and sustainable societies (Sorrentino, Trajber, & Braga, 1995).

With regard to sustainable development, in practice, it is an agglutination of entrepreneurs, government officials and a number of non-governmental organisations. As for the sustainable society, in practice it brings together those who have always been in opposition to the current development model and who believe that the first chain is only a new mantle for the maintenance of the status quo (Sorrentino, Trajber, & Braga, 1995).

To regain confidence in the system, a new leadership need to navigate within transformative environmental education. The effort points to the emergence of environmental education as a component of knowledge because it presupposes the recognition that traditional education has not approached this approach satisfactorily. For this revival of confidence, the word environmental should be an intimate part of education with a whole and not a modality or one of its dimensions, because in this vision appears an instrumentalization of the environmental issue where critical questions about education and its model submerge.

As a critique of any innovative program in this area, the insertion of an environmental dimension can also lead to the risk of instrumentalization of the environment as a whole, represented by the focus on issues such as pollution, scarcity of natural resources, and commitment to biodiversity, for example. In this case, the payment of fines imposed on the agents responsible for the environmental impact would be the great consequence to be considered. Thus, environmental education ceases to represent a formative and integrating effort to maintain the old conception that deviation from legally defined conduct has a form of compensation that again integrates the individual into the world of responsible citizens.

Environmental sensitization can characterize efforts to reduce and minimize resistance to counterflow measures of unbridled production and profit. To educate for citizenship is to act with mutual interference and respect: this is the broad sense and its condition of beauty, as the human being imagines in its context and not by the polarization of licentious actions and discursive practices.

Such adaptation to the needs of this subject should, therefore, privilege the dimension of collective well-being while assuring the affirmation of individual attributes, since it is, as has already been said, a basis of freedom, which is the foundation of biodiversity. Moreover, the question of freedom as an awareness of necessity lies at the heart of the environmental question because, since there is no permanent harmony, neither natural nor social, the balance between freedom and necessity, between free will and coercion presupposes the acceptance of conflict as inherent in social and natural relations.

Second, the traditional organizational model does not consider the circularity of the process of transformation of the material itself (in the sense of inputs and the creative-productive process) and the conception of the productive chain as a sustainable metaorganization, which must be endowed with the same language, attitudes, principles and practices as reason and sense of existence for future generations, already in the new educational model adjusted to circularity.

A sustainable society, adjusted to this model, is strengthened as initiatives that lead to the formation of new mentalities, knowledge and behaviors are amplified. This raises the challenge of questioning the logic of unsustainability by expanding access to channels where multiple transformative ideas and practices present alternative visions and promote co-responsibility in society.

The gap between the recognition of the social and environmental crisis and the actual construction of new practices capable of structuring the foundations of a sustainable society must be tackled, warning the importance of broadening the possible responses as part of a process that does not depend only on public policies, but also of the initiatives of companies, which today are institutions responsible for creating the greater part of the wealth of the world economy (Jacobi & Giatti, 2017).

The maintenance of the traditional business model has generated costs for society, which multiply damages to health and the environment, increasing social and environmental injustice and vulnerability due to pollution and the disposal of toxic waste (Andrade Júnior, 2018), and to the effects of climate change in the various sectors of housing, transport, energy sources and basic sanitation, among others.

In this sense, several initiatives are underway that focus on the need to promote economic development with social equity, considering the urgency of reducing environmental risks and the degradation and depletion of natural resources. Leadership in sustainability would alleviate human pressures on the earth system, better managing joint effort against critical global, regional and local thresholds that are close to being exceeded or even have been.

The productive system generates a great accumulation of residues by the excessive exploitation of resources because goods are produced, which are quickly discarded, as a result of a logic guided by the programmed obsolescence that generates residues that do not receive new uses and accumulate exponentially (Andrade Júnior, 2019).

Thus, in the context of a planet with finite resources, even with gains in energy efficiency and in the use of raw materials, companies are increasingly required to rethink their logic, including in the partnerships that sustain their production chain. The need to redefine strategies in meta-organizational terms of the complete production chain advances to a new economy based on resource finiteness and a sustainability perspective by innovation systems and by responses that generate a regenerative ecosystem logic, based on practices that emphasize solving social and environmental problems.

Third, the adjusted organizational influence that leads to its productive chain as a sustainable meta-organization with a conscience for sustainable practices, must also be attentive to the supply chain and reverse logistics, in order to complete the cycle. But without the help of the consumer, this is difficult because consumers will be responsible (if they are, indeed!) for introducing levels of participation, quality and environmental commitment, control of the emission of substances, in their transport, in the intended for reuse or recycling.

The productive model of traditional business management sees nature as an inexhaustible source of resources available to the human being. However, this paradigm is changing every day, the cycle of renewal and supply of nature is not achieving the same speed as demand. However, it should be noted that just over two decades ago, sustainability was seen in the margins of the business world. It was as if they were compensatory initiatives supported by projects here and there (Gonçalves-Dias, Maciel &

Soares, 2009). The issues and future challenges faced by managers and executives are only now being understood.

DUTIES AND CHALLENGES OF CIRCULAR ECONOMY FOR SUSTAINABILITY

Supply Chain Sustainability Management (SCSM) can be defined as strategic, transparent and integrated thinking to achieve economic, social and environmental goals in systemic coordination of interorganizational processes along the chain (Seuraga & Muller, 2008; Srivastava, 2007).

SCSM has its roots in the literature on environmental management and supply chain management and concerns the influence and relationships between these two areas of study. This field has developed from the practice of business and research and is undergoing a major transformation.

According to Dias et al., (2012), the definition and scope of sustainability in the supply chain have expanded from green purchasing to the integration of sustainability along the supply chain (Carter & Ellram, 1998; Srivastava, 2007). It follows the step of supplier, producer, consumer, reverse logistics (Zhu & Sarkis, 2004) and still reaches the supply chain in closed circuit (Guide & Van Wassenhove, 2006a, b).

Tang & Zhou (2012) described the "PPP ecosystem" (see Figure 2) composed of five base elements and several flows between the elements, obtaining a better understanding of the interactions between the dimensions of the triple bottom line (Figure 1).

Figure 1. Triple Bottom Line model. Adapted from Brandenburg et al., 2014

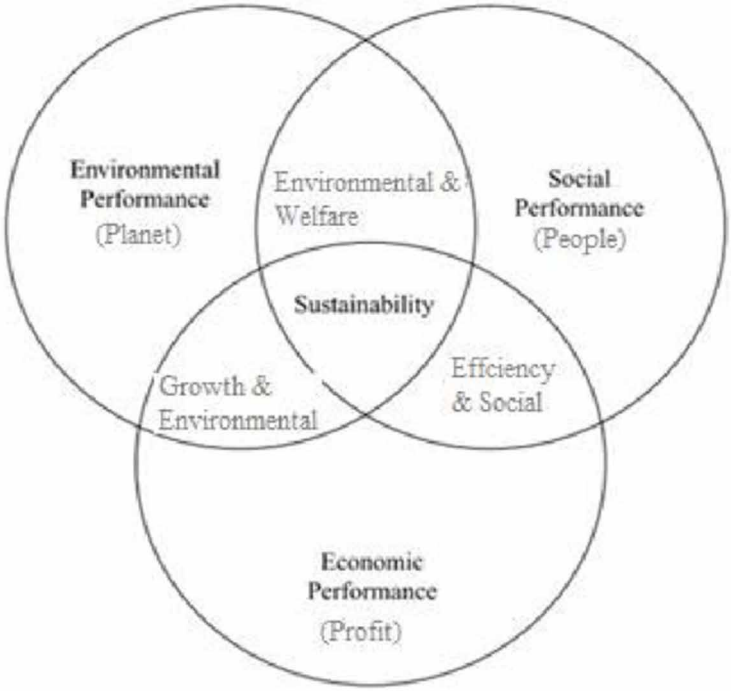
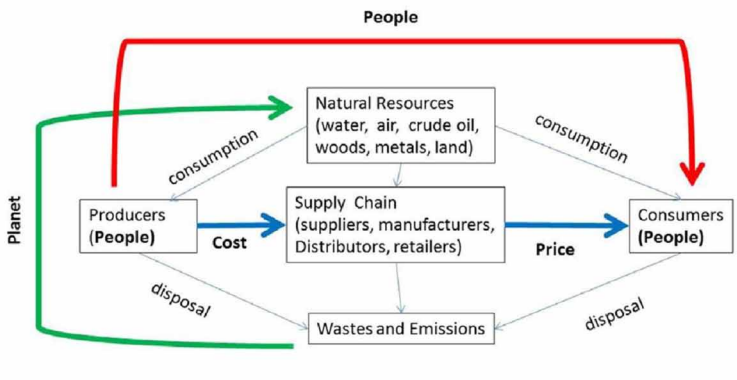


Figure 2. PPP ecosystem (profit, planet, and people) (Tang & Zhou, 2012)



Government is critical in the ecosystem as it plays a significant role in the development of public policies and creates incentives for businesses and consumers to become more environmentally and socially responsible. Consumers can play a critical role by pressing companies to focus on social and environmental issues.

Given consumer demand, each supply chain partner uses natural resources (water and energy, for example) and employs producers (all workers in the supply chain) to produce and distribute products to consumers in different geographic regions.

In this flow, each partner in the supply chain makes a number of decisions and incurs costs and revenues in order to maximize profit (blue arrows). However, like producers, supply chain partners (e.g. factories, logistics providers and retailers) "consume" natural resources in their activities and inevitably generate waste and emissions to the planet (green arrow).

Thus, to minimize the negative impact on the planet, they need to take into account environmental factors (consuming less natural resources, less waste generation, generating less greenhouse gases, etc.) in making decisions in their daily operations. In order to generate new revenue growth (economic growth), companies set up operations in rural areas, in order to develop the emerging market through the creation of new jobs, enabling poverty alleviation and the generation of new consumers (red arrow) (Tang & Zhou, 2012).

By studying the model, government, businesses, and consumers must be aligned. Through sustainable leadership in the different areas of activity, it is possible to make the cycle, already internalized by all agents (including stakeholders and shareholders), finally complete with fewer losses.

SOME INITIATIVES FOR SUSTAINABLE LEADERSHIP

There are few long term initiatives towards that, by now. The University of Cambridge's sustainable leadership institute has established a 10-year report and called it "Rewiring the Economy." In task-goal 7, it addresses the issue of organizational alignment and related modeling to fit the full circle[1].

Another organisation, The Institute for sustainable leadership (ISL) from Australia, has objectives as outlined: a) to be an independent non-profit institute that promotes the science and practice of sustainable leadership, incorporating those behaviours, practices and systems that create enduring value for

all stakeholders of organisations including investors, the environment, other species, future generations and the community; b) to conduct, foster and co-ordinate ground-breaking education and research in sustainable leadership, and to disseminate the benefits to practitioners, academia and the community for the public benefit and in the national interest; c) to promote the advancement of education and training of leaders in commerce, government and the not-for-profit sector in sustainable leadership best practice to achieve superior organisational performance over the long term for the benefit of all stakeholders, and d) to promote the scientific research into the theory and practice of sustainable leadership and the sharing of the results of the research through training programs, publications and seminars for the benefit of all stakeholders[2].

The University of Cumbria (UK) has in its organizational chart the IFLAS, a space for sustainable leadership, which is a global center for research, teaching, and dialogue on the transition to fairer and more sustainable societies (as announced on the website)[3].

FINAL

Being sustainable means recognizing that reality is a continuous, systemic, non-linear process in which relationships (social, natural, and socio-environmental) occur both simultaneously and subsequently and that each party inevitably has responsibility in this process, in gives in the existing pattern in nature, as a relation of interdependence between beings and resources that coexist in a given environment.

In order to be sustainable it is necessary to respect this same rule of transformation, knowing that only when there is systemic and dynamic behavior where people are willing to change, can one maintain a healthy life for many years and generations. The term maintain is one of the possible definitions for the word sustain, for the support given to the concept of sustainability. But it is important to use it properly, since in order to maintain, in this case, or to sustain, it is necessary to transform. There is no way to maintain the structure, behavior and thinking that we have today and guarantee sustainability. An ecosystem is only sustainable because the beings and resources that compose it exchange energy and matter in continuous cycles, they change frequently, not allowing an imbalance lasting enough to cause its collapse.

An organisation can only be considered sustainable when it focuses on people retention and engagement strategies, but one point stands out even more: opportunities for learning and development. The role of the leader as the primary responsibility for providing such benefits should be assessed.

Companies must take real actions to really contribute to a sustainable society and to leave aside the field of ideas, having the sustainable leader in the role of expanding real actions with society seeking sustainability and protection of the environment inside and outside the companies.

Sustainable leadership, in essence, is the type of ethical leadership, shared, participatory, distributive, based on the best of human character and virtue, with trust assumptions based on the example of conduct; effectively bets on its perpetuity, having a multiplier effect in space-time. In space, it is a type of intercultural and international chain leadership that drags many by a good example and, in time, because it guarantees to future generations the opportunities denied by authoritarian and individualistic capitalist alienation.

The followers of truly sustainable leadership play a decisive role in influencing other leaders, people, organisations and results.

RECOMMENDATIONS

In order for the circular economy to succeed, considering the participation of sustainable leadership, the economy itself will be based on the correction of attitudes and intervening directions in the production cycle and the supply chain in meta-organizational terms that converge towards sustainability; must recognize and be aware of the other, with the nature and with the peculiarities capable of transforming itself into sustainable solutions, in the strict ethical sense of the dignity lived by the greatest possible number of people and by the equalization of opportunities to all of them, even that these are not direct consumers.

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ENDNOTES

1 University of Cambridge. Institute for Sustainability Leadership (CISL) report. (2015, July; updated 2017, November). *Rewiring the Economy: Ten tasks, ten year*s. Cambridge, UK: Cambridge Institute for Sustainability Leadership. Retrieved from https://www.cisl.cam.ac.uk/resources/publication-pdfs/rewiring-the-economy-report.pdf

2 Beginning its activities in 1997, they affirm that they act with strong practical guidance, with models and structures developed from observations of best practice organizations based in different parts of the world. They also point out through their website that the principles of sustainable leadership they adopt are supported by evidence collected by an international network of affiliated university contributors, including masters and doctoral research students. See more at https://instituteforsustainableleadership.com/

3 See more at https://www.cumbria.ac.uk/research/centres/iflas/

Chapter 11
Understanding Political Consumerism, Political Participation, and Their Antecedents:
Evidence From Turkey

Ertem Gulen
Trinity College Dublin, Ireland

Oguzhan Aygoren
Bogazici University, Turkey

ABSTRACT

Political consumerism is a form of self-expression where consumers boycott or buycott a brand, company, or a product. The increase in the amount of these actions in recent years has led scholars and marketers improve their understanding of how and why consumers engage in political consumerism and what its predecessors are. By employing a wide scale survey among 360 participants in Turkey, this study presents empirical and qualitative evidence for boycott behavior and investigates how other forms of political participation and individual level characteristics have an effect on political consumerism. Results suggest main reason for boycott behavior in Turkey is due to political reasons and conservatism as an individual level value orientation has a negative effect on boycott behavior. In addition, online activism and voting participation behaviors have positive effects on political consumerism.

INTRODUCTION

In recent years, consumers are experiencing a transition from being a passive buyer to being a prosumer (Ritzer & Jurgenson, 2010), creating new consumption experiences and participating in the process of collaborative marketing. In addition, spread of Internet and new media technologies help consumers

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to use their power to create a change in society and form a civic engagement. This is a form of political participation by consumers, thus leading to a recent phenomenon named as political consumerism. Buycott and boycott are two main forms of political consumerism and academic literature on this field is not yet mature. Also, empirical studies in the field is rare and context dependent. By employing a survey based study among Turkish consumers, this study presents individual level antecedents for political participation in the forms of activism and political consumerism.

Literature suggests that political consumerism, just like any other form of civic and political participation, requires resources and psychological engagement (Baek, 2010; Neilson & Paxton, 2010; Newman & Bartels, 2011; Shah et al., 2007; Stromsnes, 2009). Emergence of political consumerism dates back to World War II, caused by societal changes after war and historical social shift from materialist to post materialist values and personal values. Moreover, diffusion of Internet and new media technologies and changing citizenship practices and norms also constitute the standpoint of this more general understanding of political consumerism. On the grounds of these facts, political consumerism qualifies as a form of political participation. It is becoming more and more popular thanks to increasing power of consumers.

Despite the studies in the literature examining the predictors of political consumerism, most work focus on Western societies. In spite of its historical and contemporary significance, political consumption, as a research area, has been ignored or attracted by very few scholars in Turkey. Given that literature lacks empirical evidence on understanding and conceptualizing political consumerism among Turkish consumers, the aim of this study is to understand the reasons for boycott behavior and propose a model in understanding its antecedents in Turkey.

Remaining of the chapter continues with a literature review on political consumerism and other forms of political participation. Then a section is devoted to political consumerism in Turkey. This section is followed by individual level antecedents and hypothesis. Finally, findings, discussion and conclusion are presented.

BACKGROUND

Political Consumerism: Rise of Consumption as a form of Political Participation

Consumer's behavior of buying or boycotting a particular brand or product because of ethical, social, ideological, political or environmental motivations consciously rely on 18th century; however, political consumerism is a relatively new concept which started to attract scholar's interest after 1970s. With its simplest form, political consumerism represents the use of purchasing power to support or damage a brand or company. Consumers select the producers and products in order to change the given institution or market in a way they want them to be more ethical or else (Boström et al., 2005; Schudson 2007). The first and most known definition of political consumerism is having a great impact on the term of political consumerism to be popular in the literature (Micheletti, 2003; Dubuisson-Quellier, 2009; Holzer, 2006). Micheletti (2003) defines political consumerism as the choices of consumers with the goal of changing objectionable institutional or market practices. So, those consumers react to political, environmental, ethical or human rights issues with the most powerful means they have; denying or owning consumption of a specific brand or product.

He further identifies political consumerism as an action in the borderline between individualized and collective action. Political consumerism itself is mostly considered as a highly individualized activity. According to some consumers, political consumerism occurs at once and vanishes; however, others believe that it is a chance to act as a group (Gotlieb & Wells, 2012). Copeland and Atkinson (2016), who stress the social meanings of political consumerism, state that it is an important opportunity to build powerful ties within the communities rather than consumer's market activity, and consequently it can be defined as a practice that needs to be evaluated within the social context.

Another approach in the literature is that political consumerism is defined as an unconventional political participation in which individuals state their ideologies, social expectations and unrest against the politic conjuncture (Baek, 2010; Neilson & Paxton, 2010; Newman & Bartels, 2011). Thus, political consumerism can also be described as a new citizenship practice especially individuals with certain demographic characteristics (Stolle et al., 2005; Ettenson & Klein, 2005). It is also linked with dutiful citizenship norms because of its characteristics involving punishment in similar with electoral and interest-based politics (Copeland, 2014). Combining all these definitions, political consumerism comes forward as a form of political participation. It aims to make an impact on the priority given to particular societal values – humanitarianism, environmental protection, economic justice, and so on. It also aims to change the distribution of these values in the political and economic outcomes within the society (Norris, 2002; Newman & Bartels, 2011).

There are two mechanisms of political consumerism that are studied in the literature; boycotts and buycotts (Newman & Bartels, 2011; Stromsnes, 2009).

Boycott

As the most favored form of political consumerism, boycotting refers to actions of consumers that seek to punish particular brand or company for unfavorable practice (Friedman 1999; Garrett, 1987). Boycotts are typically triggered by an environmental, social, ethical, or political rationale (Dolan, 2002; Zack, 1991; Stolle et al., 2005; Sandikci & Ekici, 2009).

The most common approach to determine the typology of boycott is the approach classifying boycotts in accordance with their functions. Such practices are divided into four categories; instrumental, expressive, punitive and rewarding (Friedman, 1999; Smith, 2000). Instrumental boycotts are done for several reasons such as trying to reduce prices or cause a closure of a unit in a company. A change in the practice of an organization is the main objective (Balikcioglu et al., 2014). These boycotts are tools to start a dialogue with the organization (Friedman, 1999) and generally originated from the times when consumers wanted better living conditions and basic foods' prices to reduce. Expressive boycotts are to show a general unrest about an incident (Smith, 2000). In this category, consumers boycott a particular company to avoid potential health and safety risks, defend animals, protect the environment, protest unlawful layoffs, fight poverty, defend minorities or civil rights (Furnham, 2008; Hoffmann & Hutter, 2012). These boycotts contain a wide range of products and in order to be successful, an organized movement is necessary. Punitive boycotts are done to cause continuous damage to companies which have irresponsible practices. No dialogue occurs between the parties (Friedman, 1999).

The first examples of boycotting date back to the times of American war of Independence (Taylor, 2007) in late 1700s. Captain Charles Boycott, who was a land agent for Earl Erne in Ireland was the first person to be boycotted. He was subject to social ostracism organized by the Irish Land League, but the term 'boycott' was first used around 1880s. (Friedman, 1999; Micheletti, 2003)

In the last century, boycotts have appeared as a punitive action against anti-social or anti-environmental politics by companies as a form of social audit (Smith, 1990; Kozinets & Handelman, 1998; Strømsnes, 2009). Some of the greatest examples of boycotts within the last century are the movement against Shell for their inhuman attitudes in Nigeria, and worldwide boycott against Swiss food company Nestle for their aggressive and misleading marketing activities proposing baby food is better than mother's milk allegedly causing baby deaths in 1973-1984 (Veraldi, 1988).

Consumer boycotts target not only products or brands, but also countries and products originating from particular countries (Shimp & Sharma, 1987). Some popular examples of boycotting of countries are call for boycott by Australia, New Zealand, Japan and Korea for French products because of nuclear tests of France in South Pasific in 1995 (Djerdjeria, 2003), call for boycott by USA for French products because France did not support Iraqi war, and boycott by Muslim consumers for Danish products because of a cartoon crisis with Denmark (Balikcioglu et al., 2014).

Buycott

A second form of political consumerism is buycotting. Unlike boycott, buycotting targets to support particular brand or company showing positive behavior parallel with the consumer's values and expectations (Friedman, 1999; Gotlieb & Wells, 2012). The main aim of buycotting is to promote particular brands or companies which are considered ethically, socially or politically correct, while boycotting requires punishing them. More often use of product labeling have resulted in an increase in this positive form of political consumerism since 1990s, since it is easier for consumers to choose certain products (Peretti & Micheletti, 2004). Boycotting and buycotting behaviors are not completely different items. An action of buycott, automatically cause a boycott for particular products for not meeting the criteria for a consumer. Moreover, sometimes governments may organize buycotts such as 'New Deal' in the USA in 1930s using 'Blue Eagle' symbol in particular companies or products meaning these companies are Franklin D. Roosevelt's NRA member. However, this use of symbol was prohibited afterwards (Taylor, 2007).

Buycotting may be costly despite reflecting consumer's voice in a very visible way. Thus, buycott is not a frequently used strategy as boycott (Neilson, 2010). However, it can be clearly seen that consumers have increased their voice via buycott in marketplace in recent years. The rise in the consumption of products by cruelty-free brands that do not test products on animals and eco-friendly brands and consequently an increase in the number of these kind of companies verify the previous statement.

Other forms of Political Participation: New Social Movements and Digital Activism

Political participation in a democracy can take various forms and voting is the most important tool of political participation. It is a form of civic engagement for effecting the management of the country. However, as consumerism takes precedence over citizenship, people would like to have more control over the government instead of solely electing a few hundred representatives for the needs of tens of millions of people. This can be an individual comment or a collective protest. Predicating this fact, many countries have recently been witnessing social movements, protests, civil disobedience to authority or any other forms of activism.

"New Social Movements" started in 1970s and gained more importance in 1980s (Önder, 2003). While social movements made policies focusing on production associations from a macro perspec-

tive, *New Social Movements* is an objection to modernity, bureaucratic state and identities insisted by sovereign power and lives set by capitalist market structure (Buechler, 2000). According to *New Social Movements* approach, identities play an important role in social movements (Melucci, 1996). It is known that *New Social Movements* use unconventional political actions such as civil disobedience and humor while achieving their targets (Sivitanides, 2011). The use of information and communication technologies, in particular new media tools developed after Web 2.0, have great impact on achieving the targets mentioned before (Buechler, 2011; Fosshagen, 2014; Baybars-Hawks, 2015).

Social media is in the center of social movements thanks to opportunities it gives to disadvantageous individuals. It plays a great role in terms of communication and organization in every kind of social movements that turns into action (Rohlinger & Earl, 2012; Castells, 2013)

User-oriented structure of social media has created an alternative public space for *New Social Movements*. Nowadays, actions of *New Social Movements* have shifted to digital, thus created a new type of activism. The concept of this shift is called 'Digital Activism', which is the intersection point between New Social Movements and Social Media (Baybars-Hawks, 2015). Consequently, developments in the communication technologies have transformed the social movements. Various sections of society have started to use these channels to stress their grievances.

The increase in the importance of social media in the axis of social movements first started using social media intensively to organize the movements in 2011 in Middle East and North Africa. Besides Arab Spring, Occupy Wall Street, Gezi Park Movements in Turkey are some other examples of how social groups engage in digital activism in order to raise their voice and realize social and political changes (Baybars-Hawks, 2015).

Calls for political consumerism as a new form of civic engagement and unconventional political participation, is also a form of digital activism. Many boycott calls, having various motivations and demands, have been made on digital platforms, and organized and spread on it (Gotlieb & Cheeme, 2017; Kelm & Dohle, 2018). They increase their scope thanks to digital platforms and increase their effectiveness on the market practices of countries and companies (Ward & de Vreese, 2011).

Political Consumerism in Turkey

Because much of the literature consists of studies of European and American social scientist focusing on Western Societies, studying on political consumerism in Turkey requires various social, cultural, economic and historic attributes on the development of consumption and political participation in Turkey.

There are several differences in Turkey compared to Western Societies such as the lack of experience of Industrial Revolution that took place in continental Europe at the times of Ottoman Empire. Late arrival of mass communication tools, advertising concept and late adoption of liberal economic policies that are the most important factors helping internalizing consumption culture are also among other differences (Boratav, 2003). Thus, development of consumption culture in Turkey has not been parallel with the West (Yavuz, 2013). Similarly, comparing to Western societies, Turkey does not have rooted and organized boycott cognizance (Sandikci & Ekici, 2009).

Examining from historical perspective, boycotts in Turkey have been motivated by national and political factors. They have also focused on short terms with insufficient organization and without clear and exact targets (Balikcioglu et.al, 2014). Studies of Balabanis and his colleagues (2001) showed that there is positive correlation between consumer ethnocentrism and patriotism and conservatism, especially having a negative effect on attitudes towards import of foreign goods.

Sandikci and Ekici (2009) also mentioning a similar finding, state that boycotts in Turkey take place with national and conservative motivations in Turkey. These emotional and political boycotts are classified as expressive boycotts. For example, Consumers Union, chambers of industry from various cities and non-governmental organizations called for a boycott against French products in 2006, because of an amendment regarding Armenian genocide. However, the boycott failed, despite taking place in the media as well (Balikcioglu et al., 2014).

There have been also some other boycott calls targeting Israeli and American products recently. The effect of boycott has been tried to increase by sharing lists covering Israeli and American products. Echoes of boycott call to Denmark have also been heard in Turkey, which started in Arab countries after publication of comics of Prophet Muhammed in 2015 by Jyllands-Posten newspaper in Denmark (Heilmann, 2016). Because of the facts that the lists people shared online to show Denmark products had mainly origins other than Denmark, and trade between Turkey and Denmark was not very extensive, this call for boycott was done very unconsciously and consequently failed (Kirgiz, 2015).

Lack of organization and a leader are among the reasons why these boycotts failed. Long lists of products to be boycotted are also among the reasons. Successful boycott against the product 'Danino' of Danone justifies it. Danone was boycotted because of an article in 2005 stating a particular ingredient in Danino cause a mental deficiency in children. This article has passed through 6,5 million people via electronic mails and word of mouth, and Danone Turkey faced the greatest boycott campaign ever done against a company in Turkey. It was stated that this boycott has caused a %26 decrease in the sales of given category (Balikcioglu et al., 2014).

Boycotts in Turkey, having been motivated by ethnocentric and national emotions in the past, have started to evolve to a different path after increasing social polarization and increasing public interest on relationship between government and capital owners. This shift has been visible after various political groups expressing their unrest about current political situation using their market power. Especially in the period after Gezi Park Protests in 2013, companies openly supporting government or having conservative positioning have been started to be boycotted individually. Kızılkayalar, Mado, Ülker and Torku may be given as examples of these companies.

These boycotts have taken place without an organization or a leader. Information regarding the reasons of boycotting a given company and lists of products of companies to be boycotted have passed through social media platforms and have spread via word of mouth. The attributes of new media such as increasing interpersonal mobilization and enabling to reach masses faster, easier on lower costs have significant effect on the spread of call for boycotts. Socio-economically disadvantageous sections of society see the new media as an alternative space for opposition and disobedience. This is also relevant with the fact that individuals act in accordance with the spirit of the time (post-modern) via new media, rather than acting in accordance with the social movement thoughts and practices (Sivitanides, 2011). Consequently, these actions may attract participation of masses thanks to digital platforms and increase the awareness and finally result in a change in the attitudes of companies boycotted.

Boycotting Pınar products after controversial Referendum in 2017, increasing social polarization more, is an example of it. The reason for the boycott was that, chairman of the board of Yasar Holding, made a statement after Referendum about reevaluating the sponsorship of Karşıyaka Basketball Club, a club of Karşıyaka district in İzmir, Turkey voted the highest percentage of 'No' in the referendum made in Turkey in 2017. Following that, call for boycott against the company, specifically Pınar products, took place in digital platforms such as Twitter and eksisozluk.com. Yasar Holding had to make a statement after the hashtag #PınarÜrünleriBoykot, meaning Boycott against Pınar Products, became the top

trend topic in social media, stating that chairman's statement is not binding for the company and family, but himself. However, increasing voices of grievances did not stop even after chairman of the company apologized for what he said. Implementation of the boycott was instantaneous which is probably due to the competitive nature of the industry with a vast choice of substitute products. This specific example also reveals the fact that boycott and buycott actions can be regarded as a way of political expression. This way, citizens raise their voice for politics via their consumer identities.

RESEARCH MODEL

Individual Level Antecedents of Political Participation

Both empirical and conceptual studies on political consumer behavior show that people differ in their motivations for participating in a boycott and buycott actions. Demographics including gender, age, education and income level are known to affect political consumerism behavior (Baek, 2010; Copeland, 2014; Shah, et al., 2007; Forno & Ceccarini, 2006; Micheletti, 2003; Stolle et al., 2005).

Also, generalized trust and trust in institutions have been strongly associated with political consumerism (Putnam, 1993). Low level of trust in political establishments of political consumers may denote a general skepticism of institutionalized power and authority (Zijderveld, 2000). These consumers' economic behaviors are the sign of the fact that they decide to take responsibility and act themselves rather than relying on governmental institutions (Beck 1997; Shapiro & Hacker –Cordon 1999). While education, income level and political interest have positive correlations with the probability of engaging in political consumerism, high level of political trust decreases the likelihood of engaging in political consumerism. Thus, it is expected that low trust in institutions and government may motivate political consumerism. Those who do not trust institutions to act in accordance with their values may feel the need to rely on their own actions to invoke change. That is, "lack of trust in state responsibility-taking encourages civil society actors to accept more responsibility" (Boström et al. 2005). So, following hypothesis is proposed:

Hypothesis One: As the level of political trust decreases, the likelihood of engaging in political consumerism increases.

Best and Krueger (2005) find that psychological factors such as political interest, online civic skills and mobilization are among the predictors of online political participation and as political interest increases, chances of engaging in political consumerism increases (Copeland, 2014; Forno & Ceccarini, 2006; Newman & Bartels, 2011; Stromsnes, 2009).

Many studies show that political interest and affiliation also increase the likelihood of engaging in political consumerism (Baek, 2010; Copeland, 2014; Forno & Ceccarini, 2006; Newman & Bartels, 2011; Strømsnes, 2009; Neilson & Paxton, 2010). Furthermore, political interest signals an individual's concern for community governance and has been widely acknowledged as a valid indicator of the willingness to engage in political activism (Stolle et al., 2005; Verba et al., 1995). Finally, political efficacy increases the likelihood of political participation, as it reflects the subjective belief of a person that his or her engagement has an impact upon political outcomes (Milbrath & La Goel, 1977). Expecting to make a difference, people with a strong sense of personal political efficacy are likely to get involved in unconventional forms of political participation (Stolle et al., 2005; Verba et al., 1995).

Hypothesis Two: As political interest increases, likelihood of engaging in political consumerism increases.

The shift in young people's cultural values from materialism to post-materialism is also broadly covered in order to investigate the link between the personality and political consumerism. Inglehart's theory of post-materialism claims that increasing material security has caused a shift in people's cultural values, enabling them to have more energy to invest in quality of life concerns, hedonism, self-expression issues instead of materialist issues, such as prioritizing physical sustenance, conformity and safety. In line with this argument, extra-institutional forms of political participation including boycott and buycott have been found to be strongly correlated to changing value orientations (Van Deth & Scarbrough, 1994).

Schwartz and colleagues map out the domain of human values along four overarching dimensions of values, including self-transcendence (broken down into personal values related to universalism and benevolence), self-enhancement (personal values related to power and achievement), conservation (personal values related to respect for tradition, conformity, and security), and openness to change (personal values related to stimulation, self-direction, hedonism). Turkey is grouped as high on self- transcendence, low on self-enhancement, high on conservation, and low on openness to change (Schwartz, 1994). However, in Turkey, the literature is highly limited on this issue. Therefore, investigating the link between value orientations and participating for political consumerism is essential to offer a comprehensive framework in this study.

Hypothesis Three: A person's value orientation has an effect on political participation behavior.

Social media has become a powerful platform in which collective activism has emerged (Baybars-Hawks, 2015). Studies show that the more social media platforms are used, the more participation in collective action and consequently social media emerges as an important predictor for politically motivated consumer behavior (Enjolras et al., 2013). Thanks to the Internet's low cost of time and effort of accessing political information, it enables consumers to have more options of engaging in unconventional political behavior including boycott or buycott.

Measures of social media use are emerging as a somewhat better predictor of political participation, especially when operationalized in terms of specific actions, such as participation in online groups or organizations (Feezell et al., 2012; Gibson and McAllister, 2011; Gustafsson, 2012) and production of user-generated content (Ostman, 2012). Relatedly, the social context that social media provide for political messages has been shown to influence participation (Bond et al., 2012). Other studies demonstrate that political interest and political discussion mediate the relationship between digital media use and political participation (Cho et al., 2009; Shah et al., 2007; Xenos & Moy, 2007). Research has also tackled whether certain types of political discussion affect political participation more so than others (Nir, 2011), as well as whether online and offline discussion have different participatory effects (Baek et al., 2012).

Hypothesis Four: The greater the degree of digital media use, the more engagement to political consumption occurs.

There is also a body of literature arguing that political consumerism is similar to other forms of political participation because it requires the same resources and value orientations (Dalton, 2008; Inglehart, 1997; Zukin et al., 2006). This study is interested in the online and offline forms of political participation such as attending a protest, signing a petition or joining a Facebook group for supporting

a cause. In addition, voting participation is an important form of political participation. So, following hypothesis is proposed:

Hypothesis Five: Other forms of political participation such as digital activism (online political participation), attending a march or protest (offline political participation) and voting participation have positive effects on political consumerism.

Method

Data collection is performed via a web survey between 11 December 2017 and 9 January 2018. Survey link was posted to several online platforms such as Facebook groups and online forums in Turkey leading to a convenience sample. The questionnaire was completed by 360 people. The overall response rate of the survey is 69.8%. 60% of the sample is women. 16.4% of the sample is aged between 18 and 24; and 49.4% of the sample is aged between 25 and 34. 53.9% is university graduate and 26.9% has graduate degree. Demographic characteristics of the sample is presented in Table 1.

Measurement of Scales

Dependent Variables

There are two forms of political consumerism. Buycott, is defined as purchasing of products for particular political, environmental, social or ethical purposes. On the contrary, boycott, is defined as conscious avoidance from purchasing a particular product for the same reasons. Studies in the literature suggest that boycotting and buycotting can be collapsed as a single dependent variable (Stolle et al., 2005; Shah et al., 2007). Studies also show that these two forms of political consumerism show a fairly strong relationship and have comparable frequency (Micheletti & Stolle, 2013; Newman & Bartels, 2011; Strømsnes, 2009). Consequently, political consumerism was measured by asking participants the following question: "Have you preferred to purchase or not to purchase a certain product or brand for political, ethical or environmental reasons in recent years?" The measure of political consumerism, then, is a dichotomous variable coded "1" if the respondent had engaged the political consumerism, and "0" if they had not engaged.

In addition, two follow up questions were asked to people who responded "Yes" for demonstrating boycott or buycott behavior recently. One of them was for identifying the reasons of boycott behavior and the other was an open-ended question to learn when, where, why, what and how the boycott took place.

Independent Variables

Political characteristics at individual level is measured by involvement in politics and trust in institutions scales. A four-item self-rating measure of Involvement in Politics scale adopted from O'cass (2007) and Aygoren (2013) was used. The scale was measured with five-point Likert scales (1 = strongly disagree, 5 = strongly agree). A five-item scale adopted from Seyd (2016) was used to measure trust in institutions.

Schwartz (1992) developed and validated a model of 10 basic, individual values that form two conceptual dimensions. First dimension measures openness to change vs conservation and the second dimension measures self- enhancement vs self-transcendence. In its original version, the Schwartz

Table 1. Sample Characteristics

	Frequency	Percent
Gender		
Woman	216	60.0
Man	144	40.0
Age		
18-24	59	16.4
25-34	178	49.4
35-44	77	21.4
45-54	27	7.5
+55	19	5.3
Education		
Primary School	5	1.4
Secondary School	6	1.7
High School	31	8.6
Associate Degree	27	7.5
Undergraduate Degree	194	53.9
Graduate Degree	97	26.9
Income		
1000 TL or less	44	12.2
1001-2000TL	44	12.2
2001-3000TL	74	20.6
3001-4000TL	49	13.6
4001-5000TL	48	13.3
5001 TL and more	101	28.1

Value Survey consists of 57 items. In this study 21 items were used that showed stable positions across cultures (Schwartz, 1992).

For Internet and Digital Media Use, items from previous research are used (Van Deursen & Van Dijk, 2010; Van Deursen et al., 2014; Sonck et al., 2011; Mascheroni & Ólafsson, 2014). Each item is scored on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree).

Political engagement and participation cover activities of online and offline activism such as protesting or signing a petition. Those activites are derived from the literature (Gerber, et al., 2011; Vecchione & Caprara, 2009, Micheletti et al. 2005, Gibson et al., 2005). The respondents indicated whether they had engaged in some of the specific activities mentioned in recent years. There are six items for online political participation and six items for offline political participation. The sample was skewed towards not participating in any activism. So, variable was coded as 1 (=not attended any activism), 2 (=attended just one actvitiy) and 3 (=attended more than 1 activity) both for online and offline participation.

Voting participation frequency was measured with a five-item scale. Value of 1 indicates respondent votes in every election and 5 means respondent never votes in elections.

RESULTS

Results show political consumerism is a common form of political participation. 296 people among 360 (82% of the respondents) indicated they have boycotted or buycotted. Among those, boycott is a strongly predominant form of political consumerism, 293 boycotts vs only 3 buycotts. Results of the survey show the motivations of political consumerism and explain the individual-level determinants of political consumerism, as well as reveal the specific motivations of participants in their boycott decisions and specific events triggering these decisions thanks to open ended questions. The first 10 most boycotted companies (brands are hidden due to confidentiality issues) are shown in Table 2. Interestingly, nine of these 10 brands are local and dominant motivation of the boycott is political reasons.

When the answers of the participants explaining the rationale of their boycott were analyzed, it can be seen that these boycotts are done via internal motivations and long-term boycotts rather than an organized boycott. Boycotts against Brand A, Brand B, Brand C and Brand H are generally done together. Statements of some participants on their boycott decisions are below:

I haven't purchased any Brand A products since Referendum. I haven't bought any Brand C product since 2002.

I try not to use Brand C products for years. I haven't bought any Brand A product after the statement of its president during referendum. And I boycott Brand G for their attitude towards its workers.

Table 2: Top 10 Boycotted Brands and Companies with Dominant Motivation and Rationale

Brand / Company (Product category)	Number of Responses	Rationale	Dominant motivation
Brand A (Dairy products)	97	Speeches of Chairman of the Board after Referendum	Political
Brand B (Restaurant chains)	34	Attitude of branches during Gezi Park protests	Political
Brand C (Biscuits, confectionary)	32	Being close to the government	Political
Brand D (Beer)	21	Speech about people who produce their own beer at home	Political / Ethical
Brand E (Beverages)	16	Being an Israeli product, being harmful	Political / Health / Ethical
Brand F (Hamburger)	11	It's attitude during Gezi Protests	Political
Brand G (Dairy products)	10	Its reaction against workers' protests	Ethical / Workers' rights
Brand H (Telecom)	8	Being sponsor to a government pro Foundation	Political / Ethical
Brand I (Dairy products)	8	Being funded by 'green capital', being close to government	Political
Brand J (Dairy products)	5	Workers' rights	Workers' rights

I did not make any purchase from Brand F after Gezi protest. I changed my service provider after government pro foundation incident, and boycotted Brand H.

While people who boycott Brand A, Brand B, Brand G, Brand H and Brand F show solid examples and reasons for their actions, some companies or brands face boycotts independent from a particular incident or consumer experience, but because of their perception or being close to government. Brand C and Brand I are among these companies.

I prefer not buying any brand close to the government.

I prefer companies who are close to my opinions and ideas.

I boycott companies who state their political view publicly and make benefit of it.

Despite not being asked, consumers boycotting Brand A, Brand B and Brand C stated that they will keep boycotting these companies and internalized their boycott. For example, a participant stated his attitude towards the company as following;

I would rather die than buying Brand A products.

Another participant explained his internalization and automation of the boycott decisions as;

Brand B, Brand F and Brand G are among the first companies that come to my mind. I prefer their substitutes. Some brands and companies are marked for me after Gezi protests. Brand G is marked for their disrespectful behavior in their recruitment process. Some brands are marked as "do not buy" in my mind, and during my shopping I do not choose these brands. Sometimes I wonder why it is in that way, and I do some research and find out that they somehow took part in a disgraceful incident. And I realize that even though that particular incident is forgotten, it somehow placed in my subconscious.

Six of 16 participants who boycotted Brand E products state that they do not buy Brand E because it is Israeli product. The most common reasons of boycott forBrand E is respectively political (10), health issues (9), ethical reasons (7). Interestingly, only 1 and 4 people stated that they boycott Brand E for minority rights and religious reasons respectively.

Those results reveal that boycotts in Turkey are mostly expressive boycotts and closely related to politics. These boycotts are also classified as punitive boycotts because of the people's motives. So, political, ethical and religious motivations are determinant in the political consumer behavior of the sample in this study. Boycotts with the concerns of animal rights and environment are not widespread in the sample.

Table 3 presents descriptive statistics and correlations of variables for regression.

Table 4 exhibits the regression results on political consumerism.

Baseline model (Model 1) suggests that women are more likely to engage in political consumerism ($\beta = -0.127$, $p < 0.05$). Also, education ($\beta = 0.112$, $p < 0.05$) and income $\beta = 0.168$, $p < 0.05$) have positive effects on political consumerism. Age does not have a significant effect ($\beta = 0.035$, $p > 0.1$) on political consumerism. As more variables are added, effect of education disappears; but the effects of gender and income stay consistent.

Table 3. Descriptive statistics and correlations of variables for regression

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Political_ Consumerism	1															
2. Gender	**-0.14****	1														
3. Age	0.05	0.08	1													
4. Education	**.17****	**-0.16****	**-0.25****	1												
5. Income	**.21****	0	**.32****	**.25****	1											
6. Trust_in_ Institutions	**.14****	-0.02	-0.02	**.15****	0.04	1										
7. PoliticalInterest	**.21****	0	0.07	0.01	0.1	-0.01	1									
8. Comm_ Digital_Media_ Use	-0.05	0.06	**-0.1***	0	-0.02	**-0.11***	0.02	1								
9. Inform_ Digital_Media_ Use	0.07	-0.05	0.05	**.13***	0.1	-0.06	0.03	0.08	1							
10. Self_enhance	-0.04	0.05	**-0.12**	0.03	-0.06	-0.01	0.04	0.10	-0.01	1						
11. Self_trans	0.02	0	-0.03	0.02	**-0.13***	**.17****	0.07	0.08	-0.07	**.14****	1					
12. Conservatism	**-0.29****	0.04	-0.02	-0.21	-0.13	**-0.26****	-0.05	0.00	**-0.18****	**.15****	**.22****	1				
13. Openness	0.087	-0.06	**-0.21****	**.16****	0.09	0.04	**.11***	**.24****	0.07	**.17****	**.16****	-0.02	1			
14. Online_Pol_ Participation	**.26****	-0.1	**.13***	**.16****	**.17****	**.13***	**.27****	**.11***	0.03	-0.01	0.05	**-0.26****	**.112***	1		
15. Offline_Pol_ Participation	**.21****	-0.01	**.10***	0.02	**.17****	-0.05	**.38****	0.10	0.08	-0.07	-0.01	**-0.21****	0.1	**.32****	1	
16. Voting_ Participation	**-0.16****	**.11***	-0.1	-0.06	**-0.12**	0.02	**-0.23**	-0.01	0.07	0.02	0.1	-0.04	-0.01	**-0.12***	**-0.19****	1
Mean	0.74	0.40	2.36	4.92	3.88	4.01	2.83	2.98	3.11	3.59	4.46	2.99	3.37	1.07	1.06	1.49
SD	0.44	0.49	1.01	1.03	1.74	0.72	0.97	0.99	0.73	0.77	0.48	0.98	0.80	0.85	0.85	0.97
** Correlation is significant at the 0.01 level (2-tailed).																
* Correlation is significant at the 0.05 level (2-tailed).																

Hypothesis one argues trust in institutions has a negative effect on political consumerism. Results of model 2 show support loading of trust on political consumerism is negative ($\beta = 0.125$, $p < 0.05$). However, in models 2-5, trust does not have a significant effect on political consumerism. So, hypothesis one is weakly supported. Hypothesis two suggests political interest has a positive relationship with political consumerism. Models 3-5 show political interest has a consistently significant effect, thus showing strong support for hypothesis two.

Among value orientation variables, conservatism has a consistently strong significant negative effect ($\beta = -0.243$, $p < 0.001$) on political consumerism through models 3-5 whereas other dimensions are insignificant. Thus, hypothesis three is supported only for conservatism dimension.

Hypothesis four suggests digital media use has an effect on political consumerism through communicational and informational means. However, results show no significant relationship. So, hypothesis four is not supported.

Table 4. Regression Results for Political Consumerism

	MODEL 1			MODEL 2			MODEL 3			MODEL 4			MODEL 5		
	Beta	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**	**Beta**	**t**	**Sig.**
(Constant)		2.88	0.00		-0.14	0.89		1.01	0.31		1.10	0.27		1.16	0.25
Demographics															
Gender	-0.13	-2.45	**0.02**	-0.13	-2.52	**0.01**	-0.12	-2.50	**0.01**	-0.12	-2.42	**0.02**	-0.12	-2.31	**0.02**
Age	0.04	0.60	0.55	0.03	0.46	0.65	0.02	0.29	0.77	0.01	0.22	0.82	0.00	0.01	1.00
Education	0.11	1.96	**0.05**	0.09	1.65	**0.10**	0.05	0.86	0.39	0.05	0.81	0.42	0.04	0.71	0.48
Income	0.17	2.91	**0.00**	0.15	2.67	**0.01**	0.15	2.57	**0.01**	0.15	2.57	**0.01**	0.14	2.39	**0.02**
Political Characteristics															
Trust_in_Institutions				0.13	2.47	**0.01**	0.06	1.05	0.30	0.05	0.89	0.38	0.05	0.91	0.36
Political_Interest				0.19	3.82	**0.00**	0.17	3.50	**0.00**	0.17	3.47	**0.00**	0.14	2.58	**0.01**
Value Orientation															
Self_enhance							-0.01	-0.24	0.81	-0.01	-0.18	0.86	-0.01	-0.11	0.91
Self_trans							0.07	1.28	0.20	0.07	1.35	0.18	0.07	1.25	0.21
Conservatism							-0.24	-4.49	**0.00**	-0.25	-4.48	**0.00**	-0.22	-3.85	**0.00**
Openness							0.03	0.52	0.61	0.04	0.72	0.48	0.03	0.59	0.56
Digital Media Use															
Comm_Digital_Media_Use										-0.05	-1.02	0.31	-0.06	-1.18	0.24
Inform_Digital_Media_Use										0.00	0.04	0.97	0.01	0.09	0.93
Political Participation															
Online_Pol_Participation													0.11	1.90	**0.06**
Offline_Pol_Participation													0.06	0.98	0.33
Voting_Participation													-0.10	-1.99	**0.05**
R	0.27			0.35			0.42			0.42			0.45		
R2	0.07			0.12			0.17			0.18			0.2		
Adjusted R2	0.06			0.11			0.15			0.15			0.17		
R2 Change	0.07			0.05			0.05			0.00			0.02		

Model 5 tests all variables in the regression equation. Online political participation ($\beta = 0.105$, $p < 0.1$) has a significant positive effect and voting participation ($\beta = -0.103$, $p < 0.05$) has a significant negative effect on political consumerism whereas offline political participation does not have a significant effect on political consumerism ($\beta = 0.055$, $p > 0.05$). Thus, hypothesis five is partially supported.

In addition, variance inflation factor (VIF) indexes of all variables are below 3 in Models 1 to 5, indicating that the multicollinearity issue is not significant. To check the potential common method bias issue, which could overestimate or underestimate the relationships between constructs, an exploratory factor analysis on all of the measures of the main constructs was performed —a total of ten variables— to examine whether more than 50% of the total variance is explained by a single factor (Podsakoff & Organ, 1986). This test is called the Harman single-factor method. Such a test generates 10 factors with eigenvalues greater than 1 and the first factor accounts for 11% of the total variance, indicating that the common method bias is not an issue in this research.

DISCUSSION

This study, first, seeks to generate an explanation regarding individual level predictors of political consumerism in Turkey. By identifying two sets of key individual-level variables, namely; demographic characteristics and political characteristics, a more refined profile of political consumers in Turkey is generated.

The results regarding demographic characteristics show that, in parallel with the literature, higher level of income increases the likelihood of engaging in political consumerism and women engage in political consumerism more than men. However, the proposed model suggests that as the level of education increases, political consumption increases and younger people engage in political consumption more than older people. Contrary to literature, statistical analyses in this study did not approve these suggestions.

Secondly, results show that political interest is a consistent predictor of political consumerism in Turkey while political distrust could not be verified to be among the predictors effecting the likelihood of engaging in political consumerism. However, it is noteworthy to point that when political characteristics –political interest and political distrust –, are entered as the only independent variables, regression results show that political distrust has a significant effect political consumerism. So, its effect is mediated by value orientation and other forms of political participation.

One of the most interesting findings of the study which is not parallel with the literature is regarding the effect of personal values on political consumerism. A desire to explain political consumerism from the dimension of changing personal values has been one of the fundamental concerns of literature regarding political consumerism. As political consumerism is an example of how peoples' political practices have changed over time, this study theorizes that post materialist values, namely; openness to change and self-transcendence as among the key predictors of political consumerism. However, results show that people who are more conservative have lower likelihood to engage in political consumerism when compared to people who are less conservative. In addition, the two post materialist values do not propose a meaningful relationship with political consumerism. Two reasons for that unlikely result can be proposed. First, considering the literature proposing the birth of these post materialist values was a result of societal change after Industrial Revolution, and societal challenges after World War II, there may be some difficulties while using these values to categorize Turkish people. Secondly, post materialist values are generally associated with young people. However, age does not show a significant relationship in this study.

Another finding of the study is as people engage in more political behavior, their likelihood for engaging in political consumerism also increases. Among those forms of political participation, online activism and voting participation behavior have significant effects on boycott behavior whereas offline activism participation behavior does not have an effect. This can be attributed to a country-specific dynamic. Conventional political participation rate, especially voting turnout in elections, is much higher in Turkey than Western Europe and US. So, people would like to have higher control on the government and they use any means and tools they have as a way to demonstrate their opinion. For that purpose, political consumerism is a convenient way to react, get attention and be heard.

In addition, contrary to the literature stating that high level digital users engage in political consumerism more, there is not any significant finding regarding the effect of Internet and digital media use on political consumerism. These results may be explained by the fact that people's increasing fear of expressing their political opinions using social media in Turkey. In this context, according to recent

research, people's fear of discussing and expressing their opinions regarding day-today political events have increased recently.

Another significant finding is the motivations for boycott behavior in Turkey. Results demonstrate, politics is the major reason why people engage in political consumerism and many boycott behaviors are against companies which are known to be close to government. This fact is also displayed in the empirical model by the conservatism dimension of the value orientation. As people become more conservative, their likelihood to engage in boycott behavior decreases because government in Turkey is a conservative one.

Limitations

The study presents a model that acts as a framework for understanding political consumer profile in Turkey with the focus on political participation and their antecedents. Thus, further studies are necessary in order to support the causal relationships shown.

The review of the literature led to conclude that the absence of precise measures of individual and collective orientations toward political consumerism are significant and lacunas should be addressed. Thus, future research should consider incorporating theories of changing values, identities and citizenship norms with the aim of developing more precise measures will be handful for Turkish consumers.

In addition, information and communication technologies continue to evolve and ease boycott organization and corporate information distribution. Future research can investigate the role of microblogging sites and other online communities. By continuing to investigate political consumerism through the digital platforms, more can be learnt about ways in which social actors engage with the marketplace, and with each other, to affect social change.

Same study can be conducted with larger population to validate relationships shown in this study and can also be replicated in another country to compare the results. It would also be interesting to have a cross-cultural study understanding which characteristics of people have different effects.

CONCLUSION

Democracy promises so much yet it delivers so little in terms of the empowerment of citizens. Voting is the most important tool of democracy but it is far from being effective. So, individuals engage in political consumerism which is referred as intentional use of consumer choice over products and producers in the market with the objective to express policy preferences and achieve political objectives. Consumerism has taken various forms and in its extreme cases it leads to identification or disidentification of individuals with certain brands, companies and products. As a way to demonstrate support or protest, consumers buy a specific brand (boycott) or reject buying a specific brand (boycott).

The actions of boycott and buycott, starting in 1970s in the West and becoming more commonplace nowadays, have spread among Turkish consumers thanks to penetration of social media and information communication technologies. Because political consumption is a reflection of consumer empowerment, civic engagement and political expression, finding out motivations and predictors of political consumerism is a crucial step in order to understand political consumerism and political behavior more generally.

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KEY TERMS AND DEFINITIONS

Boycott: The act of non-consumption and even negative promotion towards certain brands and companies.

Brand Image: The general impression of a product held by real or potential consumers.

Buycott: The act of consumption and support towards certain brands and companies.

Digital Activism: Activist behaviors performed online such as joining a Facebook group or generating word-of-mouth online.

Political Consumerism: The act of using consumption as a way of supporting or protesting an ideology present in a company or brand.

Political Interest: The interest level of individuals into politics.

Political Participation: Activities of individuals that have an effect on politics.

Chapter 12
The Role of Corporate Sustainability on Firm Value:
An Application on Borsa Istanbul

Nida Abdioglu
https://orcid.org/0000-0002-8498-9893
Bandirma Onyedi Eylul University, Turkey

ABSTRACT

This study investigates the role of listing in sustainability index on the firm values of Borsa Istanbul firms. Furthermore, the interaction effects of some firm specific characteristics on firm value are investigated. Firstly, the impact of each firm specific characteristics, and mainly sustainability dummy, on firm value is analysed. It is found that firms that are listed in BIST Sustainability Index have higher firm values. Secondly, the interaction terms with sustainability dummy and each firm-specific characteristic are created. It is concluded that, among the firms listed in BIST sustainability index, firms with higher leverage ratios, lower current ratios, lower price to equity ratios, lower asset turnover ratios, and lower tangibility ratios have higher firm values.

INTRODUCTION

Corporate sustainability is an approach that creates value for shareholders and stakeholder by embracing opportunities and managing risks deriving from economic, environmental, and social developments (Dow Jones, 2019). Moreover, corporate sustainability is composed of three types of sustainability: economic, environmental and social sustainability. Economic sustainability occurs with strong financial structure and high profit of the firm. Environmental sustainability states the firm's avoidance of environmental damage in its production processes and protection of natural resources for future generation. Social sustainability expresses enhancement of living conditions and working conditions of the employees, giving importance to the life quality of the customers, society and future generation (Gencoglu and Aytac, 2016).

Not only financial factors are considered for the developments of the companies, but also social and environmental factors should be considered. As a result, sustainable development has become an

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important area for the companies. Managers of sustainable companies take into consideration some non-financial factors for their performances such as environment protection, corporate governance structure, human capital management, quality of management, human capital management, reputation, stakeholder relations (Lo and Sheu, p. 345, 2007). Most of the international institutions such as United Nations, G20 and OECD state that in order to obtain long term development and stability, problems such as climate change, exhaustion of natural resources, human rights violation should be solved and this might be done by the increasing the environmental, social and corporate governance implementations of the firms (PWC,2011).

Sustainability reports include information about the companies' non-financial activities including governance, environmental and social issues. The information that the sustainability reports contain might be explained in different topics: i) profile of the company, goods and services that the company provide, structure of shareholding, investor relations, ethics and sustainability approach. ii) financial structure of the firm, financial and operational information, creation of employment, shareholders, and new business opportunities. iii) customers and producers of the firm, responsibilities about goods and services. iv) environment policy of the firm, investments of the firm, the energy efficiency, energy usage in the firm, environmental impacts of the firm including water and waste management. v) employment, motivation and continuity. vi) learning and innovation, responses to environmental and social risks (Aydın, 2017, p.2310).

In the new world order, the companies have to consider not only the benefits of the shareholders but also the benefits of the society. The companies which only work for the profit maximisation for the expense of shareholders can not protect their competitiveness. The most important reason behind this is that the society give importance to the sustainability factors in the companies. Thus, companies should take into account the sustainability issues in their operations. The factors that push the companies in applying sustainability policies can be diversified. Borsa Istanbul juxtapose these factors in its sustainability report (BIST, 2014, p.19). Firstly, these companies have higher brand values and reputation. Secondly, with applying sustainable policies the companies will be able to decrease their costs and their profit will increase. For instance, low energy consumption, decreased raw materials waste are among the environmental sustainability factors that decrease the costs of the companies. Moreover, skilled labour prefers to work with those firms applying sustainability policies. Fourthly, by the help of the sustainability the companies can understand the expectations of the consumers. The consumers might want environment protection and the companies have to make their operations in line with this expectation. Fifthly, the financial institutions embrace sustainable finance and they can direct their investors to the companies that apply sustainability policies. This prompt the companies to apply sustainability policies. Lastly, the sustainable companies have longer life because of the policies they apply. For instance, those companies consider corporate governance principles and as a result they have higher corporate governance values. Thus, those companies have lower cost of equity, higher liquidity, and as a result they have higher service life.

The first sustainability indices in the world are created by Dow Jones in 1999 and FTSE in 2001. Borsa Istanbul has started to create BIST Sustainability Index since 2014. BIST Sustainability Index reflects the BIST firms' approach to sustainability issue such as global warming, draining of natural resources, health, security and employment (BIST, 2019). The main aim of BIST is to present an index that enables to compare the sustainability performances of the firms and also to provide a benchmark for BIST firms. By the help of the sustainability index, the firms can evaluate themselves in terms of their performances and develop their risk management abilities for corporate sustainability, accountability

and transparency. As a result, being in the index increase their prestige. Thus, BIST sustainability index aims to increase the awareness of the companies about sustainability in Turkey (BIST, 2019). The firms are included in the index by considering international sustainability criteria. The index aims to include the companies which have highest sustainability performances. Thus, both local and international investors can compare the corporate sustainability performances of the firms that are listed in the index. The investors can select and invest in the companies which have higher sustainability performances. This increases the competition among the companies about obtaining higher sustainability performance levels. In addition, institutional investors can compare the sustainability performances of the firms by the help of BIST Sustainability Index and they might increase the values of those successful firms by investing in them.

The aim of this study is to investigate the role of listing in sustainability index on the firm values of Borsa Istanbul firms. More importantly the interaction effect of some firm specific characteristics with sustainability on firm value is investigates. Although there are some studies in the international and local literature about the role of sustainability on firm value, to the best our knowledge there is not any study which considers interaction effects. Sustainability dummy, asset turnover ratio, firm size, leverage, price to earnings ratio, asset tangibility and current ratio are used as firm specific variables. Firstly, the impact of each firm specific characteristics, and mainly sustainability dummy, on firm value is investigated. It is found that firms that are listed in BIST Sustainability Index have higher firm values. Secondly, the interaction terms with sustainability dummy and each firm specific characteristics are created. It is concluded that among the firms listed in BIST sustainability index, firms with higher leverage ratios, lower current ratios, lower price to equity ratios, lower asset turnover ratios and lower tangibility ratios have higher firm values.

The rest of this chapter is organised as follows: literature review about the sustainability and firm value explained in the next section. The hypothesis section follows it. Data and methodology and results are in Section 4 and 5, respectively. Finally, conclusion is in the last section.

BACKGROUND

Better management quality, application of corporate ethics, giving importance to customer loyalty and environmental management and having brand reputation make a business successful. These specialities are among the common corporate social responsibility practices. Furthermore, corporate social responsibility practices are related to sustainable development (Lopez, Garcia and Rodriguez, 2007). Corporate social responsibility and corporate sustainability reporting are the two interrelated topics which take place in sustainability literature. This paper investigates the role of listing in BIST Sustainability Index on firm values. Secondly, the effect of each firm characteristics on firm value among the sustained firms is examined. To the best our knowledge there is not such a study in Turkish market. Lo and Sheu (2007) examine the interaction effect of sales growth and corporate sustainability on firm values of US non-financial firms. However, the variables, the methodology and the market used in this study is different than Lo and Sheu (2007). They find a positive relation between the firm value and the interaction term they created with sales growth and corporate sustainability. Therefore, it is concluded that when a sales growth of a company is high, corporate sustainability increases firm value. However, the magnitude of positive relation between corporate sustainability and firm value diminishes in the lower sales growth levels. According to Lo and Sheu (2007) since the sustainable strategies increase a

company's production and operation costs and therefore reduce the sales, investors might be indecisive about a firm's sustainable strategies.

There is a lot of literature about the impact of corporate sustainability on firm value. Lo and Sheu (2007) investigate whether corporate sustainability affects firm value of US non financial firms. Tobin's Q is used as a proxy for firm value and sustainability dummy is used as a proxy for sustainability. A positive relation between corporate sustainability and corporate performance is reported. Artiach, Lee, Nelson and Walker (2010) examine the factors that have an impact on firms' decisions to invest in corporate sustainability performance. They compare the characteristics of firms which are listed in Dow Joes Sustainability World Index (DJSI). The growth opportunities, size and profitability of the DJSI firms are found to be different than the others. Leverage and level of cash resources are not effective in determining corporate social responsibility. Robinson, Kleffner and Bertels (2011) investigate the impact of reputation on firm value. Listing in the sustainability index is used as a proxy for reputation. They analyse whether the firms' addition or deletion to Dow Jones Sustainability World Index (DJSI) change the value of the North American firms. They report a positive stock market reaction to the firms added into DJSI. In addition, a temporary loss in the value of the firms is reported when the firms removed from DJSI. Skare and Golja (2012) report that the companies in Dow Jones Sustainability Index show higher performance than the companies which are not listed in the index. Ioannou and Serafeim (2012) examine the impacts of mandatory sustainability reporting practices on firm valuation in China, Denmark, South Africa, and Malaysia. Disclosure of social, governmental and environmental information is considered. They find an increased disclosure level in the firms that effort sustainability reporting. High level of disclosure is supported in order to increase comparability and credibility of the information. It is also found that increased sustainability disclosure results in higher firm valuation which is measured by Tobin's Q. Ameer and Othman (2012) conclude higher performances for the sustainable companies which are performing in developed and developing countries. They report higher profit before taxation, return on assets, mean sales growth and cash flow from the operating activities for these companies compared to the control companies. They also report that the performances of sustainable companies increase over time. Lourenco and Branco (2013) examine the determinants of corporate sustainability performances of Brazilian firms. Ownership concentration, firm size, international listing status, leverage and profitability variables are used as the factors affecting sustainability performance. Belonging to Bovespa Corporate Sustainability Index is used as a proxy for the level of corporate sustainability performance. Higher return on equity is found for the Brazilian leading corporate sustainability performance firms. Those firms are larger, are more likely to have an international listing status, and have lower ownership concentration than non-leading corporate sustainability performance firms. Oberndorfer, Schmidt, Wagner, Ziegler (2013) examine the impact of inclusion in sustainability index on German firms' performance. They consider two indices: DJSI STOXX and DJSI World. DJSI STOXX includes the European leaders in terms of sustainable performance and DJSI World includes the world-wide leaders in terms of sustainable performance. According to the estimation results, German stock market has penalised the firms in the sustainability index. It is concluded that higher corporate environmental and social performance were not financially rewarded in German Stock Market (Oberndorfer, Schmidt, Wagner, Ziegler, 2013, p:10).

Bachoo, Tan and Wilson (2013) examine whether the Australian firms' performances are affected by corporate sustainability reportings. A positive relation is reported between quality of sustainability reporting and firm performance. Carnevale and Mazzuca (2014) explore whether sustainability reporting affects stock prices of European listed banks. According to Carnevale and Mazzuca (2014), financial

markets are affected positively by sustainability reporting. Since sustainability reporting provides higher disclosure levels, the information asymmetry decreases. As a result, investors make more efficient decisions (Carnavale and Mazzuca, 2014:83). Marti, Rovira-Val and Drescher (2015) find that economic development level of a country and firm size are the variables that have impact on firm performance. Firms' locations are also effective in their performances. If a firm locate in a developed country, it performs better than the firms locate in less developed countries. In addition, they report that firm size negatively affects firm performance. It is reported that corporate social responsibility positively affects firm performance. They suppose that the companies apply corporate socially responsible activities improve shareholders' return which increases corporate performance. Nobanee and Ellili (2016) investigate the coverage of the corporate sustainability disclosures in the annual reports and analyse its impact on banks' performance. They consider the banks listed in the UAE financial markets. Sustainability disclosure is measured by energy disclosure items and natural environment disclosure items. Growth of short-term deposits is used as a proxy for bank performance. They report a higher degree of sustainability disclosure for conventional banks than islamic banks. The degree of sustainability disclosure positively affects the banks' performance in the UAE. The sustainability disclosure index has positive and significant impact on conventional banks' performance. Whereas it has positive and insignificant effect on islamic banks' performance. Lopez, Garcia and Rodriguez (2007) investigate whether adaption of corporate social responsibility practices affects firm performance. The firms listed in Dow Jones Sustainability Index (DJSI) are taken into account in order to catch the European firms that have adopted corporate social responsibility practices. The performances of the firms listed in DJSI and Dow Jones Global Index (DJGI) are compared. Significant differences are found between the two group of firms. A negative relation is found between the firm performance and sustainability practices during the first years which they are applied. The expenses of socially responsible actions the firms have to bear negatively affect the responsible firms compared to less responsible firms. Since the negative impact on performance diminishes over time, it is concluded that it should be investigated whether the practices impact performace positively in the long run.

On the other hand, a strand of the literature accepts corporate social responsibility as one of the disclosure indicators and examines the impact of corporate social responsibility on firm value. By accepting corporate charitable giving as a proxy for corporate social performance, Brammer and Millington (2008) examine the relation between corporate financial performance and corporate social performance. They report that both high and low corporate social performance firms have higher financial performance. Furthermore, poor social performance firms perform best in the short run and good social performers perform best in the long run. Choi, Kwak, Choe (2010) report a positive relation between corporate social responsibility and corporate financial performance of Korean firms. Inoue and Lee (2011) investigate whether corporate social responsibility is effective on firm performance in tourism industry. They consider four tourism related industries: restaurant, airline, casino and hotel. In line with Clarkson (1995), they divide corporate social responsibility in four different dimensions and examine whether each of them impacts firm performance. These dimensions are environmental issues, diversity issues, product quality, employee relations, community relations. They report that each of the dimensions has different impact on firm performance and this relation changes for different industries. Cheung and Roca (2013) investigate the performance of the stocks that are included into and deleted from Dow Jones Sustainable Index. Both group of the stocks experience a decline in returns. Lee, Faff and Smith (2009) investigate the relation between corporate social performance and corporate financial performance by using Dow Jones Sustainability Index Group which includes a group of firms that are sustainable leaders in their

industries in terms of innovation and future orientated management (DJSI, 2002). They test both accounting performance and market performance. According to their market-based tests, there is a negative relation between corporate social performance and corporate financial performance. However, there is not any relation between corporate social performance and corporate financial performance according to their accounting-based tests. Collison, Cobb, Power, Stevenson (2008) examine the financial performance of FTSE4Good indices. The companies that meet the corporate social responsibility can be added into these indices. They report that these indices outperform the benchmarks.

When it comes to Turkish markets, there are a lot of studies that constitutes sustainability and its role on Turkish firms. Alparslan and Aygun (2013) investigate the relation between corporate social responsibility and firm performance for Borsa Istanbul firms. Charities and donations of companies are used as a proxy for corporate social responsibility. A positive relation is reported between company performance and corporate social responsibility. Arsoy, Arabacı and Ciftcioglu (2012) accepted the companies listed in Borsa Istanbul Corporate Governance Index as the firms which have high level of corporate social responsibility. The firm performances of those firms listed in the index is examined. It is reported that the firms which have higher financial performance have better corporate social responsibility performance. Citak and Ersoy (2016) investigate the investor reaction to the firms listed in BIST Sustainability Index. Firstly, the study concludes that there is not any difference between the returns on the firms listed in Sustainability Index and those not listed in the index. Secondly, it is reported that the market to book values of the firms listed in the index are higher than the others. Aydın (2017) analyse the financial performance of firms listed in Borsa Istanbul Sustainability Index. According to the findings of this paper, there is not any difference in the financial performance of those firms before and after they are listed in the sustainability index. Altınay et al. (2017) examine the stock values of four banks that are listed in Borsa Istanbul Sustainability Index. The stock values of those banks do not change after they are listed in the index.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

The Relation Between Sustainability and Firm Value

It is a known fact that the increased level of disclosure in a firm results in reduced misevaluation of the share price of the firm. Increased level of information in the annual reports of a company makes possible to the shareholders to recognize the wealth creation process. As a result, increased disclosure level reduces the misevaluation of the firm's share price and this will increases the value of the firm (Anam, Fatima, Majdi, 2011). Abdolmohammadi (2005) also states that increased disclosure level in a company results in higher firm value in line with Healy and Palepu (1993), Skinner (1994), Welker (1995), Botosan (1999). Moreover, Anam et al. (2011) explain the relation between disclosure and firm value with signalling theory. If a company has higher value, the managers of the company signal this situation by disclosing more information in the annual reports. Therefore, market value of the company will cover this information. With disclosed information the companies' future value will be determined and its share price will increase. Therefore, firms operate in socially responsible way will signal this to stakeholders by issuing sustainable reports (Kuzey and Uyar, 2017). This will cause higher disclosure

Table 1. The Studies about the Role of Corporate Sustainability on Firm Value

Authors	Indicator for Sustainability	Indicator for firm performance	Result
Alparslan and Aygun (2013)	Charities and donations	ROE and Tobin's Q	+
Altınay et al. (2017)	Listing in the sustainability index	Average stock values	No relation
Ameer and Othman (2012)	Top 100 sustainable global companies	profit before taxation, return on assets, mean sales growth and cash flow from the operating activities	+
Arsoy, Arabacı and Ciftcioglu (2012)	Firms listed in İstanbul Stock Exchange Corporate Governance Index	return on asset, return on sales, Dept/ asset ratio, total sales, number of employees and equity variables	+
Aydın (2017)	Firms listed in Corporate Governance Index	return on asset, return on sales, Dept/ asset ratio, total sales, number of employees and equity	+
Bachoo, Tan and Wilson (2013)	Listing in the sustainability index	Gross sales margin, operatimg profit, ROE, ROA	No relation
Brammer and Millington (2008)	Corporate charitable giving	Market performance	+
Carnevale and Mazzuca (2014)	Corporate charitable giving	Market return	+
Cheung and Roca (2013)	Including in Dow Jones Sustainable Index	Stock returns	-
Choi, Kwak, Choe (2010)	Corporate social responsibility index	return on equity, return on assets, and Tobin's Q	+
Cıtak and Ersoy (2016)	Listing in the sustainability index	Stock return, market-to-book ratio	+
Collison, Cobb, Power, Stevenson (2008)	Listing in FTSE4 Good indices	Daily returns	+
Inoue and Lee (2011)	KLD rates are used as proxies for Corporate social responsibility	ROA and Tobin's Q	Each dimension has differential effect
Ioannou and Serafeim (2012)	ESG disclosure score	Tobin's Q	+
Lee, Faff and Smith (2009)	Dummy variable=1 if a firm belong to CSP portfolio	ROA,ROS,ROE	- for market-based tests No relation for accounting-based tests
Lo and Sheu (2007)	Firms listed in Dow Jones Sustainability Group Indices	ROA,ROE, ROS,3-year absolute return, one and six factor alpha	+
Lopez, Garcia and Rodriguez (2007)	Sustainability dummy is equal to 1 if a firm is listed in DJSGI USA and 0 otherwise	Tobin's Q	+
Lourenco and Branco (2013)	dummy variable, 0 if the firm belongs to DJGI and 1 if it belongs to DJSI	Profit/loss before taxation	-
Marti, Rovira-Val and Drescher (2015)	Listing in Stoxx Europe Sustainability Index	ROA, ROE	+
Nobanee and Ellili (2016)	Corporate Social Performance dummy variable based on Stoxx Europe Sustainability Index	ROE, ROA, Tobin's Q	+
Oberndorfer, Schmidt, Wagner, Ziegler (2013)	Energy disclosure items and natural environment disclosure items	Growth of short term deposits	+
Robinson, Kleffner and Bertels (2011)	Listing in Dow Jones Sustainability World Index	Stock returns	+
Skare and Golja (2012)	Listing in Dow Jones Sustainability World Index	Total revenue, total income, net operating income	+

level hence higher firm value. In addition, according to Lee et al. (2009) corporate social performance firms are able to manage their reputation and brand, hire the best managers and employees and they have greater communication and trust which improves the nexus of contracts. These factors enable the corporate social performance firms to have higher accounting performances. Thus, the hypothesis in this paper is that companies with sustainable reports have higher firm values.

Data and Methodology

This study examines the impact of corporate sustainability on firm value of Borsa Istanbul firms. Listing on Borsa Istanbul Sustainability Index is used as a proxy for corporate sustainability. Firms listed in BIST 100 index by 2019 are taken into account. The financial data of these 77 firms are used by excluding financial firms and sport clubs for the period 2014-2018. The data is collected from Finnet database. The firms listed in BIST Sustainability Index is obtained from Borsa Istanbul's website. Yearly data is used and the analyses are made with 385 number of observations.

Following models are used in the analyses:

$$TobinsQ_{f,t} = a_0 + a_1 SDummy_{f,t} + a_2 AT_{f,t} + a_3 PE_{f,t} + a_4 Tang_{f,t} + a_5 Size_{f,t} + a_6 Lev_{f,t} + a_7 CR_{f,tf,t} + \varepsilon \quad (1)$$

$$TobinsQ_{f,t} = a_0 + a_1 SDummy * X_{1..6} + a_2 SDummy_{f,t} + a_3 AT_{f,t} + a_4 PE_{f,t} + a_5 Tang_{f,t} + a_6 Size_{f,t} + a_7 Lev_{f,t} + a_8 CR_{f,t} + \varepsilon \quad (2)$$

Tobins Q is used as a dependent variable in the above models. This variable is used a proxy for firm value. Tobin's Q is calculated with the following formula: (Total Liabilities-Shareholder's Equity+ Market Value)/ Total Assets. Sdummy is a dummy variable which is equal to 1 if a firm is listed in BIST Sustainability Index and 0 otherwise. AT is the ratio of net sales to total assets. PE is price to earnings ratio which is equal to market value per share to earnings per share. Tang is calculated by dividing tangible assets by shareholder's equity. Size is natural logarithm of total assets. Lev is leverage ratio which is equal to total debt divided by total assets. CR is current ratio which is the ratio of current assets to short term debt.

In model 2, interaction terms are used in order to find the interacted effect of each independent variable on firm value. $SDummy * X_{1..6}$ shows the interaction terms in model 2. $X_{1..6}$ represents 6 independent variables used in model 1. Each independent variable is multiplied by Sdummy in order to create an interaction term. The impact of firm specific characteristics of sustainable firms on firm value is examined by the help of interaction terms. This method will be an important contribution to corporate sustainability literature.

Two Stage Least Square (2SLS) Regression analyses are used in this study. Sdummy variable is estimated endogenously in the first stage regression. According to Durbin-Wu-Hausman test results, SDummy variable is endogenous with 136.77 (1) chi square value. Since there is an endogeneity problem, using OLS will give biased and inconsistent results. As a result, instrumental variables should be used through 2SLS regressions. Tobins Q and Sdummy variables are simultaneously determined in two different models. Model 1 is used as second stage regression.

SOLUTIONS AND RECOMMENDATIONS

Table 2 shows the summary statistics of the variables used in this study. Panel A of Table 2 represents the summary statistics of the whole sample which includes 385 number of observations. Price to earnings ratio, leverage and tangibility ratio are winsorised at the 1% level. According to this table, mean value of Sdummy is 0.32. Therefore, 32% of the BIST100 firms are listed in BIST Sustainability Index. The average firm in the sample has a Tobin's Q ratio of 0.76. Thus, those firms are overvalued. The mean value of asset turnover ratio of the sample BIST100 firms is 0.79. Since this ratio is lower than 1, it can be concluded that BIST100 firms can not efficiently use their assets to generate sales. These firms are not efficient in their asset usage. Average firm has price to earnings ratio of 15.39 and leverage ratio of 0.53. Current ratio with a mean value of 2.14 shows that the companies in the sample have current assets twice as large as current liabilities. Tangibility ratio with a mean value of 1 shows that tangible asset level is equal to shareholders equity for the sample firms.

Panel B of Table 2 shows the descriptive statistics of the firm specific variables for the firms which are listed in BIST Sustainability Index. 125 firms are listed in the Sustainability Index out of 385 firms. Panel C represents the descriptive statistics of the firm specific characteristics of BIST100 firms which are not listed in the Sustainability Index. According to Panel B and C, asset turnover ratio, price to earnings ratio, leverage, firm size, and tangibility ratio are higher for the firms listed in the sustainability index than the others. BIST100 firm which are not listed in the Sustainability Index have higher current ratio and Tobin's Q value.

Table 3 compares the mean values of the variables used in this study for two groups: The firms listed in Sustainability Index and the firms are not listed in the Sustainability Index. The mean values of each variables for the firms listed in Sustainability Index is shown in column 1. Moreover, the mean values of the variables for the BIST100 firms that are not listed in Sustainability Index is shown in column 2. In the last column, the t-test values of the mean differences are shown. The differences between two groups are statistically significant for leverage, firm size and current ratio at 1% significance levels. Firms which are listed in the Sustainability Index have higher leverage and size than the other firms. However, those firms have lower current ratio than the other firms.

Table 4 demonstrates the pearson correlation coefficients for the variables used in this study. This table shows that multi-collinearity is not an issue in the analyses of this study. Asset turnover ratio and price to earnings ratio are positively and significantly correlated with Tobin's Q. On the other hand, firm size is negatively correlated with Tobin's Q at a univariate level. While asset turnover ratio is positively correlated with leverage, it is negatively correlated with current ratio. Leverage is positively correlated with size and tangibility and it is negatively correlated with current ratio. Size is negatively correlated with current ratio and current ratio is also negatively correlated with tangibility ratio.

Table 5 shows the impact of corporate sustainability on firm value. In addition, the determinants of firm value for BIST100 firms are shown in Table 5. In column 1, Tobin's Q is used as a proxy for firm value. Moreover, EBIT is used to measure firm value in the last column. Sdummy variable has a positively significant coefficient in Table 5. Therefore, a positive relation between corporate sustainability and firm value is found in this study. As it is expected it is found that sustainable firms have higher firm values. This result is in line with the most of the studies in the literature such as Lo and Sheu (2007), Marti, Rovira-Val and Drescher (2015). The increased disclosure level with sustainability reporting results in higher firm value. In addition, asset turnover ratio and current ratio are positively related with firm value. On the other hand, leverage and firm size have negative relations with firm value.

Table 2. Descriptive Statistics

Panel A						
Variable	**N**	**Mean**	**SD**	**p25**	**p50**	**p75**
Sdummy	385	0.32	0.47	0.00	0.00	1.00
Tobinsq	385	1.37	0.76	0.94	1.17	1.54
AT	385	0.79	0.60	0.42	0.67	0.95
PE	385	15.39	22.46	3.05	8.85	16.93
Lev	385	0.53	0.23	0.35	0.56	0.71
Size	385	21.82	1.57	20.58	21.76	22.91
CR	385	2.14	2.25	1.02	1.47	2.33
Tang	385	1.00	1.12	0.37	0.75	1.12
Panel B	Sustainable firms					
Variable	**N**	**Mean**	**SD**	**p25**	**p50**	**p75**
Tobinsq	125	1.36	0.42	1.03	1.30	1.56
AT	125	0.83	0.46	0.52	0.73	1.01
PE	125	16.83	22.96	6.52	10.42	15.98
Lev	125	0.64	0.17	0.52	0.67	0.74
Size	125	23.22	1.25	22.47	23.18	23.97
CR	125	1.48	0.66	1.05	1.38	1.79
Tang	125	1.12	1.22	0.44	0.79	1.16
Panel C	Other Firms					
Variable	**N**	**Mean**	**SD**	**p25**	**p50**	**p75**
Tobinsq	260	1.38	0.88	0.89	1.15	1.52
AT	260	0.77	0.65	0.36	0.64	0.91
PE	260	14.69	22.22	0.00	8.11	19.26
Lev	260	0.49	0.24	0.27	0.49	0.68
Size	260	21.15	1.23	20.19	21.20	21.94
CR	260	2.45	2.64	1.02	1.51	2.65
Tang	260	0.95	1.07	0.34	0.66	1.11

Table 5 shows the impacts of interacted variables on firm value. Different interaction terms are created with each firm specific characteristics that affect the firm value as shown in model 1. And these interaction terms are added into the six different models. Firstly, Size*Sdummy is an interaction term which is created with multiplying firm size with Sdummy in column 1. The relation between firm size and firm value among the sustainable firms is tested. However, the coefficient for this interaction term is not found to be significant. Therefore, there is not any impact of firm size on firm value among the firms listed in BIST Sustainability Index. In column 2 of Table 5, an interaction term Lev*Sdummy is created with leverage and Sdummy variables. When this variable is added into the model, a positively significant

Table 3. Comparison of Firm Specific Characteristics

Variable	Sdummy=1	Sdummy=0	t-test
Tobin's Q	1.36	1.37	0.14
AT	0.83	0.77	-0.88
PE	16.83	14.69	-0.88
Lev	0.64	0.49	-6.15***
Size	23.22	21.15	-15.43***
CR	1.48	2.45	4.07***
Tang	1.12	0.95	-1.35

coefficient is found for it. Thus, increase in the level of leverage among the sustainable firms increases the firm value. Higher level of leverage might be an indicator of higher level of firm operations. This might attract the investors and result in increased firm value. In order to analyse the relation between liquidity and firm value for the sustainable firms, an interacted term with current ratio and Sdummy variable is created. The negative coefficient for this interaction term shows that as the liquidity increases, this result in a decrease in firm value. According to Marti et al. (2015), a negative relation between Tobin's Q and current ratio is expected. This shows that available resources are not intelligently invested and this increases the investors' perception of risk (Chen, 2010). Moreover, higher level of current ratio in the sample firms of current study might affect negatively the value of firms. AT*Sdummy is created with asset turnover ratio and Sdummy variable. The negative coefficient of this variable shows that as asset turnover ratio increases among the sustainable firms, their firm value decreases. As it is seen in Table 2, the mean value of asset turnover ratio is 0.82 and therefore the firms listed in BIST Sustainability Index can not efficiently use their assets to generate sales. This has an impact in the results of current paper and lower levels of asset turnover ratio results in decrease in firm value. PE*Sdummy interaction term created with price-to-earnings ratio and Sdummy variable. The negative coefficient of this interaction term shows that as higher the price-to-earnings ratio of sustainable firms, the lower their value will be. Finally, an interaction term is created with tangibility ratio in the last coloumn. According to Table 5, as tangibility ratio increases among the sustainable firms, the firm values decrease. The sample sustain-

Table 4. Pearson Correlation Matrix

	Tobinsq	AT	PE	Lev	Size	CR	Tang
Tobinsq	1						
AT	0.4477*	1					
PE	0.2540*	-0.0168	1				
LEV	0.0047	0.2601*	-0.0037	1			
SIZE	-0.2298*	-0.0708	-0.0631	0.2602*	1		
CR	0.1175	-0.1881*	-0.036	-0.6365*	-0.1675*	1	
Tang	-0.0449	0.0154	-0.0066	0.5027*	0.0671	-0.2765*	1

* denotes significance at the 1% level.

Table 5. The Impact of Corporate Sustainability On Firm Value

Variable	Tobin'sQ (1)	EBIT (2)
Sdummy	4.792***	24.006***
	[0.000]	[0.000]
AT	0.386**	0.86
	[0.017]	[0.313]
PE	0	-0.02
	[0.946]	[0.403]
Lev	-1.205*	-8.748**
	[0.077]	[0.015]
Size	-0.897***	-4.037***
	[0.000]	[0.000]
CR	0.088*	0.176
	[0.082]	[0.508]
Tang	0.107	1.544***
	[0.267]	[0.002]
Constant	19.143***	82.701***
	[0.000]	[0.000]
N	385	385
* p<0.1, ** p<0.05, *** p<0.01		

able firms in this paper have more tangible assets than shareholders' equity. The increase in the tangible assets impacts negatively the value of the firm.

CONCLUSION

In the last decades, successful businesses are determined by their ability by applying corporate social responsibility concepts such as corporate ethics, environmental management, customer royalty, brand reputation, management quality (Lopez et al., 2007). These corporate responsibility concepts are related to sustainable development. Corporate sustainability has become an important criteria in investors' investment decisions in the last years. It is accepted that strategies that consider sustainability criteria can create long term value (Lopez et al., 2007). Corporate sustainability includes implying economic, social and environmental factors in the operations of the firms with corporate governance principles with the aim of reducing potential risks that the companies might come across. In other words, firms take into account not only accounting performance but also ethical principles in their operations.

The firms which are listed in the sustainability index are accepted as the firms which take into account social, economic and environmental issues. It is assumed that the firms that are listed in this index should have higher firm values. According to Anam et al. (2011), the firms listed in sustainability index are known with their higher disclosure levels. This increased disclosure level is a reason for higher firm

Table 6. Interacted Effects of Firm Characteristics and Corporate Sustainability

Variable	TobinsQ (1)	TobinsQ (2)	TobinsQ (3)	TobinsQ (4)	TobinsQ (5)	TobinsQ (6)
Sdummy	65.078	-11.787*	8.463*	10.526***	5.748***	6.919***
	[0.235]	[0.068]	[0.071]	[0.001]	[0.000]	[0.000]
Size*Sdummy	-2.86					
	[0.237]					
Lev*Sdummy		17.280*				
		[0.061]				
CR*Sdummy			-3.672*			
			[0.081]			
AT*Sdummy				-7.670***		
				[0.001]		
PE*Sdummy					-0.084***	
					[0.000]	
Tang*Sdummy						-2.181***
						[0.000]
AT	0.323	0.752***	0.498***	1.949***	0.350**	0.653***
	[0.236]	[0.000]	[0.001]	[0.000]	[0.037]	[0.000]
PE	0.007*	0.012***	-0.001	-0.004	0.029***	0.001
	[0.095]	[0.007]	[0.910]	[0.495]	[0.000]	[0.783]
Lev	0.697	-3.724*	-1.995	-1.681*	-1.300*	-2.224**
	[0.351]	[0.087]	[0.147]	[0.070]	[0.061]	[0.012]
Size	0.745	0.094	-0.648**	-0.903***	-0.824***	-0.832***
	[0.312]	[0.491]	[0.035]	[0.000]	[0.000]	[0.000]
CR	0.086	-0.115	0.07	0.126*	0.074	0.115**
	[0.115]	[0.324]	[0.154]	[0.053]	[0.153]	[0.050]
Tang	-0.074	-0.126	-0.121	0.328**	0.127	1.064***
	[0.518]	[0.253]	[0.273]	[0.032]	[0.204]	[0.000]
Constant	-15.472	1.17	15.039**	18.401***	17.390***	17.212***
	[0.324]	[0.532]	[0.033]	[0.000]	[0.000]	[0.000]
N	385	385	385	385	385	385
* p<0.1, ** p<0.05, *** p<0.01						

value. Furthermore, the companies with higher disclosure levels want to signal this information to the market. They can manage to do this by disclosing more information in the annual reports of the firms. The market value of the firm covers this signalled information. The firm's future value is determined with the disclosed information and as a result its share price increases. Thus, the firms which operate in socially responsible way signal this to stakeholders by issuing sustainable reports (Kuzey and Uyar, 2017). This will cause higher disclosure level and as a result higher firm value.

With considering the recent importance of sustainable development, Borsa Istanbul has started to generate BIST Sustainability Index since 2014. The firms which are listed in BIST Sustainability Index between November 2014 and October 2018 are examined in this study. The impact of listing in sustainability index on firm value is examined firstly. Secondly, the interaction effect of each firm specific characteristics with sustainability dummy on firm value is investigated. According to 2SLS regression results, the firms listed in BIST Sustainability Index have higher firm values. Therefore, as it is expected sustainable firms have higher values because of their higher disclosure levels. Furthermore, some of the specialities of corporate social performance firms ease to have higher accounting performance for these firms. Managing reputation and brand, hiring best managers and employees, greater communication and trust are among these firms' specialities (Lee et al., 2009).

Secondly and the most importantly, this paper concludes that there are interaction effects of some firm specific characteristics of the firms with sustainability on firm value. Leverage, current ratio, asset turnover ratio, price to earnings ratio and tangibility variables are found to have these interaction impacts. According to the 2SLS regression results, there is a positive relation between leverage and firm value among the firms listed in sustainability index. In other words, as the leverage increases among the sustainable firms, the firm value increases. Moreover, current ratio seems to has a negative interaction effect on firm value. As the liquidity ratio increases among the sustainable firms, the firm value of these firms decreases. If the firms which are listed in the sustainability index reduce their current assets or increase their current liabilities, the firm values of these firms increase. In addition, as the current ratio of these firms decrease, the firm values of the firm increase. This result might be explained with the fact that the increased liability usage in these firms positively affects the firm value. This can be explained with the signalling effect of the liability usage. As the ability of debt usage increases, the firm gives positive signals to the investors. Thus, these investors prefer to invest in these firms. Asset tangibility which is defined as the ratio of tangible assets to shareholders equity, has a negative interaction impact. As asset tangibility ratio increases the firm value of sustainable firms decreases. Furthermore, as price to earnings ratio increases among the firms listed in sustainable index the firm values decrease. Since the firms which are listed in sustainability index have financial stability, increased price to earnings ratio negatively affects firm value. These firms invest in economic, social and environmental factors in the long term. However, the investors give more importance to the earnings performance that price performance. Finally, there is a negative relation between asset turnover ratio and firm value among the sustainable firms.

As a further research, several firms from different emerging markets might be selected and the impact of sustainability on the firm values in these countries might be examined. This make it easy to compare the sustainability applications of different markets. In addition, the impact of sustainability on the firm values of developed and developing counties can be compared. Furthermore, different firm characteristics might be added into the model and their interacted effect on firm value might be investigated.

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KEY TERMS AND DEFINITIONS

BIST Sustainability Index: It is an index that provides information about Borsa Istanbul companies which have high performance on corporate sustainability

Corporate Disclosure: Corporate disclosure is giving relevant information about the company to the public with the help of the financial reports.

Corporate Governance: Corporate governance includes the processes, rules and practices by which companies are operated and controlled.

Corporate Social Reporting: Corporate social reporting is a procedure that contain reporting of the social and environmental effects arising from the companies' activities. It also includes managements of these effects.

Corporate Social Responsibility: Corporate social responsibility is a management perception whereby firms consider economics, social and environmental issues in their operations.

Corporate Sustainability: Corporate sustainability is an approach that creates value for shareholders and stakeholder by embracing opportunities and managing risks deriving from economic, environmental, and social developments

Institutional Investors: An institutional investor is a large organisation that invest on behalf of other people. Mutual funds, banks, insurance companies, hedge funds are among examples of institutional investors.

Chapter 13
The Economic and Environmental Impact of Large Financial Developments in an Oil-Dependent Economy:
The Case of Bahrain

Hanan Naser
https://orcid.org/0000-0002-9062-0603
American University of Bahrain, Bahrain

ABSTRACT

This study examines the economic and environmental impact of large financial developments in Bahrain from year 2006 to 2016. To do so, the relationship between energy consumption, oil prices, market shares, dividend yields, and economic growth has been investigated using Vector Error Correction Model (VECM). The key findings are summarized as follow: (1) Long run relationship exists between the suggested variables. (2) Both energy and financial markets are significant in the long run relationship, and positively affect the economic growth of Bahrain. (3) According to the estimated ECM term, the model is stable in the short run. (4) Decline in oil price has negative significant drawback on the economic growth of Bahrain. Accordingly, it is recommended that policy makers in Bahrain focuses on implement strong strategies that aim at encouraging investments in non-oil sectors without impeding energy sector or economic growth in order to move towards sustainability.

INTRODUCTION

Since the discovery of oil in 1930s, the six Gulf Cooperation Council (GCC) countries including: Kingdom of Bahrain, Kingdom of Saudi Arabia, Kuwait, Oman, Qatar and the United Arab Emirates, have witnessed a considerable high rates of economic growth. Such growth did not only have the means to build the foundations of basic infrastructure, but also to improve the standards of living, levels of

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education, life expectancy and lower rates of poverty. Although many economists attribute this growth to several factors, oil revenues played the key role as its benefits covered the entire Arab world and not only the GCC countries due to the appearance of alternative forms of energy (such as wind, water, and solar power). Nevertheless this, the importance of oil exceeds economic aspects and affects social life in general. Thus, the prevailing view among economists is that there is a strong relationship between the growth rate of a country and oil-price changes. Precisely what form this relationship takes, and how it might be modified, and other such questions are issues of outstanding value. Accordingly, the subject of oil price-economic growth relationship has become an interesting subject for many researchers. It has been proved that various transmission channels exist through which oil prices may have an impact on economic activity (Balke, Brown, and Yücel (2002)(Brown & Yücel, 2002), (Lescaroux & Mignon, 2008) or (Lardic & Mignon, 2006) among others). These consequences are expected to be different in oil importing and in oil exporting. Whereas an oil price increase should be considered good news in oil exporting countries and bad news in oil importing countries, the reverse should be expected when the oil price decreases.

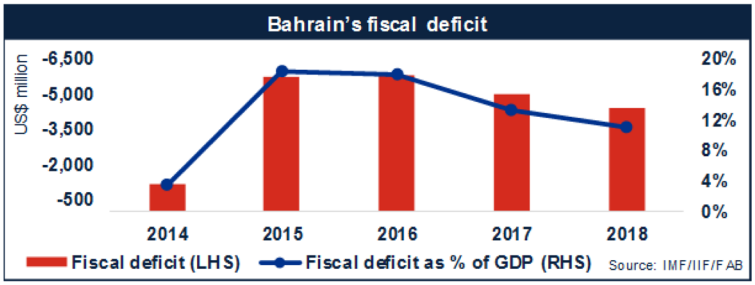
On the other hand, although the financial developments are considered as an important factor for sustainable growth, the financial system in the GCC was tightly regulated and protected from foreign competition by keeping relatively high levels of government controls over the banking and financial system. While those financial and regulatory policies were aimed at providing stability to the financial system, they had their negative effects on the financial system's competitiveness and efficiency.

Looking at the case of oil exporting countries like the GCC, where both oil prices and investments are matter, it has been noticed that there is an adverse impact of the hikes of oil prices on investments as the firms' costs are consequently increase. In addition, changes in oil prices do not only affect the supply and demand, but also influence inflation, foreign exchange and stock markets.

As in most GCC countries, Bahrain's economic growth has been strongly influenced by the fluctuations in oil and gas prices in international markets. This reveals Bahrain's economic dependence on its oil sector even though it is considered as the least oil dependent compared to its regional peers. Bahraini growth rates have generally followed a similar path to Saudi growth rates but have been less volatile because of huge gaps in oil and gas production and reserve between the two countries. Precisely, Bahrain's oil and natural gas production and sales create about 85% of the Bahraini government revenues. Oil is about 70% of government revenues and about 60% of export revenues.

Alternatively, the kingdom of Bahrain has succeeded as one of the Gulf's financial centers for decades. Despite increasing competition from emerging financial centers in the region, its advanced regulatory framework, educated workforce and relatively low-cost environment means that it remains an attractive platform for companies engaging with the wider GCC and beyond. The recent decline in oil prices, however, serves as a reminder of the government's reliance on its hydrocarbons resources for revenues. Facing a stubborn fiscal deficit; as shown in Figure (1), Bahrain is in the process of overhauling its subsidy framework and seeking new income streams, both of which are challenging prospects in an economy renowned for generous social support and light-touch taxation. Revenue-enhancing measures include increasing tobacco and alcohol taxes and increasing fees on some government services (primary health care).A cost-cutting program entailed the removal of the meat subsidy in 2015 and raising petrol prices by 60% in January 2016 (which is likely to create savings worth $148.4 million); the gradual phasing-in of price increases for electricity, water, diesel and kerosene by 2019; and an increase and unification of natural gas prices for industrial users at $2.5 per million BTUs beginning April 2015. As a result, the

Figure 1. Bahrain's fiscal deficits



2015 non-oil primary balance improved by 2.5% of non-oil GDP relative to 2014. However, this was insufficient to mitigate the negative impact of lower oil revenues.

The kingdom's long-standing diversification strategy, meanwhile, has taken on a new urgency with the prospect of volatile oil prices for some years to come.

In order to understand the phenomena of the Bahrain's economy, this study extends the scope of the analysis to the various links between oil prices and several macroeconomic and financial variables for the Kingdom of Bahrain. The variables included are: real gross domestic product, real oil price, consumer price index (CPI), energy consumption, financial market share points and the percentage of the growth in dividend yield. The key findings shed the light on the importance of both energy and financial sectors in the long run of Bahrain's economic growth. In fact, results do not only confirm the importance of oil prices and energy consumption for the real growth of Bahrain's economic, but also the financial sector plays a vital role in long run economic growth.

Our study contributes to the literature in the following important folds. First, as noted above, there are very few papers that specifically examine how natural resource dependence affects the relationship between financial development and economic growth. Thus, this paper contributes to the scant evidence on the effects of oil dependence on the relationship between financial development and economic growth.

In what follows, the paper first provides a background on Bahrain's economy in Section 2, followed by literature review in Section 3. Section 4 describes the data and Section 5 shows the model, where empirical work and results are represented in Section 6. Finally a conclusion and policy implications are provided in Section 7.

BAHRAIN'S ECONOMY

Bahrain is the smallest country in the Arabic Gulf with a population of just over 1 million including around 50% expatriate citizens. It witnessed a prompt modernization and economic growth since the discovery of oil in 1932. Bahrain was among the first countries in the Middle East and North Africa region to build an industrial base and it has been the most attractive for foreign investors, including regional ones in its industrial development (Looney, 1989).

It is worth to note that Bahrain's economic strength originates from regional oil wealth, though it is not any significant oil producing country or a member of the Organization of Petroleum Exporting Countries (OPEC). It, however, hosts one of the largest oil refineries in the world – the BAPCO Sitrah

Refinery with a processing capacity of 267,000 barrels of crude oil per day. About one-sixth of the crude oil processed at this refinery originates from Bahrain and the rest comes from Saudi Arabia, the largest oil producer in the world. A 54-kilometre long oil pipeline connects Bahrain to the Saudi off-shore oil facility Abu Saafa in the Persian Gulf. Most of the crude oil Bahrain receives from Abu Saafa is processed and then re-exported to Asian and North American markets.

Although diversification policy started to step up since late 70s, where the government paid some attention to attract financial and service institutions, in the late 1990's, Bahrain was the first state in the Arabic Gulf who initiated the official idea of diversifying the economy to prepare for the post-oil and post-gas period. Thus, serious actions have been taken and convert it to be the most diversified economy in the region. Bahrain has grown successfully over the past 10 years due to its liberal economic policies and the clear roadmap that aims to achieve prosperity for the society. However, Bahrain's oil and natural gas production and sales create about 85% of the Bahraini government revenues. Oil is about 70% of government revenues and about 60% of export revenues, as reported by Bahrain's Economic Development Board (2017).[1]

Hikes in oil prices in early year of 2000 and till year 2009, Bahrain witnessed a durable growth in economy with a growth rate of 6.1%, where the assets of banks have increased from US$108 billion in 2009 to $241 billion (ISI Emerging Markets Blog, 2011).[2]In fact, most of the global banks and business firms have no dearth of trust in the Bahraini financial system due to many regional, political and economic factors. As a result, although the market of Dubai has shaken during the financial crisis of 2009, Bahrain continued to boom and grow steadily. In year 2011, the economic base and financial backbone of Bahrain had clear drawbacks, where the stock markets went down 6-10%, hotel occupancy rates fell below 30%, and a 1.4% and 1.7% deficits in gross domestic products is projected for 2011 and 2012 respectively (Ameinfo.com, 2011).[3]

Aiming at reducing the reliance on oil revenues, the government of the Kingdom of Bahrain has strengthened the structural reforms to improve the infrastructure of the kingdom as well as the wellbeing of Bahraini citizens. Bahrain has also become an open-ended economy with liberalized trade and capital account. It has also become the hub of international affairs and the preferred destination for investors. At 25% of GDP, financial developments have become the second largest component of the Bahraini economy.

In light of the above efforts, the aim of this paper is to examine the relationship between oil price, energy and financial market in the Kingdom of Bahrain, to check whether or not oil prices spikes and plunges are still having great impact on economic growth. In addition, we look at the relationship between energy consumption and economic growth, financial sector performance and economic growth and thus provide some policy implications. To do so, we use selected indicator variables that measure the performance of financial sector in Bahrain including the dividend yield and market share. Also, energy market variables are included to investigate the relationship between energy consumption (which is an indicator for industrial market) and economic growth taken into account the inflation and the fluctuations in oil prices. To our knowledge, literature has very limited such studies on the GCC countries in general, and on the Kingdom of Bahrain in specific.

LITERATURE REVIEW

As oil is the most traded commodity in the world wide due to its crucial role in production and economic growth, literature has paid great attention to study the relationship between oil prices and economies.

In fact, many empirical studies suggest that there is a linear negative relationship between oil prices and real activity in oil importing countries. Those studies include (Rasche & Tatom, 1981), (Darby, 1982), (Hamilton, 1983), (Burbidge & Harrison, 1984), and (Gisser & Goodwin, 1986). The study conducted by (Hamilton, 1983)identified a robust relationship between oil price increases and subsequent economic downturns for majority of the post- World War Two recessions in the United States (US) economy. Subsequently, a large literature has considered the oil price-economic growth nexus for a number of developed countries based on various theoretical linkages. Studies linking oil prices to the macro-economy through the channels of labor market dispersion(Loungani, 1986); (Finn, 2000); (Davis & Haltiwanger, 2001). Others have focused on investment uncertainty ((Bernanke, 1983); (Dixit, Dixit, Pindyck, & Pindyck, 1994); (Staff, 2005), consumption smoothing in durable goods (Hamilton, 2005); (Lee & Ni, 2002) and the consequences for inflation (Pierce, Enzler, Fand, & Gordon, 1974); (Cavallo, 2008) suggest that indirect transmission mechanisms may be the crucial means by which oil price shocks have macroeconomic consequences.

More recently, (Blanchard & Gali, 2010) used a VAR model including GDP, oil prices, wages, and two other price indices, to argue that the effect of oil price shocks has reduced over time. (Hamilton, 2009) deconstructs their arguments to show that past recessions would have been mild or have merely been slowdowns if oil prices had not risen. Furthermore, he argues that the large increase in the price of oil that climaxed in 2008 was a major factor in causing the 2008-2009 recessions in the US. However, because it is hard to substitute other inputs for energy, the short-run elasticity of demand for oil and other forms of energy is low and the main short-run effects of oil prices are expected to be through reducing spending by consumers and firms on other goods, services, and inputs rather than through reducing the input of energy to production ((Hamilton, 2009), (Edelstein & Kilian, 2009)). Therefore, models using oil prices in place of energy quantities may not provide much evidence regarding the effects of energy use itself on economic growth. Although oil prices in literature entered into modeling using different ways, theoretical model in (Carruth, Hooker, & Oswald, 1998) and some of those in (Phelps, 1994) imply that it is the level rather than the change in firms' input prices which matter. More recently,(Naser, 2014), (Naser, 2015)have tested the impact of both oil prices and energy use on economic growth and find that both are important and significantly influencing the economic growth in the long-run. In another study proposed by (Naser, 2017), it has been revealed that oil consumption and oil prices promote economic growth in the Kingdom of Bahrain.

With regards to the financial market, economists agreed that financial market development plays a very vital role in economic growth and development. However, the ongoing empirical research works concerning financial market development, its measures and impact on economic growth have not reached any consolidative consensus (agreement). (Levine, Loayza, & Beck, 2000) examine the relationship between financial development and economic growth and the sources of growth in terms of private saving rates, physical capital accumulation, and total factor productivity using a pure cross-country instrumental variable procedure and a dynamic panel technique. The primary measure of financial intermediary development employed was private credit, which measures the value of credits by financial intermediaries to the private sector divided by GDP, and alternative measures used are liquid liabilities and commercial-central Bank. The outcome of their study shows that financial intermediaries exert a

large and positive impact on total factor productivity, which translate to overall GDP growth and that the long-run links between financial intermediary development and both physical capital growth and private savings rates are very weak. They concluded that higher levels of financial development lead to higher rates of economic growth, and total factor productivity.

(Erdal, Esengün, Erdal, & Gündüz, 2007) empirically examines the relationship between financial development and economic growth in Northern Cyprus by using Ordinary Least Square (OLS) Estimation Method. Annual growth rate of GDP was used as proxy for economic growth and the financial development variables used are; the ratio of domestic investments to GDP and ratio of deposit to GDP. Employing time series data from 1986-2004, the study found a negligible positive relationship between financial development and economic growth in Northern Cyprus. Although, Granger causality test showed that financial development does not cause economic growth, on the other hand there is evidence of causality from economic growth to the development of financial intermediaries. Their empirical finding shows that there is a causal relationship between annual growth rate of GDP and both the ratio of domestic investments to GDP and the ratio of loan to GDP. They concluded that, there is no evidence to support the view that financial development promotes economic growth in Northern Cyprus. By implication, financial development does not cause economic growth, rather, economic growth causes financial development.

More recently (Chortareas & Noikokyris, 2014) investigated the effects of oil supply and demand shocks on U.S. dividend yield components, i.e. dividend growth, real interest rate, equity premium. Following disentangling methodology proposed by (Kilian & Park, 2009), they showed that although positive relationship between oil price increase and dividend yield is evident, the persistence of relationship is highly dependent on the driving force of the oil price increase case of Singapore.

Here, this paper follows the literature in analyzing the long run-relationship between the selected variable, we aim at investigating the impact of oil prices on economic growth. In addition, we look at the causal linkage between energy consumption and economic growth, financial sector performance and economic growth and thus provide some policy implications. To do so, we use selected indicator variables that measure the performance of financial sector in Bahrain including the dividend yield and market share. Also, energy market variables are included to investigate the relationship between energy consumption (which is an indicator for industrial market) and economic growth taken into account the fluctuations in oil prices.

DATA

This empirical analysis uses annual data that covers the period from 2006 till 2016 for the Kingdom of Bahrain. The dataset has been collected from two main sources named the World Indicators and the Central Bank of Bahrain (CBB). Although the period has been chosen on the basis of data availability, it is an interesting interval as it witnessed the main critical events of both upsurge and plunge in oil prices.

Given that the aim of this paper is investigating the relationship between energy market, oil prices, financial market and economic growth, the data include a wide range of information on many related indicators as shown in Figure 2 – 7 and briefly explained below:

1. **Real Gross Domestic Product Per Capita (GDP):** Is a wide macroeconomic definition measure which represents the value of economic output for all good and services in an economy during a certain time period. Since this paper uses the real value of the GDP, thins implies that it has been adjusted for price changes (i.e., inflation or deflation). In another word, this adjustment has converted the measure of money-value that included in measuring the nominal GDP into an index for quantity of total output.
2. **Consumer Price Index (CPI):** A measures that shows the level of prices by accounting prices of a market basket of consumer goods and services purchased by households during a certain time. The CPI is a statistical estimate constructed using the prices of a sample of representative items whose prices are collected periodically. In this paper, the CPI has been used to convert the nominal GDP on Kingdom of Bahrain into a real GDP and thus, descriptive statistics gives an idea about the trend in the CPI among the years 2006 – 2015.
3. **Energy Consumption Per Capita (EC):** Which measures the aggregate consumption of energy including fossil and non-fossil fuels in a country, taking into account the number of total population in each year. This indeed includes the usage of energy by firms, industries, households and all other possible parties that may consume energy.
4. **Real Crude Oil Prices (ROP):** The WTI crude oil prices are converted into real prices to account for inflation pressure.4
5. **Market Share Points (MS):** Represents the percentage of an industry or market's total sales that is earned by a particular company over a specified time period. This metric is used to give a general idea of the size of a company in relation to its market and its competitors.
6. **The Percentage of the Growth in Dividend Yield (DY):** A measure of an investment's productivity, and some even view it like an "interest rate" earned on an investment. A security's dividend yield can also be a sign of the stability of a company and often supports a firm's share price. Normally, only profitable companies pay out dividends. Therefore, investors often view companies that have paid out significant dividends for an extended period of time as "safer" investments. Thus, should events occur which are detrimental to the share price, the allure of the dividend combined with the stability of the company can support the price somewhat.

More precisely, growth, inflation and energy market data are collected from World Indicator, while the last two financial variables are obtained from the Central Bank of Bahrain (CBB). Table (1) shown below represents the statistics of the original data.

Since the selected variables are available on annual basis for the Kingdom of Bahrain, (Denton, 1971) Method is applied to interpolate these series into its quarterly values as used by IMF.

MODEL

In this paper we apply recent advances in time series techniques by estimating the cointegration relationship between the suggested variables as proposed by (Johansen, 1988) and (Johansen & Juselius, 1990).

To do so, the time series econometric procedures are used in order to examine the relationship between selective indicator variables with relates to energy market, other financial indicators and economic growth i.e. whether oil prices, financial variables and energy consumption will affect economic growth or is it economic growth drives the demand for more energy consumption in the economy while it cope with

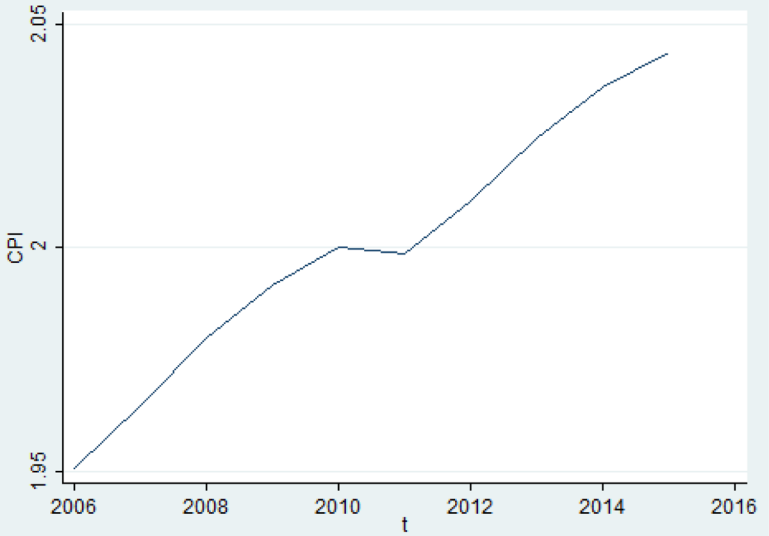
Table 1. Variables descriptive statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Real GDP	10	4.327	0.017	4.303	4.349
CPI	10	1.999	0.029	1.950	2.043
EC	10	4.012	0.035	3.973	4.071
ROP	10	1.921	0.115	1.673	2.041
MS	10	3.178	0.131	3.027	3.440
DY	10	4.641	0.954	3.07	5.86

the fluctuations in oil prices by developing the financial sector. There are three steps involved in estimating the relationship between oil prices and economic growth. The first step is to test the stationarity of the series or their order of integration in all variables i.e. energy consumption, electricity consumption, energy prices, economic growth and the rest of variables. In this study, the Augmented Dickey Fuller (ADF) is utilized to investigate the order of integration. The second step is to examine the existence of a long run relationship between energy consumption, energy prices and economic growth, i.e. whether a linear combination of the series is stationary. This stationary linear combination of the variables converges to a long-run equilibrium over time and is known as the co-integrating equation. In this study, the Johansen test ((Johansen, 1988; Johansen & Juselius, 1990) are used to investigate the existence of long-run relationships between the variables. Although there exists a number of co-integration tests, such as the (Engle & Granger, 1987) method and the (Stock & Watson, 1988), Johansen's test has a number of desirable properties, including the fact that all test variables are treated as endogenous variables. Once the co-integration is confirmed in the model, the residuals from the equilibrium regression can be used

Figure 2. Plot of Time-series Variables (GDP)

Figure 3. Plot of Time-series Variables (CPI)



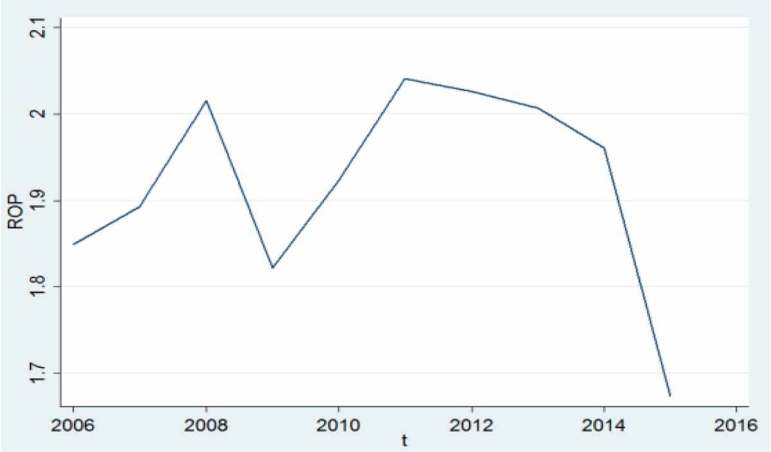
to estimate the Vector Error Correction Model (VECM) in the third step, where the VECM equation can be written as follow:

$$\blacklozenge Z_t = \mu + \sum_{i=1}^{k} \Gamma_i \blacklozenge Z_{t-i} + \alpha\beta^{'} Z_{t-1} + \varepsilon_t \quad (1)$$

Where $\blacklozenge$ is the first difference notation, Z_t is an integrated vector of order one and sized by $k \times 1$, μ is $k \times 1$ constant vector representing a linear trend in a system, *k* is a lag structure, and ε_t is a $k \times 1$ Gaussian white noise residual vector. Γ_i is a *(k x k)* matrix and indicates short term adjustments among variables among *p* equations at the *i* lag. Two matrices, α and β are of dimension *k x r*, where α denotes

Figure 4. Plot of Time-series Variables (EC)

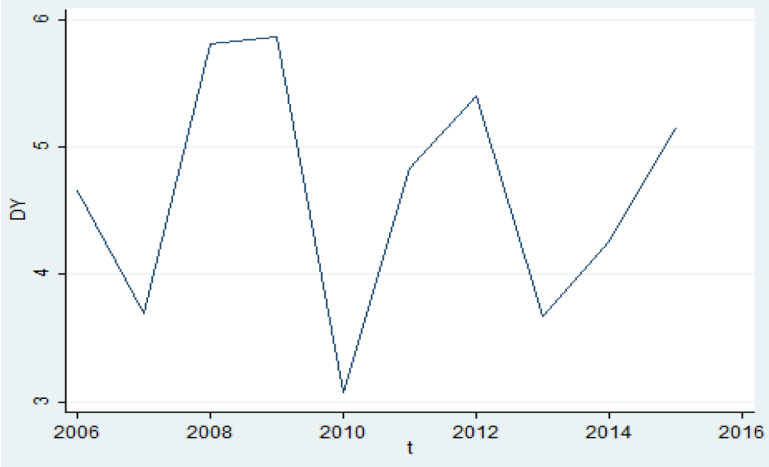
Figure 5. Plot of Time-series Variables (ROP)



the speed of adjustment (loading), β represents the cointegrating vectors. Precisely, $\alpha\beta^{'}Z_{t-1}$ is the error correction term ECT_{t-1}, which is one period lag of the residual term (disequilibrium) from the long run relationship. The above equation can be estimated by the usual Ordinary Least Square (OLS) method if all its terms are I (1) and therefore standard hypothesis testing using t-ratios and related diagnostic tests can be conducted on the error term. Theoretically, the coefficient of the one period lag of the disequilibrium term should be negative (i.e. $\pi < 0$) and significant if the disequilibrium is to be corrected in subsequent period and long run equilibrium restored. In this light, the coefficient of the error term represents the speed of adjustment to the long run equilibrium i.e. it shows by how much any deviation from the long run relationship is corrected in each period.

Figure 6. Plot of Time-series Variables (MS)

Figure 7. Plot of Time-series Variables (DY)



EMPIRICAL WORK AND RESULTS

Denton (1971) Interpolation Method

Since the selected variables are available on annual basis for the Kingdom of Bahrain, (Denton, 1971) Method is applied to interpolate these series into its quarterly values as used by IMF.

Basically, (Denton, 1971) Least Square formulation was developed to eliminate the "step problem" that arises when related series, with imperfect coverage, are used to interpolate low frequency GDP data.[5] The step problem occurs when the Benchmark to indicator (BI) ratio changes dramatically from year, given that the indicator or related series that is used in the distribution process grows at different rate from the benchmark. Step problems are most evident in simple pro-rata distribution techniques which is implemented as follows:

$$X_{q,\beta} = I_{q,\beta}\left[\frac{A_\beta}{\sum_q I_{q,\beta}}\right] \tag{2}$$

$X_{q,\beta}$ is the level of the quarterly national accounts estimate for quarter q of yearβ. $I_{q,\beta}$ is the level of the indicator in quarter q of year β and A_β is the level of the annual data for year β. The expression $\left[\frac{A_\beta}{\sum_q I_{q,\beta}}\right]$ is the annual BI ratio. With pro-rata distribution, there will be a distinct jump in adjacent $X_{q,\beta}$ where $I_{q,\beta}$ and A_β grows at different rates, such that the compensating adjustment in quarterly estimates from one distinct year to the next will be put into the first quarter of each year, while other quarterly growth rates are left unchanged. The significance of the step problem depends on size of the variation in the annual BI ratio. To maintain simplicity, we outline only the basic version of the Denton

Least square method (the Proportional Denton Technique or PDT). This method involves solving the following optimization problems:

$$\blacklozenge y_t = \complement + \sum_{i=0}^{p} \alpha_i \blacklozenge y_{t-i} + \sum_{i=0}^{p} \sum_{j=1}^{k} \beta_i x_{t-i}, j + u_t \tag{3}$$

$$\left(X_1 \ldots\ldots\ldots X_{4^2}^{min} \ldots\ldots\ldots X_T\right) \sum_{t=2}^{T} \left[\frac{X_t}{I_t} - \frac{X_{t-1}}{I_{t-1}} \right]^2 . \tag{4}$$

under the restriction that, for the flow series,

$$\sum_{t=2}^{T} X_t = A_{y,y} \in \{1 \ldots\ldots\ldots \beta\}^4 \tag{5}$$

Where ***t*** is time.[6] Intuitively, the PDT implicitly constructs from the annual observed BI ratios a time series of quarterly BI ratios that is as smooth as possible. Enhancements to the PDT improve the ability of the technique to extrapolate based on available indicators when there are no available annual benchmarks.

Unit Root Test

Many economic and financial time series exhibit trending behavior or non-stationary in the mean. Leading examples are asset prices, exchange rates and the levels of macroeconomic aggregates like real GDP. An important econometric task is determining the most appropriate form of the trend in the data. Two common trend removal or de-trending procedures are first differencing and time-trend regression. First differencing is appropriate for I(1) time series and time-trend regression is appropriate for trend stationary I(0) time series. Unit root tests can be used to determine if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. Moreover, economic and finance theory often suggests the existence of long-run equilibrium relationships among non-stationary time series variables. If these variables are I(1), then cointegration techniques can be used to model these long-run relations. Hence, pre-testing for unit roots is often a first step in the cointegration modeling as discussed above. Finally, a common trading strategy in finance involves exploiting mean-reverting behavior among the prices of pairs of assets. Unit root tests can be used to determine which pairs of assets appear to exhibit mean-reverting behavior.

Thus, in this paper, conducting stationary test is essential for identifying the order of integration of the proposed variables before testing for any causality or long-run relationship(s). The most popular tests in literature is the Augmented Dickey and Fuller (ADF) test which is an augmented version of the original Dickey-Fuller test(Dickey & Fuller, 1979). In 1984, the very same statisticians expanded their basic autoregressive unit root test (the Dickey-Fuller test) to accommodate more complex models with unknown orders (the augmented Dickey-Fuller test). This has been employed in this study to verify the

order of integration, Id, for each variable. The ADF testing procedure tests the unit root hypothesis as following:

$$\Delta y_t = \theta_0 + \gamma_0 t + \gamma_1 y_{t-1} + \sum_{i=0}^{p} \theta_i \Delta y_{t-1} + \tau_t \quad (6)$$

where y_t is the variable in period t; Δy_{t-1} is the y_{t-1} - y_{t-2} ; the i.i.d. disturbance τ_t has mean 0 and variance 1; t the linear time trend and p is the lag order. In order to test the null hypothesis for the presence of a unit root in y_t , we conducted the hypothesis testing that γ1= 0 in Equation (6). If γ1 is significantly less than zero, the null hypothesis of a unit root is rejected. Results of ADF are obtained for both level and first differenced variables as a treatment for non-stationary data as below in Table (2).

Accordingly, the results shown in Table (2), it is revealed that all variables are roughly non stationary at level and integrated of order one- I(1).

Selection of Lag Length for the Vector Autoregressive Regression (VAR) Model

In literature, it is common to start regressing the VAR model using 4 lags for annual data and then obtain the results of testing the usage of lags in order to obtain the optimal lag length, k. Here, the lag tests

Table 2. Results of unit root test

Variable	ADF	
	Level	*Differenced*
Real GDP	0.337	-1.917**
EC	-1.293	-1.965**
ROP	-0.491	-1.975**
MS	-1.52	-2.364**
DY	-0.016	-10.052***

Notes: The regression includes an intercept and trend. All variables are in natural logarithms, while the lag length determined by Akaike Information Criteria and are in parentheses. **, and *** indicates significance at the 5% level and 1% level, respectively. The nulls for the unit root.

Table 3. Optimal lag selection results

lags	Test				
	LR	df	AIC	HQIC	SBIC
1	.	36.000	-340.539	-345.541	-341.789
2	119.33*	36.000	-360.428	-375.429*	-375.898
3	47.865	36.000	-368.405*	-373.407	-379.655*
4	37.458	36.000	-364.648	-369.65	-361.677

Notes: LR is the likelihood-ratio, AIC, HQIC and SBIC stand for Akaike, Hannan and Quinn and Schwarz's Bayesian information criteria, respectively. In the case of conflicting results, we use the results that are common between more than one type of tests.

Table 4. Results of Johansen's Cointegration Test

Trend: constant Observations = 37				
Sample: 2006q4 - 2015q4 lags = 3				
maximum rank	**LL**	**eigenvalue**	**trace statistic**	**5% critical value**
0	468.33589		72.6961	47.21
1	489.93799	0.68891	29.4919*	29.68
2	500.39737	0.43185	8.5731	15.41
3	504.22234	0.18678	0.9232	3.76
4	504.68394	0.02464		

are done using Akaike (AIC), Hannan and Quinn (HQIC), and Schwarz's Bayesian (SBIC) information criteria are used to build a decision.[7]

The sample used covers the period 2006 - 2015 due to the availability of data. Since the default maximum number of lags is four for annual data as discussed above. Although the results shown in the table above are conflicting, the choice done based on AIC results as suggested by (Pesaran & Pesaran, 1997). In fact, both Akaike's information criterion (AIC), and Schwarz's Bayesian information criterion (SBIC) have provided identical selection of lag 3. The likelihood-ratio (LR) and Hannan and Quinn information criterion (HQIC) lag-order selections are 2.

Cointegration Test

Since the series are stationary at the same level I(1), then it is possible to find linear combination(s) of the variables to be stationary at the zero level I (0), which means that the data are cointegrated. It is also possible to have more than one linear combination, and so more than cointegration relationship between the variables exists. Johansen and Juselius (1990) provided two likelihood ratio tests to obtain the number of cointegrated vectors, which are insignificantly different from unity.

$$\lambda_{trace} r = T \sum_{i=r}^{n} \ln\left(1 - \widehat{\lambda}_i\right) \tag{7}$$

$$\lambda_{max}\left(r, r+1\right) = -T \ln\left(1 - \widehat{\lambda_{r+1}}\right) \tag{8}$$

Where, $\lambda_i^{\wedge}$ equals the estimated eigenvalue of the characteristic roots, r = 0,1,2,..,T= number of observations. The null hypothesis of the trace test is to test if the number of distinct cointegrated vectors is less or equal *r* against the alternative.

The table above represents the results obtained from applying Johansen (1988) test (Johansen, 1988)in order to test for the existence of r = 4 cointegration relationships among the five variables of the model. The test starts in general by testing for no-cointegration among the suggested variables where r = 0. If the model is rejected, then a test for r = 1 is performed and so on until r = 4. Reduced-rank regression

has been used to form a likelihood ratio test of that hypothesis on the basis of the so-called trace statistic. The results of testing for the number of cointegrating vectors are shown on the fourth column of reveal that the null hypothesis of no cointegration can be rejected at the 1% and 5% significance level, where it cannot be rejected at r= 1. These findings suggest the existence of one cointegration vector in the system of economic growth of Kingdom of Bahrain. Hence, a cointegration rank of one is imposed on the VAR and the coefficients of the long-run relationship is estimated using VECM.

Long-Run Relationship

On the basis of the results obtained above, restrictions have been imposed on estimating the following long run relationship:

$$\boldsymbol{GDP} = 0.0721\boldsymbol{EC} + 0.178\boldsymbol{MS} + 0.152\boldsymbol{DY} + 0.022\boldsymbol{ROP}$$

(0.000) (0.0450) (0.002) (0.050)

Following (Johansen & Juselius, 1990), the normalized cointegrating equation above shows that, in the long run, there is a clear and reliable positive relationship between economic growth and energy consumption, suggest that energy consumption stimulates economic growth in the Kingdom of Bahrain. In addition, both financial market variables have positive linkage with economic growth in the long-run. However, real oil prices have very low significant impact on the economic growth in the long-run. Given the fact that our model is log-linear model, we can interpret the coefficients of the long run equation as long run elasticities. Meaning each coefficient of the variables measures the contribution of each variable to the real GDP. For instance, a 1% increase in energy consumption will result in almost 7% increase in real GDP if all other variables are not changing. By this standard, we can regard market share and dividend yield contributions as the most significant in the future economic growth followed by energy consumption while oil prices seems to have very low impact on economic growth. More clearly, a decrease of 1% in real oil prices negatively affect the level of economic growth by 2.2%, which explains the slowdown of economic growth in Bahrain since the plunge of oil prices in June 2014. Looking at the variables that tackle the performance of the financial market, it is clear that these two variables are not only significant in the long-run relationship, but also have considerable impact on the economic growth. In the long-run, both market share and dividend yield have positive and significant impact on the economic growth in the Kingdom of Bahrain. Precisely, an increase in the market share by 1% increases the economic growth by 17.8%, where an increase of 1% in the dividend yield will increase the economic growth by 15%.

Our next empirical analysis would therefore involve the estimation of the Vector Error Correction Model, in order to investigate the speed of adjustment for any deviation from the long run path.

VECM

The empirical investigation in this paper proceeded estimating a VECM model for the suggested set of variables to report the corresponding equation of economic growth model. Since Johansen‘s maximum likelihood estimation procedure is employed with one cointegrating vector, the correction term reflects

Table 5. Results of VECM

	Δ GDP	**Std. Err.**	*Probability*
constant	-0.008	0.003	0.828
Δ GDP_t-1	0.289**	1.487	0.038
Δ GDP_t-2	0.066*	1.435	0.096
Δ EC_t-1	0.079**	1.084	0.046
Δ EC_t-2	0.083	1.181	0.147
Δ MS_t-1	0.065*	0.386	0.090
Δ MS_t-2	0.066	0.407	0.105
Δ DY_t-1	0.048**	0.057	0.040
Δ DY_t-2	0.062	0.055	0.261
Δ ROP_t-1	0.065**	0.0455	0.015
Δ ROP_t-2	0.009**	0.0517	0.018
ECM_t-1	-0.045***	0.195	0.000
Statistical tests			
R ^2	0.67		
Adjusted R ^2	0.55		

the influence of deviation of the relationship among the variables from long-run and short-run economic growth equilibrium are presented below:

Although the estimate coefficient of the error correction term (-0.045) is showing that the adjustment of disequilibrium in economic growth equation is very slow for Bahrain, it is statistically significantly different from zero and with appropriate negative sign. This suggests the validity of the long run equilibrium relationship among the variables in the equation. In other words, it shows that 4.5% (error correction term -0.045) of the deviation of the real GDP from its long run equilibrium level is corrected each quarter. The estimated results in the ECM also show that short-run changes in most lagged variables affect the economic growth. All variables are significantly effective and have clear impact on the GDP.

CONCLUSION AND POLICY IMPLICATIONS

The paper studies the relationship between oil prices and economic growth in the Kingdom of Bahrain over the period of 2006-2016. To this purpose, the study incorporates a number of effective variables to overcome the problem of omitted variables in such models. These variables are critical for both oil and financial market to allow for investigating the long run relationship among them. In fact, variables are: real GDP, CPI, real oil price, energy consumption, market share and dividend yield of the market in Bahrain. The time series of the model have been examined the in terms of stationarity, using ADF test. This was followed by applying the Johansen cointegration test and the estimation of the long run cointegrating vectors, followed by an Error Correction Model is used to examine the short run analysis. It is found that the variables of the model were characterized by a unit root at level, but, the hypothesis of nonstationarity was rejected at first difference. In this study the Johansen's cointegration test is used

to examine the cointegrating relationship between the real GDP, oil price, energy consumption, market share and dividend yield of the country, while inflation was ineffective and thus removed from the cointegration equation. According to tables 4, both the maximum eigenvalue tests and the trace tests indicate that there is one cointegrating equation at 5% significant level among the real GDP, real oil price, energy consumption, market share and dividend yield in the sample.

Since the long-run cointegrating relation is found among the variables, the long run vector coefficients indicate that 1% increase in the level of international oil prices causes the level of RGDP of Bahrain to increase by 2.2%. At the same time, increasing energy consumption by 1% affect the economic growth positively with around 7.2% growth in the real GDP of Bahrain. On the other hand, both market shares and dividend yields are not only significant in the long-run relationship, but also have considerable impact on the economic growth. In the long-run, both market share and dividend yield have positive and significant impact on the economic growth in the Kingdom of Bahrain. Precisely, an increase in the market share by 1% increases the economic growth by 17.8%, where an increase of 1% in the dividend yield will increase the economic growth by 15%. These results reveal that the real GDP of Bahrain is elastic to changes in both oil and non-oil sectors (elastic). The estimated coefficients for the error correction terms is - 0.045, suggesting that suggests that the Bahrain economy 4.5% movement back towards equilibrium following a back towards long run equilibrium, after the shock of oil price. Finally, Bahrain should depend on policies that focus not only on the energy market, but also non-oil market especially that the long run analysis shows that non- oil sector has more impact on economic growth of Bahrain in the long-run.

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ENDNOTES

[1] For more information, visit: http://bahrainedb.com/app/uploads/2017/06/BEQ-June-2017.pdf.

[2] For more information visit: https://www.isimarkets.com.

[3] Reports available at: https://ameinfo.com/.

[4] Since the most traded oil is the West Texas Intermediate (WTI) which is also known as light sweet, this paper uses the WTI spot prices as the benchmark in oil pricing and thus it is deflated using the Consumer Price Index (CPI) of the United Statesobtained from the U.S. Energy Information Administration (EIA).

[5] For more information, refer to (Serju, 2004).

[6] (t = 4y -3) is equal to the first quarter of year y, and t = 4y the fourth quarter of year y. Similarly, t = 1 is equal to the first quarter of year 1.

[7] In cointegration analysis and causality testing, if the chosen lag is less than the true lag length, this can cause bias due to omission of relevant lags.

Chapter 14
Circular Economy Measurement and a Case of the Developing Country Context

Kerem Toker
https://orcid.org/0000-0002-1904-1406
Bezmiâlem Vakıf University, Turkey

Fadime Çinar
https://orcid.org/0000-0002-9017-4105
Istanbul Sabahattin Zaim University, Turkey

Ali Görener
https://orcid.org/0000-0001-6000-5143
Istanbul Commerce University, Turkey

ABSTRACT

Circular economics (CE) is increasingly discussed among researchers, practitioners, and politicians. The discussions between the parties and the confusion about the concept cause the issue to remain on the agenda. According to the general view, CE is the slowing, shrinking, and closing of the welding flow to increase the welding efficiency. However, little attention has been devoted to measuring the CE level of a given economic system. The aim of this chapter is to demonstrate the emergence and development process of CE, and also to show how the CE level of any economic system can be measured. In this context, it is important for developing countries to interest with the issue but not in practice. To put this into perspective, the study examined Turkey's economic system. Turkey's economic, environmental, and social indicators examined were found to have a remote structure of the CE principle. It is expected that the results of the study will lead to a positive social change and become a framework for increasing the contribution of developing economies to the sustainable world.

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INTRODUCTION

Today, there is widespread agreement that current consumption and production practices have a detrimental effect on environmental quality, social equity and long-term economic stability (Millar *et al.,* 2019). Undoubtedly, the growth pressure on enterprises has a big share in the emergence of this negative condition. As long as economic growth is an important performance criterion for both business and state administration, destruction on the environment and society seems to continue. The interesting part of the issue is that businesses and governments that have caused environmental and social destruction are trying to develop a variety of policies to prevent this destruction. The conception of the 21st century global economy is similar to an indefinite journey through which destruction and construction proceed together. Developed countries seem to be aware of the issue and are trying to establish a sustainable economic system by developing a number of regulatory policies. Developing countries continue to grow economically without considering environmental and social problems, as they perceive economic development as yet to consume more. There is a need for a paradigm shift that will soon give up this approach that would compromise the ability for future generations to meet their needs. In this way, it is possible to reach the limits of the "*take-make-dispose"* economic model and to develop alternative economic models. (Jørgensen & Remmen, 2018). In this context, in order to achieve sustainable development goals, the circular economy must be turned into an indisputable economic policy by the states. Otherwise, sustainable development targets will only continue to create normative pressure on enterprises resulting in more sustainability challenges.

The linear economy causes both environmental impacts such as pollution and social impacts such as exploitative and violent behavior. In modern times, extreme inequalities, population growth, urban sprawl, diseases of outbreaks, public and personal debts, psychological stress and depression, over-eating, overwork, unemployment, excessive alcohol use, tobacco and other drugs, suicides, retirement systems, it is observed that various elements such as taxes, materialism, alienation, mistrust, refugees, civil liberties, military occupations and terrorism are related to each other. Therefore, the long-term future crisis of humanity must be taken into consideration (Greyson, 2007). However, widespread concerns about resource security, greenhouse gas reduction and ethics are developing the approach to seeing resources as assets that need to be protected rather than continuously consumed (Stahel, 2016). According to Cullen (2017), it is tempting to think of a completely circular economy (CE) as a practical reality. Thus, an economy that does not contain waste, is closed to material cycles and is recycled, and is continuously returned without any consumed source input is considered as the future of CE. In this respect, CE also aims to contribute to higher regional competitiveness and equal economic growth and welfare distribution. At a theoretical level, the CE model focuses on the relationship between industrial development and the environment (Geng *et al.,* 2009).

Industrialization has developed rapidly in recent years in the European Union (EU) candidate Turkey should regulate economic policies of resource utilization and considering the environmental issues. In this context, identification of gaps between the current state of the CE principles of Turkey's economy, will be a guide for the development of the economies of developing countries, said the policy. It is obvious that similar economic models have similar problems. Therefore, developing countries can learn a lot from each other's problem solving methods. Thus, it can eliminate legal, technical and social barriers associated with the CE.

BACKGROUND

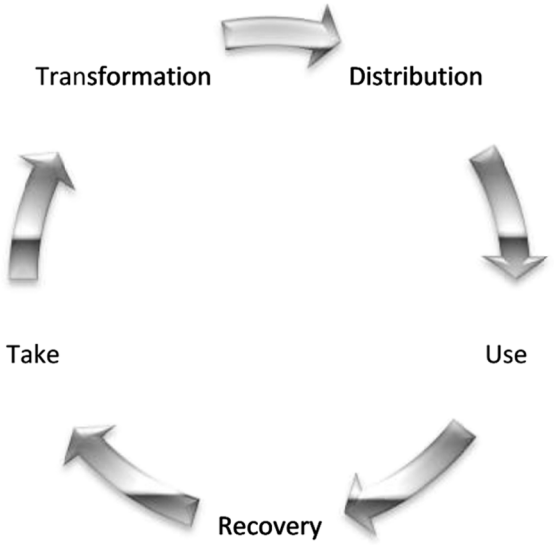
All major global challenges, including nature, geological destruction, society and the economy, are linked to the very concrete question of how to manage resources. The countries' resource management policies should set a target for the future. A society that loses its positive expectations for the future also loses its capacity to cope with current problems. The global downturn, which shows the declining prospects for the future, shows that there is a need for more positive expectations for the future than economic growth. An effective future image should also support effective decision-making. The decisions about the economic structure include alternative future images. Then, social and individual behaviors take action to realize the most preferred future image (Greyson, 2007).

A circular economy (CE) transforms goods into new production resources by creating closed industrial ecosystem cycles at the end of their useful life. Thus, CE is fundamentally changing the logic of economics as it displaces the concepts of production and capability. In the CE system, the wastes are reused, those that cannot be reused are recycled, the fractures are repaired, and those that cannot be repaired are reproduced (Stahel, 2016). The aim of the CE is to move away from the linear economic model, which is summarized as *"take-make-dispose"* with raw materials at one point and wastes discharged at the other point. Instead, in a CE economic model, the wastes are recovered by recycling and reuse, thus becoming re-evaluated sources. (Gregson *et al.,* 2015).

In this context, researchers and practitioners are increasingly interested in CE. On the other hand, many consultancy reports have been published. However, little attention has been devoted to measuring the CE level of a given economic system. The reason why organizations are so interested in CE is because they see it as a means to implement sustainable development programs (Kirchherr *et al.,* 2017). For example, a study conducted in 7 European countries found that the transition to a cyclical economy would reduce greenhouse gas emissions for each country by up to 70% and increase the workforce by 4% (Stahel, 2016). Many estimates show that the world's population will reach about 11 billion in 2100, four times more than in the early 20th century, and an increase of 50% (Avdiushchenko, 2018). However, 66% of the world's population is estimated to live in cities by 2050. Therefore, decision makers have had to take appropriate actions on sustainability. In addition, the concept of CE emerged from the integration of various disciplines, from business to natural sciences. The basic logic behind CE is the development of closed material and closed energy cycles that go beyond the linear special purpose economic models and protect the value of the resources in the economy (Petit-Boix & Leipold, 2018). Unlike the traditional linear production model, the circular economic approach encourages the organization of economic activities through the processes of feedback that mimic natural ecosystems in the process of in natural resources → conversion to manufactured goods → production of by-products used as a resource for other sectors (Geng & Doberstein, 2008). The transition to CE requires eco-innovations to turn off the cycle of the product life cycle, to obtain valuable products from waste, and to meet the flexibility needs of the natural environment during the economic growth process. For this reason, CE is a manifestation of a fundamental paradigm shift. In this new paradigm, society also uses the laws of nature as a source of inspiration to respond to environmental regulations, as well as changes in the way it produces and consumes (Prieto-Sandoval *et al.,* 2018). The structure of this new economic paradigm can be seen in Figure 1.

As depicted in Figure 1, the circular economy cycle begins with *"take",* which is recycled raw material is taken to the factory, next the raw material is "*transformed"* into the new goods. The next stage is the *"distribution"* is the delivery of these new goods to the consumer. In the *"use"* phase the consumer uses

Figure 1. Circular economy cycle



Source: (*Prieto-Sandoval et al. 2018)*

these environmentally friendly goods. Then it leaves back to *"recovery"*. This new economic paradigm is built on the principles of *reduction, reuse* and *transformation*. As a result, less waste is generated in the production and consumption processes, while at the same time an efficient economy is achieved. The CE strategy requires a complete renewal of the entire human system of action, which includes both production processes and consumption activities (Yuan *et al.,* 2006). Therefore, CE requires a radical change of mind in society.

In the area of discussion of economic problems, CE has received a lot of attention but has also been widely criticized. Unfortunately, the differences between practice and interpretation among researchers, practitioners and politicians have led to a reduction in opportunities for international cooperation. The subject of interpretation is also linked to the difficulty of assessing the impact of the transition to the cyclical economy. Several studies have emerged in recent years that show that CE has the potential to provide economic, environmental and social benefits, but the focus and dimensions of these studies are often different. Furthermore, this area of research is still in its early stages, and therefore the quantitative models applied are sometimes based on over-simplifications and assumptions. In addition, it is questioned whether these models have adequately taken into account the numerous challenges associated with the transformation of linear structures and business models that have been applied for many years (Rizoz *et al.,* 2017). Therefore, it is a critical need to identify the issues that CE focuses on and to define the performance indicators clearly. However, it can be known at which stage of the CE.

Considering the complexity of the transition from a linear economy to CE, the global implementation of the principles and theories of CE has been different and unfounded. However, there are many positive studies that provide a useful macro-economic plan that positively affects the adoption and implementation of CE principles (Botezat *et al.,* 2018). For example, Wastling *et al*. (2018) stated that product design is extremely important in transition to circular economy. According to the authors, the transition to CE requires, above all, the prolongation of the usability of the products. This emphasizes the high costs

of transition to CE, but also provides significant benefits to the use of resources, the environment, the economy and society. This high cost issue leads many developed countries to develop early transition policies and strategies supported by appropriate financial programs. (Botezat *et al.,* 2018).

In this context, Tantau *et al.* (2018) listed the principles that a country should follow to transform its traditional economy into CE:

1. Circular economy design, which means that products are designed at the beginning of production to ensure the product is reused or recycled at the end of its life;
2. Creating new, innovative business models that facilitate the transition from the principle of procurement, consumption and disposal to the principles of sustainability;
3. Creation of reversed cycles, ie the return of used materials to soil or production, as well as providing efficient, innovative production systems for new materials and products;
4. As market mechanisms, activators and accelerators, educational institutions, policy makers, financial institutions need to encourage the reuse of materials and higher resource efficiency.

There are many approaches and activities that use the principles of CE. These vary by country. As depicted in Figure 1, circular economic activity includes reuse, repair, recycling, eco design, sustainable supply and responsible consumption. In fact, this abundance of concepts shows that the definition of CE is not a solid foundation. However, it can reach a basic level of understanding through the current literature (Esposito *et al.,* 2018). According to the literature, one of the most important elements for CE is that the ownership of the products is not the main focus; instead, it is the new consumer culture in which access to the function provided by the product is important. (Junnila *et al.,* 2018). In recent years, the Ellen MacArthur Foundation, which has made significant contributions to the concept of CE, in particular the process, operations and objectives of the model, emphasizes five main features in CE. These features include designing waste, creating flexibility through diversity, generating energy from renewable sources, thinking in a system and in cascades (Esposito *et al.,* 2018). In the framework of these developments, it is important to reach a consensus on a common approach on CE. This idea and method of unity can increase the level of understanding and implementation of the concept. Based on review of literature it appears that little attention has been devoted to measuring the CE level of a given economic system.

MEASURING CIRCULAR ECONOMY

This study evaluated the CE transition to Turkey's economy. The reason Turkey was selected in this study is because it became an EU candidate country and is the world's 20th largest economy. In 2018, Turkey's GDP was 631.163 billions $ (statisticstimes, 2019). It is also the 19th most populous country in the world with a population of about 82 million (TÜİK, 2019a). Therefore, Turkey is one of the countries with the most appropriate features of developing countries.

In January 2018, the European Commission adopted a monitoring framework for CE, which aims to assess progress towards CE in the EU. Currently, there are more national and private sector initiatives that seek to achieve circularity in a given economic context. Circular measurements can be classified into two types. These are activity-based or product-based tools for businesses instruments and national instruments at the macro level (European Commission, 2019). In this study, based on the national

macro-level metrics to measure the circularity of Turkey's economy a monitoring framework for the circular economy guide is used. 10 indicators grouped according to the 4 stages of CE: production and consumption, waste management, secondary raw materials and competitiveness and innovation. These indicators show progress towards the circular economy in the EU and its member states. As Turkey is a candidate country for EU membership, this is the most appropriate metric for this country. Table 1 shows the CE indicators identified by the European Commission.

The research team discussed the CE indicators in Table 1 on the EU and Turkey as follows.

1. Self-Sufficiency for Raw Materials

This metric emphasizes that a country should be self-sufficient in the procurement of raw materials in production processes. But when Turkey's foreign trade structure is analyzed, it appears that the structure dependent on foreign production. In 2017, approximately USD 233.8 billion of imports was made from oil and mineral fuels of USD 37.2 billion (Global Edge, 2017). This shows that the country with insufficient oil resources is not in the process of a comprehensive transformation of renewable energy sources. In 2017, only 10.5% of the total electricity consumption was covered by renewable energy (Uğurlu & Gokcol, 2017). This share is 17% in the EU. It is targeted to be 20% in 2020 (European Commission, 2016). Turkey is unable to use this potential to quite harm the country's economy although extremely convenient in terms of renewable energy sources such as sun, wind and geothermal energy. However, intermediate goods and raw materials consists of import structure, production processes and supply security of Turkey. This appears to be a major risk for Turkey.

2. Green Public Procurement (GPP)

Turkey's government has been authorized to purchase the Public Procurement Board does not have any agenda about buying "*green"*. In addition, the Public Procurement Law did not make any legislative arrangements regarding green purchasing. In this context, it can be stated that "*green"* is not on the agenda in the commercial relations of the state. (Turkey Public Procurement Law, 2019). This situation constitutes a major obstacle to Turkey's transition to circular economy. Because the state should be a role model for the private sector and households with the necessary legal arrangements and green practices. In this way, expected consciousness and positive behavior changes can be created in the society. However, the green public procurement policy of the public sector is dealt with in the European Commission. To be effective on the economic structure, the public procurement process needs to include clear and verifiable environmental criteria for products and services. The European Commission and many European countries have developed a guideline in this area in the form of national GPP criteria. Thus, the consideration of the issue by more public sector organizations supports GPP to become a common practice. It is extremely difficult to ensure that the green procurement requirements in the public sector are harmonized among EU member states. Therefore, the GPP strategy will accelerate the formation of a single market in the EU for environmentally friendly goods and services, and thus will have common practices in the transition process to the circular economy.

Table 1. Indicators on the circular economy included in the monitoring framework

No	Name	Relevance	EU Levers (Examples)
Production and consumption			
1	EU self-sufficiency for raw materials	The circular economy should help to address the supply risks for raw materials, in particular critical raw materials.	Raw Materials Initiative; Resource Efficiency Roadmap
2	Green public procurement*	Public procurement accounts for a large share of consumption and can drive the circular economy.	Public Procurement Strategy; EU support schemes and voluntary criteria for green public procurement
3	Waste generation	In a circular economy waste generation is minimised.	Waste Framework Directive; directives on specific waste streams; Strategy for Plastics
4	Food waste*	Discarding food has negative environmental, climate and economic impacts.	General Food Law Regulation; Waste Framework Directive; various initiatives (e.g. Platform on Food Losses and Food Waste)
Waste management			
5	Overall recycling rates	Increasing recycling is part of the transition to a circular economy.	Waste Framework Directive
6	Recycling rates for specific waste streams	This reflects the progress in recycling key waste streams.	Waste Framework Directive; Landfill Directive; directives on specific waste streams
Secondary raw materials			
7	Contribution of recycled materials to raw materials demand	In a circular economy, secondary raw materials are commonly used to make new products.	Waste Framework Directive; Ecodesign Directive; EU Ecolabel; REACH; initiative on the interface between chemicals, products and waste policies; Strategy for Plastics; quality standards for secondary raw materials
8	Trade in recyclable raw materials	Trade in recyclables reflects the importance of the internal market and global participation in the circular economy.	Internal Market policy; Waste Shipment Regulation; Trade policy
Competitiveness and innovation			
9	Private investments, jobs and gross value added	This reflects the contribution of the circular economy to the creation of jobs and growth.	Investment Plan for Europe; Structural and Investment Funds; InnovFin; Circular Economy Finance Support Platform; Sustainable Finance Strategy; Green Employment Initiative; New Skills Agenda for Europe; Internal Market policy
10	Patents	Innovative technologies related to the circular economy boost the EU's global competitiveness.	Horizon 2020

**Indicators under development*

Source: (European Commission, 2018a)

3. Waste Generation

In recent years, Turkey has shown significant improvements in waste management. The National Waste Management and Action Plan for 2016-2023 prepared by the Ministry of Environment and Urbanization is evidence of this development (Republic of Turkey Ministry of Environment and Urbanisation, 2019). The National Waste Management and Action Plan (2016-2023) is a document prepared in line with both the implementation of national legislation and the harmonization with the EU acquis. The current situation of waste management in 81 provinces has been analyzed. In this way, it is aimed to collect the wastes separately at the source according to their types, to recycle them, to recover them by different methods and to reveal the disposal methods. At the same time, it is aimed to determine the sustainable waste management strategies throughout the country by recycling the wastes with the economy in order to prevent the rapid consumption of natural resources (National Waste Management and Action Plan, 2016).

EU average amount of waste produced by a person is more than the average amount of waste produced by a person in Turkey. However, more total waste is produced as the population is higher than some of the EU countries. Domestic waste constitutes 42.8% of total waste in Turkey. After domestic wastes, the energy sector produces the most waste. There is no official data on the amount of waste generated by manufacturing, construction and demolition. With the urban transformation and the increase of urbanization, a lot of construction and demolition waste is formed. These wastes are usually stored in an uncontrolled manner and therefore cannot have a clear knowledge of the amount of waste generated. There are also serious problems in waste of Turkey. For example, a total of 8,612,000 tons of plastic is consumed annually in the country. Approximately 1,800,000 tons of plastic packaging is marketed every year, and only 384,000 tons are collected back. Data show that the process of collecting and recycling plastic wastes is not effective (TMMOB, 2018). Plastic wastes accumulate in soil, rivers, seas and threaten human health and harm ecosystem (Chamber of Environmental Engineers, 2018). Reports and applications issued by the authorities reveals Turkey's waste management processes is insufficient for the transition to CE.

In the EU, 911 million tons of waste were produced in 2016, except for large mineral wastes equivalent to 36% of total wastes. In terms of population size, an average of 1.8 tonnes of waste was produced per capita, excluding the main mineral wastes in 2016. There is a development in the EU for two main categories of waste treatment, namely recovery and disposal. The waste collected for the purpose of recycling or energy recovery for the collected wastes increased by 28.6% from 960 million tons in 2004 to 1,235 million tons in 2016. As a result, the share of such a recovery in total waste treatment rose from 45.4% in 2004 to 53.5% in 2016. At the same time, the amount of waste disposed of in 2004 decreased from 1,154 million tons to 1,074 million tons in 2016 and decreased by 7%. The share of waste in total waste treatment decreased from 54.6% in 2004 to 46.5% in 2016 (EU Waste Generation, 2016). It can be said that the EU also has a long way to go relative to the CE for waste management

4. Food Waste

Food waste, considered as solid waste, has now become a global problem. Food waste directly threatens the environmental and social and economic sustainability. For this reason, food waste has become one of the most important issues in recent years. In this context National Recycling Strategy Certificate and Action Plan 2014-2017 by the Ministry of Sciences, Industry and Technology has been prepared Turkey in 2014. In this report, data on food waste are not included and no policy has been identified for the

occurrence or recycling of these wastes. Reliable and updated data base regarding food waste is not in Turkey. There is also no strategy for the evaluation of these wastes.

In 2016 the European Commission issued a report on food waste called Fusions. According to this report, approximately 143 million Euro and 88 million tons of food waste are produced annually in the EU (European Commission, 2016b). The policies proposed by the commission to reduce this amount of waste are as follows: (1) to support the fight against climate change (food waste only accounts for about 8% of Global Greenhouse Gas Emissions); (2) helping to eliminate hunger and malnutrition by saving nutritious food and redistributing it to those in need (about 43 million people in the EU cannot eat healthy every day); and (3) to save money for farmers, businesses and households. All actors in the food chain play an important role in the prevention and reduction of food waste, from those who produce food (farmers, food producers and processors) to those who consume food (hospitality sector, retailers) (EU Food Waste, 2016). In this context, it appearsis seen that the EU has made efforts to overcome an important stage in the transition stage to the circular economy by taking measures on food waste.

5. Overall Recycling Rates

Turkey lacks recycling policies and implementation of best practices. According to the annual report of Turkey's Oil Industry Association (PETDER, 2017); the lack of awareness in the society hampers the achievement of targeted results despite legal regulations on recycling processes. For example, 644,424 tons of mineral oil was consumed in the country in 2017. In the same year, 19,996 tons of these oils were collected as waste mineral oil. As is known, waste mineral oils are extremely dangerous for a sustainable environment. For example, 1 liter of waste engine oil makes 1 million liters of drinking water insufficient. At the same time, 0.625 liters of base oil can be produced from 1 liter of waste engine oil or 9,500 – 10,000 kg of calories can be supplied (PETDER, 2017). According to data from the Statistics Institute of Turkey, only 3,092 tons of the total 31,584 thousand tons of waste in 2016 was subjected to recycling processes (TÜİK, 2019b). There are no official data on 2017 and 2018. The most recent data available shows that about 10% of waste recycled in Turkey. EU average in this regard is 41.2% for 2016 (Eurostat, 2019a).

These rates are far from the 100% recycle and zero-waste target of CE. In the report titled "Report From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee of The Regions" published by the European Commission in September 2018, it aims to increase this ratio to 50% by 2020. The Waste Framework Directive prepared by the Commission has recently been revised to include new and more ambitious targets. These targets were determined as 55% in 2025, 60% in 2030 and 65% in 2035 (European Commission, 2019). Although it may be difficult for some member states to achieve these goals, The European Commission remains committed to the transition to a circular economy.

6. Recycling Rates for Specific Waste Streams

Waste Framework Directive in the context of special waste explosive, oxidizing, highly flammable, irritant, harmful, toxic, carcinogenic, corrosive, infectious etc. wastes with effects are evaluated. Preventing and recycling these special wastes requires special policies and special laws to be produced and implemented. According to the Directive, member states should ensure that the development of waste legislation and policy is a fully transparent process by observing the existing national rules on

consultation and participation of citizens and stakeholders. However, member states should consider the general environmental protection principles of sustainability, and consider its technical and economic practicability, its impact on the general environment and society (Directive 2008/98/EC of The European Parliament and of the Council, 2008). Hazardous waste management is subject to special obligations. (such as labeling, controls, mixing, and prohibitions on shiping to non-OECD countries). Eurostat data for the EU28 in 2012 show that 3.3% of all waste categories are hazardous.

Wastes which are explosive, flammable, flammable, produce flammable gas, cause oxidation, cause corrosive, acute and / or chronic intoxication, cause infection and produce toxic gas, and have one or more of the properties of producing ecotoxic and liquid extraction; they are defined as hazardous waste in Turkish Hazardous Waste Control Regulation (Erdem, 2006). One of the main problems occur with industrial activities in Turkey are discarded or uncontrolled hazardous waste discharged illegally. Another problem is the habit of mixing waste water with municipal waste in landfills. To solve these problems, a web-based system called Hazardous Waste Reporting System (HWDS) was established in 2005 by the Ministry of Environment and Forestry. With this notification system, all types and of hazardous waste can be seen in geographical regions. Thus, the recommended control methods for hazardous waste can be managed more easily, economically and quickly. However, the capacity of the disposal and recycling facilities is not sufficient for waste produced by the country's industry which is over 2.5 million tons per year (Akkoyunlu *et al.,* 2017). In this context, it is seen that the CE has an application level that is far from the zero hazardous waste target.

7. Contribution of Recycled Materials to Raw Materials Demand

This indicator measures how much of the entry into the production system for a given raw material is due to scrap recycling from old scrap or end-of-life products. Accelerating technological innovation and rapid growth of emerging economies have led to increased global demand for metals and minerals. Ensuring stable access to a large number of raw materials, including many critical raw materials, has become a major requirement for national and regional economies, such as the EU economy, which has to import many minerals and metals needed by the industry. In 2008, the EU launched the European Raw Material Initiative to eliminate the growing concern of securing valuable raw materials for its industry. This is an integrated strategy that takes measures to secure and improve access to raw materials for the EU. The purpose of this strategy is (1) to provide a fair and sustainable supply of raw materials from international markets; (2) To strengthen the sustainable supply within the EU; and (3) To promote recycling to improve resource efficiency (European Commission, 2017).

In spite of increasing rates of recycling in the EU, 12% of the material resources used in the EU in 2016 came from recycled products and recycled materials. This indicator, called circular material utilization rate, measures the contribution of recycled materials relative to total demand. Indicator rates are lower than the recycling rates that measure the share of recycled wastes. Some types of materials, such as fossil fuels consumed as energy or biomass used for food or feed, cannot be recycled (Eurostat–Newsrelease, 2019). However, 12% is still far from the goal of CE.

A circular economy aims at minimizing waste generation by restoring products to the production cycle at the end of use, and preserving the value of products, materials and resources as long as possible (Eurostat–Newsrelease, 2019). Turkey is just up the road and has not developed a national policy in this regard. Scrap dealers and in recent years the ever-growing ship dismantlers are in the metal recycling area. Turkey's largest shipbreaking facility with approximately 50% of the arriving ships for dismantling

in Aliaga, mainly comes from the Syria, Lebanon, Egypt and Libya as Middle East and North African countries. However, there are no official data on the recycling of plastic and electronic goods in the country. Therefore, the process of producing raw materials from recycling, which is one of the most critical indicators of the CE, has unfortunately not reached the desired level.

8. Trade in Recyclable Raw Materials

Recycled materials in the circular economy can be reintroduced into the economy as new substances or products. However, some countries do not have the capacity to deal with such wastes and to export most of their recyclable waste to other countries. Since 2004, the import of recyclable wastes from non-EU countries has decreased significantly and reached 5.9 million tons in 2018. (9.1 million tons or -35% compared to 2004). In 2018, the value of recyclable raw materials imported from non-EU countries amounted to EUR 9.2 billion. On the other hand, exports of recyclable raw materials from the EU to non-EU countries reached 36.8 million tons in 2018, up 69% from the end of 2004. This figure was 14 billion Euro in 2018. However, Turkey and China, are the main destinations for the export of recyclable materials. Since 2004, recyclable waste exports to the EU and to Turkey increased by about three times in 2018 and reached around 12.8 million tonnes. Meanwhile, the EU's exports of recyclable waste to China fell by half from its peak figure of 12.4 million tonnes in 2012 to 5.1 million tonnes in 2018. At the same time, the EU receives recyclable wastes from non-EU countries. Imports of the largest recyclable raw materials were realized as 1.6 million tons from China in 2018 (Eurostat, 2019b).

In Turkey, 95% of household waste is a significant part of the body being more buried; it is a strategic raw material for many sectors. A significant portion of the remaining wastes are energy recoverable. On the other hand; More than 7% of the energy and raw materials used are imported by Turkey. This is a proof of external dependence on production. These wastes should be evaluated and urgent losses prevented (Türktay, 2019). Turkey is located in the waste trade importers. The Organization for Economic Cooperation and Development (OECD) has established data for 2015 on the collection of garbage in Turkey and shows that only 1% of the conversion done. According to the data collected by the Turkey Statistical Institute (TSI) in 2016, of the 31 million tonnes of waste generated only 9.8 perent were sent to s waste recycling plants (Euronews, 2018). Turkey is forced to import waste for recycling their own waste and that the assessment is not sufficient. Therefore, no waste exports are in question.

9. Private İnvestments, Jobs and Gross Value Added

More than 3.9 million jobs have been created in the EU in CE. Despite the economic and financial crisis, CE sectors increased by 6.1% compared to 2012 and created an added value of around 141 billion Euros in 2014. There are also several EU funding programs available to support the transition to the cyclical economy, such as the European Strategic Investment Fund, European Structural and Investment Funds, Horizon 2020 and LIFE program. In addition, the Circular Economy Financing Support Platform was launched in January 2017 (European Commission, 2018a). However, private sector investment in the CE has reached 17 billion Euros (Eurostat, 2019c).

You recycling market in Turkey finds the average economic value of 3.5 billion euros. The amount of investment in this area is expected to be around 7 to 9 billion Euros in the coming years. Especially the big holdings are oriented towards this area. Subject matter experts small and medium-sized enterprises (SMEs) are also involved in this process. Enterprises investing large amounts in recycling activities

expand their investments as they see the results of these investments. It is not just a field of activity that provides the recycling industry with raw materials and helps in the protection of nature. Thousands of people work in this sector, collecting wastes called rubbish, glass, pet bottles or waste paper, scrap metals and their subsistence trade. In this context, recycling plants in Turkey is also very useful in terms of creating new jobs. It provides employment to 60 thousand people in the recycling facilities established within the scope of the efforts aimed at contributing to the employment by not recycling the wastes and reintroducing the wastes (Ministry of Environment and Urbanization of Turkey, 2019). The Ministry expects this number to reach 70 thousand by the end of 2019.

10. Patents

Since circular economy is mainly based on research and innovation, two indicators are frequently used in this field. These indicators are the percentage of GDP in research and development expenditure (R&D) and the number of patents per 1 million people is related to recycling and secondary raw materials (Vuță *et al.,* 2018). According to Eurostat 2014 data, the number of patents related to recycling and secondary raw materials is 338. The number of patents per 1 million inhabitants is 0.67 (Eurostat, 2019d). In Turkey, there is no recycling and secondary raw materials with a patent application related issues. CE's current status is shown by EU28 and Turkey in Table 2.

An honest practice of CE depends on the existence of policies. For this reason, the state, businesses and civil society should produce CE policies and the implementation of these policies should be ensured by legal regulation. However, due to the imperative policies, CE related data can be produced. The current state of the countries can be measured through the data produced. Progress can only be achieved in this way. Something that cannot be measured is unmanageable. In this context, the European Commission's implementation steps in CE are of utmost importance. These CE indicators are a guide for countries, companies and the community. Through these indicators, it became clear in which context the policies should be produced. This development is twofold. As data are generated with these indicators; policy

Table 2. EU28's and Turkey's Circular Economy Status

Indicator	EU28	Turkey	Circular Economy
EU self-sufficiency for raw materials	C	D	A
Green public procurement	C	D	A
Waste generation	B	C	A
Food waste	B	D	A
Overall recycling rates	B	C	A
Recycling rates for specific waste streams	B	B	A
Contribution of recycled materials to raw materials demand	B	D	A
Trade in recyclable raw materials	B	C	A
Private investments, jobs and gross value added	B	C	A
Patents	B	D	A

A: Policy and data. High implementation	**B:** Policy and data. Low implementation.	**C:** Policy established but no data. Low implementation.	**D:** No policy and data.

making will be easier and policy will make it more official data. Thus, managing and improving CE processes will be faster and easier. In Table 2, it is seen that EU28 has policy and data for 8 indicators. On 2 indicators, it has a policy but does not have any data.

Turkey is just up the road. There are no policies or data on the 5 CE indicator. It has a policy of 4 indicators. In terms of 1 indicator, it has both policy and data. EU28 and Turkey have low implementation level for indicators with policy and data.

CONCLUSION

CE is theoretically seen as a prescription of liberation from the extinction of the world. For this reason, the CE model has started to be discussed in academic literature and civil society in recent years. As a result of these discussions, the Commission of the European Union declared the CE framework indicators in 2018. These indicators made the process more objective. Now, for countries that want to convert CE, the guideline is clear. EU28 has a policy and has current data in 8 indicators including waste generation, food waste, overall recycling rates, recycling rates for specific waste streams, contribution of recycled materials to raw materials demand, trade in recyclable raw materials, private investments, jobs and gross value added and patents. In the green public procurement and self-sufficiency category for raw materials indicators, the policy is formed but does not yet have a data set. When the EU is evaluated according to this guideline, it is progressing day by day in policy making and data collection. The implementation level is not yet at the desired level. However, the numerical objectives set out demonstrate the commitment of the EU28.

When the issue is examined in the context of developing countries, Turkey is an appropriate example. Turkey and the EU candidate countries, as well as the world's 20th largest economy. The country's industrialization and economic growth motivation show that it neglects CE processes. CE is not on the agenda of the business world, government and society. 5 of the EU Commission's CE indicators have not been evaluated yet. The policy was created in 4 indicators. In the 1 indicator, both policy and data are collected. In addition, research CE is regarded in much of civil society in Turkey, it reveals that the business world and academia to not show enough interest in the issue.

However, if developing countries establish their economies according to the principles of CE from the outset, the earth becomes a more livable place. It is necessary to develop social awareness. The conscious society changes the patterns of consumption and presses companies and public institutions in this way. Subsequent policy formations can lead to legal regulations. This ensures that relevant records are kept so that the way to progress is opened.

According to OECD in order to cope with the increasing environmental pressures Turkey must accelerate the transition to green growth. Turkey has strengthened the institutional framework in order to cope with environmental problems. In addition, it has updated the environmental legislation to a great extent and made it closer to European Union criteria. However, the important strategic tools, such as environmental assessment and integrated permits, must be fully implemented and monitoring should be strengthened further. Further progress is being made to improve access to environmental information (OECD, 2019).

In this study, Turkey demonstrated that it should develop the policy on the indicators of self-sufficiency for raw materials, green public procurement, food waste, contribution of recycled materials to raw materials demand, patents. It also has a policy on overall recycling rates, waste generation, trade in

recyclable raw materials, private investments, jobs and gross value added indicators but it has no data yet. Lastly, the data is also available in the recycling rates for specific waste streams indicator as it has the policy. But even the indicators with policy are far from the ideal CE level. Therefore, the CE issue should be taken specifically in the context of developing countries. The sources of inadequacy should be identified and the revise process should be started by all economic actors quickly.

RECOMMENDATIONS FOR FUTURE RESEARCH

This research gives to answer the question of how to measure the circular economy. The measurement indicators related to this issue became clear by EU Commission in 2018. However, official data on these criteria are more recent. Therefore, it is very difficult to perform a quantitative analysis. All of the analyzes in the literature are based on different indicators. This situation constitutes the limit of the study. In addition, the study pointed out the current situation of developing countries regarding CE. Future research may develop a framework for circular economy maturity levels. It is also expected that the indicators data will be published regularly in the following years. Thus, further researches on quantitative and comparative analysis can be realized.

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Chapter 15
Developments on Sustainable Finance:
A Growth Opportunity for Global Economy

Seda Süer
Izmir Katip Çelebi University, Turkey

ABSTRACT

Worldwide, the growing impetus towards sustainable finance is aroused by the maturation and the destructive effects of carbon markets in the form of severe weather, floods, and forest fires. It is widely acknowledged that supporting the transition to a low-carbon, green, and sustainable economy needs forefront of efforts to build a financial system. Given the provisions of sustainable finance, the policies that regulate the transition to green economy includes environmental social and corporate governance criteria. Sustainable finance is a type of financing that takes into account environmental, social, and corporate governance issues in providing finance to investors. Therefore, this chapter aims to highlight the importance of sustainable finance providing a growth opportunity to the global economy. Thus, the developments on sustainable finance constitute a strong potential that supports economic growth globally.

INTRODUCTION

Acknowledging the fact that global warming or climate change is due to the industrial growth because of the increase in greenhouse gases concentration which is a devastating problem involving the entire world as an environmental issue. Since the late 1800s, the average temperature of the world's surface has been rising and the fundamental reason for the increasing temperature is industrialization during the last 150 years leading to the burning of greater quantities of fossil fuels and the cutting of forests. These activities have increased the amount of greenhouse gases in the atmosphere (Gupta, 2016). During the maturation and broadening of carbon markets in the form of severe weather, floods, and forest fires, a growing awareness of prominent devastation to the world economy in the form of climate change is realized. Reducing global carbon dioxide emissions is a critical challenge for the world economy, requires a transition from the traditional fossil-fuel based-economy into a low-carbon economy mitigating greenhouse

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gas and other polluting emissions, through technological and business innovations (Galharret & Wang, 2011). Understanding the resources of the world is exhausting and it is seen that people, institutions and organizations who are aware of this issue in an increasing population are trying to find solutions to this severe issue. The issue is undeniably prominent today and there is a need for rapid implementation of measures and action plans involving all people for humanity (Sonuç, 2014).

Today facing global warming, loss of biodiversity, rapid depletion and contamination, hunger, poverty, discrimination, human rights violations, and corruption are the major problems for humanity is in quest of a new order now. Covington (2017) highlighted the transition to a low-carbon economy, decarbonization, would shift the economic balance of some countries and change the business models of several industries causing a swift change in the energy mix of the world economy that would disrupt many economic sectors. Furthermore, the transition to the green economy means conversion (evolution) from the existing financial models towards one based on increased social and environmental responsibility (Ryszawska, 2017). Additionally, an important part of this transition is how to engage the financial system, in particular, towards a low-carbon economy (Batten et al., 2016). According to this transition, new concepts of finance have emerged in public debate such as green finance, sustainable finance, climate finance, carbon finance. The new approach of finance is purpose-oriented, mission-oriented, and value-oriented which is opposite to the traditional role of finance. The role of finance is changing from the dominant view which focuses on maximizing profits and shareholders wealth towards one supporting sustainable development, green economy, low-carbon economy and mitigation of climate change (Ryszawska, 2017). Given the circumstances, the transition, to be credible, requires full engagement of the financial system. Since its importance is recognized and to endorse the transition, sustainable finance is considered the key to this transition (Esposito et al., 2019).

First and foremost, the idea of sustainable finance is gaining attraction with the idea of financing investments that take into account environmental, social and governance considerations. The importance of sustainable finance will continue to increase with shifting market forces and societal expectations, the proliferation of policies and initiatives designed to accelerate the low-carbon economic transition, technological advances, and other innovation. Sustainable finance facilitates and creates values, and transacts financial assets providing real wealth for the long-term needs of an environmentally sustainable economy. A sustainable financial system plays three key roles to enable transition to a low-carbon, climate-resilient economy: first, it effectively recognizes the costs and risks of high-carbon and resource-intensive assets; second, it allocates sufficient attractively priced capital to low-carbon, resource-efficient assets; and third, it ensures that financial institutions and consumers are resilient to climate shocks, including natural disasters (Bem et al., 2017).

Sustainable finance is considered as finance supporting sustainable development in three combined dimensions: economic, environmental, social and corporate governance. The fundamental purpose of a sustainable financial system is to serve the economy and wider society to ensure that environmental, social and governance (ESG) factors are at the heart of financial decision-making. Society and economy expect that finance aligns themselves to environmental, social and corporate governance transition. The environmental transition needs money for mitigation and adaptation to climate change, protection of ecosystems and biodiversity. Redistribution of financial resources is necessary for social transition such as reducing poverty and inequalities. (Ryszawska, 2017). Eventually, the last dimension entails corporate governance practices that embrace transparency, equality, and accountability to all the company's stakeholders.

Henceforward, the main objective for companies which was profit maximization is left behind. The aim of the companies in the new world order it is expected to make a profit, establishing a "win-win" relationship in which it can be parallel to social interests. That is, companies are now not only responsible for company partners, but also all its stakeholders. In today's conditions companies which are only focusing on economic sustainability and investing in the future without evaluating the benefits of its stakeholders and ignoring environmental, social and corporate governance risks, will not be able to protect or enhance its competitiveness. Today, stakeholders expect companies to be a responsible legal citizen and require more information and transparency on how they create value. When the growth trends are examined on a sectoral basis, wind energy in the energy sector, eco-tourism in the tourism sector, socially responsible investments in investments area and organic farming in agriculture are the fastest growing area in the sector in the world. Thus, the aim of the chapter is to investigate the growth opportunities provided by sustainable finance that creates value for the global economy (BIST, 2019).

BACKGROUND

The Scope of Sustainable Finance

Today's society needs the financial system to move the global economy toward sustainable development. A global consensus has arisen that sustainable growth will be one of the greatest challenges of this century (TFI, 2018). The current period witnesses that companies just only producing and selling goods and services is not sufficient to obtain financial success, at the same time they should be environmental and human sensitive corporate citizens and it is expected to adopt the principles of good corporate governance for the global transition process. This is the concept of sustainability as a reflection of the process recently companies and often on the agenda of investors that is located. Concepts such as corporate sustainability, corporate social responsibility, responsible investment hold a prominent place in the agenda of governments, business circles, civil society organizations and academics in recent years. Awareness of being responsible for just not against this generation also to the future generations is accepted in all segments of society. The fulfillment of responsibilities towards future generations and making the world more livable will be possible only with the understanding of protecting the environment and the quality of life of people. Therefore, for sustainable development now the environmental, social and corporate governance dimensions need to be taken into account that mandates long-term approaches. Short-term and only profit-oriented approaches are unsustainable in the long-term and society also react to such approaches are explicit. For all these reasons environmental, social and governance factors should be acted as a whole in the management of the company adopting corporate sustainability approach, the risks associated with these factors and the opportunities should be effectively managed by replacing the classic business models (BIST, 2019). As in previous structural transformations, the financial system needs to play a major role in this process, the full potential of the financial system needs to be harnessed to serve as an engine in the global economy's transition toward sustainable development (TFI, 2018).

Sustainable finance is a broader and newer concept whose meaning is still evolving. Sustainable finance is the term used to define financial flows, public and private, that are allocated in a way that simultaneously promotes economic growth, social inclusion and environmental stewardship (TFI, 2018). Converging on a definition of sustainable finance can be facilitated by understanding related concepts, including some that are developed before the idea of sustainable finance began to be used. Further

Table 1. Selected Definitions of Sustainable Finance

Definition	Source
Sustainable finance is a term mainly used as financial capital and risk management products and services which are provided in ways that promote or do not harm economic prosperity, the environment, and social well-being.	PwC 2008
A sustainable financial system is one that creates, values and transacts financial assets in ways that shape real wealth to serve the long-term needs of an inclusive, environmentally sustainable economy.	The UN Environment Inquiry Report: The Financial System We Need (UN Environment Inquiry 2015)
Financial flows—public or private—that are allocated in a way that simultaneously promotes sustainable development, including its economic, social and environmental imperatives.	Homi Kharas and John McArthur – Brookings Institution (Kharas and McArthur 2016)
Sustainable finance refers to any form of financial service integrating environmental, social and governance (ESG) criteria into the business or investment decisions for the lasting benefit of both clients and society at large.	Swiss Sustainable Finance Initiative (as defined in the glossary presented in http://www.sustainablefinance.ch/)
Three definitions (from narrow to broad): 1. Integrating ESG factors in financial decisions; 2. Finance fostering sustainable economic, social and environmental development; 3. A financial system that is stable and tackles long-term education, economic, social, environmental issues, including sustainable employment, retirement financing, technological innovation, infrastructure construction, and climate change mitigation.	EU High-Level Expert Group on Sustainable Finance. Interim Report, July 2017 (EC HLEG 2017)
Sustainable finance in Indonesia is defined as comprehensive support from the financial service industry to achieve sustainable development resulted from a harmonious relationship between economic, social and environmental interests.	Indonesian Financial Authority Roadmap for Sustainable Finance in Indonesia 2015–2019 (OJK 2014)

Source: Adopted from UN Environment Inquiry 2017

clarification of the meaning of sustainable finance can be obtained by defining a subset of sustainable finance; these definitions sometimes, erroneously, are used interchangeably. Sustainable finance supports investments across a broad set of sectors that are required to build an inclusive economically, socially, and environmentally sustainable world (UN Environment Inquiry, 2017). Sustainable finance can be understood as a broad concept defined by the use given to resources raised and allocated. The definition of sustainable finance and concepts such as climate and green finance refer to the use given to financial resources. It is important to differentiate climate financing from the term green financing, which, in addition to climate, includes other areas necessary to support environmental sustainability, including biodiversity and other resources conservation. Furthermore, the term green financing is increasingly associated with financial flows from private institutions (UN Environment Inquiry, 2017). Table 1 presents a selection of definitions used by different organizations.

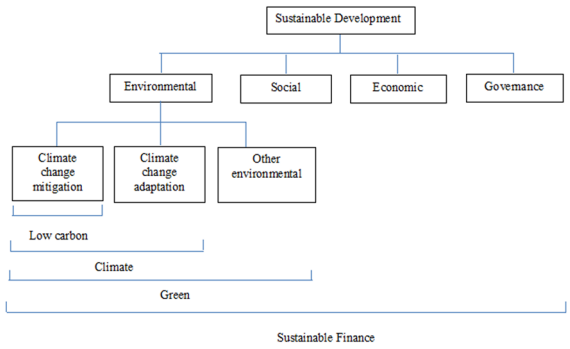
The Factors of Sustainable Finance

Beyond economic performance, environmental, social and corporate governance factors are determined as company valuation criteria for the investors while selecting companies in advance of making investment decisions. In this new era, it is barely possible for companies to operate independently of its stakeholders' interests and benefits, therefore the company value should be determined by reflecting social interest according to different criteria. Company valuation criteria including environmental, social and governance performances and the achievements in managing opportunities and risks associated with these dimensions are valuable assessments for the investors while making investment decisions. Sustainability concept coming into prominence and investors consider sustainability factors at the time

of company selection. Additionally, capital market regulators and stock markets carefully bent on the factors of sustainable finance that the companies and the investors take various initiatives to spread awareness of sustainability for society (BIST, 2019). Thus, the financial system is already transitioning to create value, and transacts financial assets in ways that shape real wealth to serve the long-term needs of a sustainable and inclusive economy along all dimensions relevant to achieving those needs, including economic, social, and environmental issues; sustainable employment; education; retirement financing; technological innovation; resilient infrastructure construction; and climate change mitigation and adaptation. Shifting to a sustainable financial system does not just comprise a change in the traditional functions of the financial sector. Rather, these functions can be realigned toward sustainable goals to ensure the growth of a more inclusive and sound financial sector, one that intermediates resources, enables payments, and facilitates risk management with increased efficiency and effectiveness (UN Environment Inquiry, 2017). Thus, sustainable finance embraces economic, environmental, social and corporate governance factors depicted in Figure 1.

Sustainable finance refers to any form of financial service integrating environmental, social and corporate governance criteria into the business or investment decisions for the lasting benefit of both clients and society at large. Thus, sustainable finance is a new era that considers environmental, social and corporate governance (ESG) criteria to generate long-term competitive financial returns and positive societal impact. From the 1990s onward, a broader set of investors sought to use environmental, social, and corporate governance criteria to select investments (Knoll, 2002). This type of "new financing" is generally known for ESG criteria, a concept that is defined as "an approach to investing that aims to incorporate ESG factors into investment decisions, to better manage risk and generate sustainable, long-term returns (UN Environment Inquiry, 2017). Therefore, the scope of sustainable finance highlights the links between environmental, social and corporate governance aspects. The providers of sustainable finance products would be wise to take into consideration that these factors are not three separate issues, but rather to admit the links between them. By adopting this 'three-dimensional' aspect, the financial institutions and other suppliers of financial products are building on the bridge of sustainable finance (Bouma et al., 2001). Sustainable finance also means that investors will seek out and be overweight in firms which are eco-efficient and gain competitive advantages through good environmental and social practices and corporate governance (Joly, 1999). A subset of institutional investors emerged seeking

Figure 1. Factors of sustainable finance



Source: Adopted from European Commission, 2018.

a sustainable finance approach that used a negative list screening approach to exclude investments in certain companies facilitating carbon or fossil-fuel-based production.

Environmental, social, and corporate governance (ESG) are the criteria that altogether establish the framework for assessing the impact of the sustainability and ethical practices of a company on its financial performance and operations. Initially, the ESG framework was only used by impact investors to determine if they were suitable investments. Nowadays, the framework gains more recognition among all types of investors because of the greater attention of governments and regulators to such factors, and a stronger public awareness of the environmental and social influence of companies. The majority of the big publicly traded companies publish reports about their ESG initiatives. ESG factors can significantly impact the company's financial performance. For instance, Volkswagen's emission's scandal in 2015 cost the company $7 billion to cover the costs and more than $4 billion in penalties. Besides, the company's stock experienced dramatic declines throughout the scandal. Nevertheless, environmental, social, and governance criteria are a very subjective and accurate assessment of the factors can be extremely challenging (Corporate Finance Institute, 2019).

Environmental Factor

The environmental factor is primarily concerned with the company's influence on the environment and its ability to mitigate various risks that could harm the environment. Generally, a company is assessed by its use of energy, waste generation, level of the pollution produced, utilization of the resources, and treatment of animals. The company's environmental policies and its ability to mitigate environmental risks may directly influence its financial performance. More governments around the world introduce strict environmental policies and the company's inability to comply with the standards may result in significant penalties. Besides, the company's irresponsible environmental policy may damage the areas of the operations and subsequently limit the company's operational capacity (Corporate Finance Institute, 2019).

Social Factor

The social factor investigates the company's relationships with other businesses and communities. Social factor considers the attitudes towards human rights, income distribution, diversity, employment abuse, staff rotation health and safety at the workplace, product safety, and consumer protection. The social factor may affect the company's operational success by attracting new customers and retaining their loyalty, and maintaining relationships with business partners and communities affected by the company's operations (Corporate Finance Institute, 2019).

Corporate Governance

Corporate governance is an important pillar of being a sustainable company. High corporate governance quality means low capital cost, increased financing and liquidity, easier to overcome the crises, and extending the life of well-managed companies (BIST, 2019). Corporate governance is concerned with the internal company's affairs and the relationships with the main company's stakeholders, including its employees and the shareholders. Governance issues can relate to trends in fraud and corruption, government involvement and the impact on the management of the company, the independence of the board of

directors, the remuneration of the leaders, and anti-competitive practices (Equitis Gestion, 2019). The proper and transparent corporate governance can help avoid conflicts of interest between the company's stakeholders, and potentially huge litigation expenses. Besides, corporate governance is directly linked to the company's long-term success as proper governance policies can help to attract and retain talented employees (Corporate Finance Institute, 2019).

The Transition Toward Sustainable Finance

From the development of industrialization and international trade starting in late 18th century Britain to the massive industrial and infrastructure growth in East Asia in the last 50 years, the financial system has been fundamental to facilitating the structural transformation of economies. Today's society needs the financial system to help move the global economy toward sustainable development. A global consensus has arisen that sustainable growth will be one of the greatest challenges of the 21st century along with the measures to combat climate change and adapt to its. As the previous structural transitions, the financial system needs to play a major role in this process as the financial system serves as an engine in the global economy's transition toward sustainable development. Already, the financial system is in the transition to create, value, and transact financial assets in ways that shape real wealth to meet the long-term needs of an inclusive and more sustainable economy (UN Environment Inquiry, 2015, 2016).

As sustainability considerations are transforming the real economy, and the financial sector is evolving to respond to that reality which is called sustainable finance. More recently financial institutions have started turning to adapt their business models, skills, and incentives to embed sustainability into their core strategies. Financial institutions are realigning existing products as well as creating new ones to match the risk-reward and maturity needs of sustainable investments (UN Environment Inquiry, 2017).

Practitioners are already creating new approaches to building portfolios based on ESG criteria applied to traditional investments, financial instruments and even asset classes emerging from sustainable finance such as ESG-based indexes and benchmarks (Fullwiler, 2015). The process of the transition needs to be accelerated to meet global sustainability demands. To facilitate the transition, the terms are defined to accelerate and strengthen sustainable finance globally:

- **Policy Alignment:** Policy alignment ensures that the international, national, regional, and subnational financial regulators are aligned with long-term sustainable policy goals. Since the financial sector authorities are not involved in developing and executing sustainability policies, the role of the financial sector is to be an integral part of the development and execution of sustainability policies (UN Environment Inquiry, 2017). Leadership in developing new systems and shaping the business contribution to global challenges and willingness to advocate for policy and market incentives is crucial for the financial sector. This term of transition involves actively engaging with governments and policymakers to shape future regulation and systems to become a part of sustainability considerations (UNGC, 2013).
- **Financial Stability:** Financial stability indicates financial system resilience to the environmental and climate-related pressures and other sustainability risks. In the main, only short-term environmental and social risks associated with specific projects are considered as having an impact on sector stability. Increased risk-aversion may occur as the broader long-term sustainability risks begin to be considered, measured, and managed. The transition enables both short- and long-term

sustainability risks are measured, priced, and managed concerning specific financial transactions and systemically (UN Environment Inquiry, 2017).

- **Public Finance Effectiveness:** This term of transition highlights the effective use of scarce public finance to catalyze sustainable finance. Government interventions are temporal with limited measurement of costs/ benefits and scale-up viability. Because of the government interventions, the momentum may be lost behind innovative approaches to sustainability. The best way is to focus on removing barriers to sustainable finance (UN Environment Inquiry, 2017).
- **Principles, Cultures, and Beliefs Aligned to Sustainability:** To facilitate the transition, the financial system is sensitized, responsive to, and rewarded for environmental stewardship and sustainability considerations. Sustainability considerations are absent or limited to niche subsectors in the financial system. As the understanding of the concept behind sustainability increases, companies as a whole is making sufficient efforts to address global sustainability challenges (UNGC, 2013). Incentives across all the financial system and companies will be aligned toward long-term sustainability according to the current transition (UN Environment Inquiry, 2017).
- **Market Integrity:** The transition requires effective transparency and accountability for the measurement, monitoring, and management of sustainability metrics; quantification of business value concerning its impact on sustainability (UNGC, 2013). Multiple disclosure initiatives lacking common standards may damage the credibility of emerging initiatives as disclosure initiatives are undertaken on certain segments only. The transition urges disclosure standards are implemented and integrating sustainability metrics into financial reporting (UN Environment Inquiry, 2017).
- **Technology and Innovation:** One of the most notable characteristics of sustainable finance is a large amount of financial innovation it has catalyzed (Fullwiler, 2015). This term of the transition ensures that innovative financing instruments and business models are aligned to the financial system's purpose. Investing in technology and business model transformation led solutions to sustainability challenges; generating competitive advantage through new technologies and innovative business models (UNGC, 2013). Financial technology (fin-tech) and other mechanisms of financial innovation redefine the relationship among financial sector stakeholders with a focus on sustainable finance (UN Environment Inquiry, 2017).
- **Long-Term Horizon:** This term of the transition emphasize that financing decisions take into account longer-term risks and opportunities associated with the environment and sustainability. In the main, the focus is on short-term sustainability risks. The new sustainable finance model adopts standards to measure and manage long-term sustainability risks and opportunities (UN Environment Inquiry, 2017). The new model engages in scenario planning and business impact modeling by scanning the horizon for future opportunities in understanding and appreciation of the scale of global sustainability challenges (UNGC, 2013).
- **New Information and Capabilities:** This term of the transition ensures the effective flow and use of market-relevant sustainability information. Know-how on sustainability and its implication for the operation of the financial system is limited within the financial sector. Usually, limited market-relevant sustainability information is integrated into the financial system and also disjointed efforts to develop sustainability information and capabilities lead to a mismatch of practices across the financial system. The new model constitutes common information metrics that are used broadly across the financial system and stakeholders have the know-how to incorporate such information into day-to-day operations and long-term strategy formulation (UN Environment Inquiry, 2017).

Ultimately, the success of efforts to effectively integrate sustainability information into financial decision making is significantly influenced by the incentives that shape practice within financial institutions. If information is available, and readily understood by practitioners, transformation is contingent upon the core values, culture, and policies of firms that are motivated by incentive structures. Increased sustainability disclosure in financial markets contributes to helping align incentives across participants in the financial system. The cultural change needed in the transition to sustainable finance also requires an appropriate alignment incentive within financial institutions. This requires incorporating sustainability targets into the usual business key performance indicators to which officers in the institution are held accountable (UN Environment Inquiry, 2017).

Benefits of Sustainable Finance for Companies

Environmental, social and corporate governance criteria become a major concept for companies to achieve sustainability in the context of sustainable finance. Companies who embrace and enact within their sphere of influence, a set of core values of sustainable finance has some benefits. The benefits of sustainable finance for companies also triggers the growth opportunities for the world such as the creation and growth of green bond markets, sustainability indices.

Ensuring Brand Value, Trust, and Reputation

Companies that integrate sustainability into its activities and share with the public transparently, establish a positive impression in the eyes of the society and civil society, increase their reputation and brand values. Reputation, which is one of the most valuable assets of companies, acts as a shield protecting the company in crises. Positive sustainability practices contribute to brand value and reputation, on the other hand, activities of companies which neglect of possible negative social and environmental impacts, irreparably damage the value of the company that is established in years through its brand, trust, and reputation. For instance, a company that manufactures and sells sports equipment worldwide, lost reputation in the eyes of the public as it knowingly continued working the same supplier despite poor working conditions in the supply chain, so the company's share prices were negatively affected. This situation forced the company to take steps to sustainability (BIST, 2019).

Growth and Differentiation

Companies have the opportunity to turn the sustainability into an advantage and value creation process. The research held by United Nations Global Compact (2013) provides clearest insights from the emergence of two perspectives in sustainability, between those companies still reacting to external expectations on sustainability and focusing on incremental mitigation, and those that perceive sustainability through an aspect of growth and differentiation. For leading companies, many CEOs state that the urgency of global challenges provides an opportunity to differentiate their products and services; to access new market segments; and to grow into new regions, countries, and areas where their products can meet a pressing need (UNGC, 2013).

Cost Savings With Increased Profitability

Lower energy consumption due to the environmental dimension of sustainability, improvements such as decreasing waste of raw materials and waste disposal costs, reduces costs, therefore, increases profitability and productivity (BIST, 2019).

Increased Motivation

As companies compete to attract a qualified workforce to employ in this period, companies that have adopted sustainability practices stand out. These companies have more prestige in the eyes of qualified employees. Nowadays, qualified employees have their values and they prefer to work in overlapping companies. This prestige also increases employee loyalty to the company. Human resources policies developed with the understanding of sustainability increases their commitment to the company as well as their motivation (BIST, 2019).

Consumer Demands

Sustainability supports the understanding of consumers' expectations as well as all stakeholders of companies. The research held by the United Nations Global Compact (2013) reveals that sustainability is an important issue for consumers and consumers' expectations from companies are gradually increasing. According to this study, 72% of the participants who are the consumers, expect companies to protect nature. Moreover, consumers now pay attention to the ingredients of the product. Therefore, companies that bend on sustainability during production and other activities, will bring them one step forward in the eyes of consumers. On the other hand, as the awareness of sustainability increases in the consumer side, some products or the raw materials used in their production are labeled as "good" or "bad" and their perception will be shaped according to this. For instance, some companies began not to use PVC (polyvinyl chloride) in their products after PVC has been declared the worst plastic by Greenpeace (UNGC, 2013).

New Business and Innovation Opportunities

Engaging stakeholders in business processes and activities with the understanding of sustainability and receiving feedback from different groups on new products, contribute to exploring new processes and markets. Already the sustainability perspective and seeking creative solutions inevitably engender innovations. Most companies in the world now benefit from the green innovation method to achieve long-term competitiveness such as producing high-energy-saving white goods or hybrid cars just like taking into account the demands of consumers (BIST, 2019).

Effective Risk Management

Companies reduce capital costs by effectively managing risks by quickly adapting to the social conditions and managing the needs of economic, social, environmental and corporate governance. Companies that have integrated sustainability into their business models and manage these risks in a pro-active and effective manner, and thus adapt to changing conditions easier and faster. Companies that make business

plans considering risk factors of social and environmental impacts such as climate change, water, and raw materials scarcity, toxic wastes, depleted coal, oil, natural gas resources, will improve the effectiveness of risk management and provide them one step ahead of other companies (BIST, 2019).

Growth Opportunity for Global Economy

Sustainable finance supports market growth, including policy frameworks and standards that promote the issuance of green financial products (that is, green bonds and securities), the development of new market platforms (that is, crowdfunding and fin-tech), or the competitiveness of financial centers. There is growing evidence that environmental, social and corporate governance based investing outperforms traditional diversified portfolios. Mercer (2011) also found that there are a neutral or positive relationship between environmental, social and corporate governance (ESG) factors and return in 30 of 36 studies. Fulton et al. (2012) reviewed 58 academic studies evaluating ESG-based portfolios and found that ESG factors were strongly associated with a reduced cost of capital. Ghoul et al. (2014) reported that their research found evidence for lower costs of equity among higher ESG-rated firms in manufacturing industries across 30 countries (Fullwiler, 2015). Sustainability considerations are transforming the real economy, and the financial sector is evolving to respond to that reality. The size of the sustainable finance business continues to grow. In part, because the definition of sustainable or green financing is still evolving, there is not yet a global, systematic estimate of the size of this market. Though, some specific estimates do exist for regions and/ or sectors.

Based on the national climate-change commitments and underlying policies of 21 emerging-market economies, representing 48 percent of global emissions, the sectors in each region with the greatest potential for investment is identified from climate-resilient infrastructure in South Asia to clean energy in Africa. Concerning declining costs for renewable energy technologies, successful green building business models, and the emergence of promising developments in climate-smart agriculture, companies, and investors have up to $23 trillion in growth opportunities between 2016 and 2030. Global investment in clean energy is mainstream as a result of massive cost reductions, solar photovoltaic (PV) and wind power which is more than twice the amount invested in coal- and gas-fired power generation, nearly $350 billion. Besides, farmers are investing in more productive, climate-resilient agricultural practices and the green buildings market has doubled every three years for the past decade. International Finance Corporation (IFC), a member of the World Bank Group, is the largest global development institution focused on the private sector in emerging markets, invested more than $15 billion in long-term financing for renewable power, energy efficiency, sustainable agriculture, green buildings and private sector adaptation to climate change, while further mobilizing an additional $10 billion from other entities (IFC, 2016). Especially, in specific sectors, such as renewable energy, investments are expected US$7.4 trillion of global through 2040 (BNEF, 2017). Although these estimates refer to levels of investments, most of these resources are intended to flow through the financial sector as bank lending, project finance, institutional investing, or equity investing (UN Environment Inquiry, 2017).

Financial institutions are realigning existing products as well as creating new ones to match the risk-reward and maturity needs of sustainable investments. In many cases, realigning business activities toward sustainable sectors can be achieved with existing products adapted to the specific needs of new sustainable markets and, to ensure broad acceptability, with an accompanying set of standards that can facilitate origination processes. For instance, in 2016 the European Mortgage Federation, along with the European Covered Bond Council, launched a mortgage financing initiative to support energy efficiency

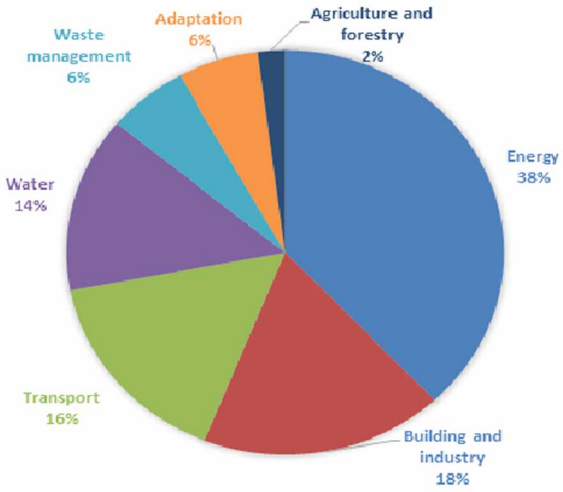
improvements in buildings by creating a standardized approach and market benchmark. Similarly, sustainable finance energy products are built on traditional project finance for renewable energy projects. In the case of retail finance, as there is a critical development because about 20% of global energy consumption goes to residential and business buildings' heating, lighting, and appliances; the financial institutions are offering consumer loans to finance efficient electrical appliances and heating/cooling systems for increased energy efficiency (EIA, 2016). Another case is the insurance industry that there is an increase in climate-related perils has raised the protection gap to US$100 billion per year (ClimateWise, 2016). Insurance companies are playing a double role in the development of sustainable finance products. As institutional investors, they have been crucial in fostering the demand for green bonds as well as other long-term instruments to match their liabilities. They also play a more direct role by creating products to facilitate the management of risks. Although these estimates refer to levels of investments, most of these resources are intended to flow through the financial sector as bank lending, project finance, institutional investing, or equity investing (UN Environment Inquiry, 2017).

In capital markets, the development of green bonds is positioning the need for longer-term financing that is generally required by sustainable projects. Green bonds are now being used to raise funds across multiple sectors and the portions of sectors that use green bonds are depicted in Figure 2. The European Investment Bank was the first issuer of a climate awareness bond in 2007, followed by the World Bank's first labeled green bond in 2008. Since then a market for bonds designated as "green" has emerged. This market was initially dominated by multilateral development banks (MDBs) but has grown significantly since then and now includes a much broader universe of issuers. In 2016, green bond issuances reached US$80 billion, almost double the total issuance of 2015. Green bond issuances of financial institutions registered the highest growth, a seven-fold increase from 2014 to 2015, making up half of the corporate issuance in 2016 and green bond issuances reached to US$155.5 billion with more growth expected in 2017. (UN Environment Inquiry, 2017).

Despite their impressive growth in recent years, green bonds remain a small segment of the overall bond market, which stands at almost US$100 trillion in 2017. The momentum of demand for green bonds is expected to help drive more capital to low-carbon including renewable energy projects. For investors, green bonds can achieve attractive risk-adjusted financial returns along with environmental benefits, in addition to meeting allocations for climate-aligned investment and green investment. Green bonds can also offer a hedge against carbon transition risks in a portfolio that includes emissions-intensive assets. The bonds can also demonstrate and implement an issuer's approach to environmental, social, and governance (ESG) issues and deliver reputational benefits, enhancing the issuer's corporate sustainability strategy and its environmentally friendly brand. The upfront and ongoing transaction costs of the labeling and associated monitoring of a green bond, as well as the costs of reporting, verification, and tracking the use of its proceeds, can be offset through improved internal governance structures and environmental and social management systems (UN Environment Inquiry, 2017).

Moreover, market institutions are also advancing the information agenda through partnerships and coalitions which a global growth opportunity to accelerate sustainable finance. Market institutions are working together to help enhance flows of sustainability information, including through disclosure of investment policies, portfolio allocation, and alignment with a low-carbon future. Principles for Responsible Investment (PRI), the world's largest coalition of institutions sharing sustainable investment priorities which have increased by over 185 members since 2016 and now represents 50 percent of global assets under management. The Montreal Pledge was launched in 2014, has reached more than US$10 trillion in assets under management with over 120 investors committed to measure and publicly disclose

Figure 2. Use of Green Bond Issuances in Sectors



Source: UN Environment/WBG Roadmap Team based on Climate Bonds Initiative (2017) data.

the carbon footprint of their investment portfolios on an annual basis. The Portfolio Decarbonization Coalition, a multi-stakeholder coalition of investors committed to reducing the carbon footprints of investment portfolios, releases information detailing the decarbonization approaches and strategies of its members. Newmarket coalitions are looking beyond basic information on environmental performance (such as carbon emissions) to build awareness of impacts achieved in the real economy. The Principles for Positive Impact Finance was launched in January 2017, supported by 19 global banks and investors totaling US$6.6 trillion in assets (UN Environment Inquiry, 2017).

The Role of Stock Markets in Sustainable Finance

In recent years, especially developing countries, developed regulations for public disclosure of sustainability practices of companies traded in stock exchanges to inform their current and the global corporate investors and made decisions to increase transparency and raise awareness on sustainability. Some of these decisions and applications are developing sustainability guidelines, organizing training programs in the field of sustainability and encouraging research, and creating sustainability indices as a tool to help institutional investors evaluate capital more sustainably. The most effective product is perhaps the sustainability indices developed by stock exchanges in the area of responsible investments (BIST, 2019).

Stock markets and institutional investors have played a key role in encouraging disclosure in the real sector. Stock exchanges are important in encouraging improved environmental disclosure by corporations, including through listing requirements (UN Environment Inquiry, 2017). The sustainability indices go back to the 1990s. The first sustainability indices that financial markets and investors consider as global sustainability indicators were created by Dow Jones and FTSE (Financial Times Stock Exchange) in 1999 and 2001, respectively. South Africa (2004) and Brazil (2005) launched sustainability indexes before many developed markets and pioneered other emerging markets. Since 2008, sustainability indices have been launched in developing countries such as China, Indonesia, India, Hong Kong, Korea, Mexico and

Egypt (BIST, 2019). Momentum is increasing, the Sustainable Stock Exchanges (SSE) Initiative now includes over 60 stock exchanges, representing more than 70 percent of listed equity markets and some 30,000 companies with a market capitalization of over US$55 trillion (UN Environment Inquiry, 2017).

BIST Sustainability Index: Steps toward Sustainable Finance in Turkey

BIST Sustainability Index aims to provide a benchmark for Borsa İstanbul companies with high performance on corporate sustainability and to increase the awareness, knowledge, and practice on sustainability in Turkey. The index allows companies to compare their corporate sustainability performance locally and globally. With the Index, companies are provided with a performance assessment tool to make improvements and to set new targets and to improve corporate transparency and accountability and risk management skills related to sustainability issues. Moreover, the index is a platform for institutional investors to demonstrate their commitment to companies managing environmental, social and corporate governance (ESG) issues with high performance. The Index also provides a tool for investors to differentiate and invest in companies that adopt sustainability and corporate social responsibility principles (BIST, 2019).

Considering the fact of sustainability Borsa İstanbul has signed a cooperation agreement with Ethical Investment Research Services Limited (EIRIS) to create the BIST Sustainability Index in 2013. BIST Sustainability Index has been launched in 2014 with the code XUSRD. Following this agreement, EIRIS assesses Borsa İstanbul listed companies based on the international sustainability criteria. In 2014, the index started to be calculated with the constituents selected from the BIST 30 Index according to sustainability assessments. Starting from 2019, it has been calculated with the constituents selected from a list of companies which constitute BIST 100 and BIST Sustainability indices and voluntary to be assessed for the BIST Sustainability Index. The assessment is based upon only publicly available information and assessment costs of companies are covered by Borsa İstanbul (BIST, 2019).

The index provides a competitive advantage to Turkish companies managing their corporate risks and opportunities effectively. It is an investible index on which new instruments can be developed is in place to attract capital for companies. The Index reflects companies' approach to important sustainability issues including global warming, draining of natural resources, health, security, and employment, while allowing an independent assessment of their operations and decisions regarding these issues and, in a sense, their registration. The Index facilitates companies access to global clients, capital, and lower-cost finance. The project aims to create an instrument which allows investors to select and invest in companies that adopt principles of sustainability and corporate governance. Today, responsible investment is preferred mainly by institutional investors. BIST Sustainability Index encourages founding such funds while facilitating for Index-constituent companies to get a larger share from such funds. At the same time, the Index offers a new financial asset category for all investors. As a result of the assessments, the recognition and reputation of the companies included in the index will increase among the public and investors and be more preferable to investors. The index will be an indicator for asset managers to issue various financial products such as sustainability-based funds, stock exchange mutual funds and structured products (BIST, 2019).

Today, most of the responsible investments are made by institutional investors. The Sustainability Index will encourage the establishment of funds investing in this area and facilitate the participation of the companies included in the index from such funds. At the same time, a new category of financial assets will be presented for all investors. Moreover, in 2013, the Sustainability Platform Borsa was established under

the leadership of Borsa Istanbul to exchange mutual opinions on the results of the sustainability studies carried out in our country and to create a sharing network that will enable the joint steps to be taken on the subject of sustainability. Sustainability Platform members meet at least twice a year (BIST, 2019).

Case Study: Sustainable Finance in Turkey

In this section, some practices of a service sector company listed in BIST Sustainability Index is mentioned, which adopts the sustainability approach and integrates them into the activities and report sustainability although there is no legal obligation. A company listed in BIST Sustainability Index and operating in the service sector stands out with the following sustainability practices:

- Sustainability reporting was started by the company in 2012, as a beginning. Besides, since 2010, greenhouse gas emissions have been reported every year within the scope of the Carbon Disclosure Project. Independent audit was also performed in the report made in 2014.
- The company continuously increase the value it adds to its customers, stakeholders, employees, and society by giving utmost importance to sustainability. It also aims to contribute to global efforts to reduce environmental risks and ecological scarcity, as well as increase social welfare and improve social equity.
- The company's sustainability approach encompasses the main principles of sustainable finance such as customers, environmental impacts of operations, society, stakeholders, human resources and corporate sustainability management in line with the sustainability policy approved by the board of directors.
- Renewable energy projects account for 50% of the company's financing for energy generation projects.
- In 2013, the company signed 'Declaration of Energy Efficiency in Buildings' initiated by the Business World and Sustainable Development Association to draw attention to the high level of energy use in buildings and to reduce energy use.
- The company was the first company in the sector to offer the Women Entrepreneur package as part of its support to "Women Entrepreneurs Project". It aims to inform women on basic issues, and to encourage them to create new opportunities in their work and to contribute to their personal development. Besides, the company signed the Women Empowerment Principles in 2014 (BIST, 2019).

CONCLUSION

As it is well known, all financial instruments traded in the capital markets are valued according to free-market conditions. This assessment system, based on traditional financing instruments, is no longer sustainable because it does not take environmental and social impacts into account. The role of the financial sector emerges in the process of providing resources to support development with a solid infrastructure and a widespread distribution of resources by giving priority to sustainable production. Sustainable finance increases the opportunity of success if they include key components grounded in a systematic assessment of overall needs, estimation of required financing, identification of barriers, and identification of suitable policy measures whose progress and the impact can be readily measured.

Though today new markets are being shaped by new generation investors who believe in a sustainable future facilitating new generation financing instruments, such as carbon exchange or social investment indices. The process of developing new products and greening existing ones in support of sustainable finance will have to be accelerated to meet the increasing needs of the global economy. The financial sector is expected to play a role in supporting national and international development goals and to facilitate the transition to a green and low carbon economy. This is a magnificent opportunity for the sector to prove its added value to society. Since the climate change poses significant financial and economic risks has only been emphasized by the tens of billions of dollars in losses due to recent climate-related natural disasters such as the floods and wildfire, there is considerable attention to the environmental and social sustainability of the projects that are financed.

The relationship of sustainability and many other important dimensions have been studied before, these include unemployment (Yilanci & Sasmaz, 2018), carbon taxes (Bayar & Sasmaz, 2016), reverse logistics (Gencer & Akkucuk, 2016), supply chain management (Akkucuk, 2016), and governance (Akkucuk & Seckin-Celik, 2019). Sustainable finance has two dimensions: the direct and indirect impacts of economic, environmental, social and corporate governance. Direct impacts represent the impact of the entity's operational activities. For instance; electricity, water, natural gas, paper consumption, fuel consumption from business trips are the direct environmental impacts of the organization. Recently, it is common practice for organizations to manage and offset these effects by reporting their carbon footprint and water footprint inventories. The economic impact, the conditions of this employment, the quality of occupational health and safety, and educational opportunities are the activities that are directly covered by social impacts. Accountability, transparency, and commitment to ethical values are entailed to corporate governance impact of sustainable finance. Thereby, it is very important that the financial system is sustainable, that it supports sustainable growth without causing inflation, and that it mediates financial intermediation activities without causing systemic risk. The second dimension concerns companies that the financial system transfers funds. The compliance of these companies with the principles of corporate governance, environmental awareness, and social citizenship is also of great importance for sustainability. In terms of both dimensions, capital markets have great responsibilities. The main impact for financial institutions is the indirect impacts that occur due to the activities financed. Today, financial institutions are accepted as responsible for the impacts caused by the projects they finance. Unfortunately, most financial institutions today make credit decisions within the scope of risk management approaches, taking into account only financial risks. However, it is advisable to make a financing decision by evaluating non-financial risks together with financial risks. Even if it is foreseen that the risk will be minimized with different collateral and guarantee structures, the reputational loss of the negative effects that may arise should not be ignored. Besides, the financial sector is the engine of effective risk management as it is capable of raising awareness, capacity building, steering and sanction in the real sector with the power of money. In particular, environmental, social and corporate governance risk management, which is a topic that international financial institutions attach great importance to, is an approach that recommends that financial institutions have a credit assessment methodology that is above the legal minimum requirements and in line with international good practices. Such a risk management structure enables new international funding agreements and acts as a catalyst to soften conditions

Investors now make different demands by questioning the environmental, social and corporate governance impacts caused by companies. More recently, financial institutions support the concept of low-carbon investment or require companies to report on their carbon footprints in which they invested.

The international stance brought by this development and awareness indicates that sustainable financing practices will increase day by day, globally with a growth opportunity. The process, which started with environmental credits in the late 1990s, continued with energy and resource efficiency projects in the mid-2000s. Today, in addition to the projects that provide positive environmental impact, special financing models have been developed for projects with social benefits. Different categories of financing models supporting local employment, empowering women in the workforce and social life, improving education and health opportunities are now being discussed more and more. Sustainable financing efforts are also being developed and diversified for increasing interest and demand. While sustainable financing practices and instruments are diversified, their categorization, impact assessment, and reporting are equally important to diversification. Sustainable finance products are products that can be developed not only by financial institutions but also by institutions and organizations from different sectors. Even municipalities can take part in this process by issuing green bonds. In particular, the demands of investors and stakeholders play a critical role in turning companies into sustainable and innovative financing models. These developments on sustainable finance present evidence for the global economy as a growth opportunity in terms of innovative sustainable products supporting environmental, social and corporate governance criteria required by international institutions and individual investors.

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KEY TERMS AND DEFINITIONS

Crowdfunding: Crowdfunding is a method of funding a project or venture by raising capital through the collective efforts of a large number of individual investors primarily via the Internet.

Equity Investing: Equity investing is a practice of investing in a company by purchasing shares of that company in the stock market by individuals.

Financial Technology (FinTech): Financial technology, often shortened to fin-tech, is the technology and innovation created to provide financial services easier, better and faster than traditional financial methods to improve and automate the delivery of and activities in financial services.

Green Bonds: Green bonds are broadly defined as fixed-income securities that raise capital for a project with specific environmental benefits such as renewable energy projects, energy efficiency measures, mass transit, and water technology.

Impact Investment: Impact investment refers to investments that made into companies, organizations, and funds intending to generate a measurable, beneficial social or environmental impact alongside a financial return.

Institutional Investing: In an institutional investing an organization serves as an intermediary between individual investors and companies that invests on behalf of its members.

Project Finance: Project finance is a loan in the financing of long-term infrastructure and industrial projects investments based on the future cash flows that will be generated from the investment.

Sustainable Investment: Sustainable investment refers to investments that integrate long-term sustainability issues into core investment-making processes and seeks to support sustainable economic development, enhance the quality of life and safeguard the environment.

Chapter 16
Management of Industrial Waste

Aynur Akata
https://orcid.org/0000-0002-5422-6983
Independent Researcher, Turkey

ABSTRACT

Al substances that are left directly or indirectly into the environment that may cause harm to human health and the environment are regarded as waste. Waste generation occurs as a result of daily activities during production of goods and after their use by consumers. In order to decrease and/or eliminate the negative effects onto the environment, a proper waste management is crucial for the societies and governments. In this chapter, the subject is explained starting from the brief historical aspects of waste and waste management and continuing with explanation of the main concepts and their types, focusing on solid waste management and recycling. Various examples are given.

INTRODUCTION

Al kind of substances left directly or indirectly into the environment which may cause harm to human health and the environment, are regarded waste. Waste generation happens because of daily activities during production of goods and after their use by consumers. A proper waste management is crucial for the societies due to decrease or eliminate its bad effects onto the environment. In this chapter, waste and waste management concepts are explained focusing to solid waste management and recycling and various examples are given in five sub chapters.

In the first sub chapter historical aspect of waste and waste management is explained starting with antiquity and coming to nowadays, and some landfill disasters are mentioned. Second sub chapter contains explanations of basic concepts and components and change of waste management approaches in context with "*change*" models and the "*cultural*" connections.

In the third sub chapter solid wastes are explained as the major concern of the chapter in two main sections. Fourth sub chapter deals with industrial waste management connected with life cycle of industrial goods or "*artifacts*" and relationships between life cycle and waste generations and its management.

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Fifth and last sub chapter is left to the "*recycling*" concept and, "*recycling of plastics*" is chosen due to its great importance on the everyday life and on the environment related with small and medium size entrepreneurs in plastic recycling area.

RUDIMENTARY HISTORY OF WASTE MANAGEMENT

Historical Aspects of Waste

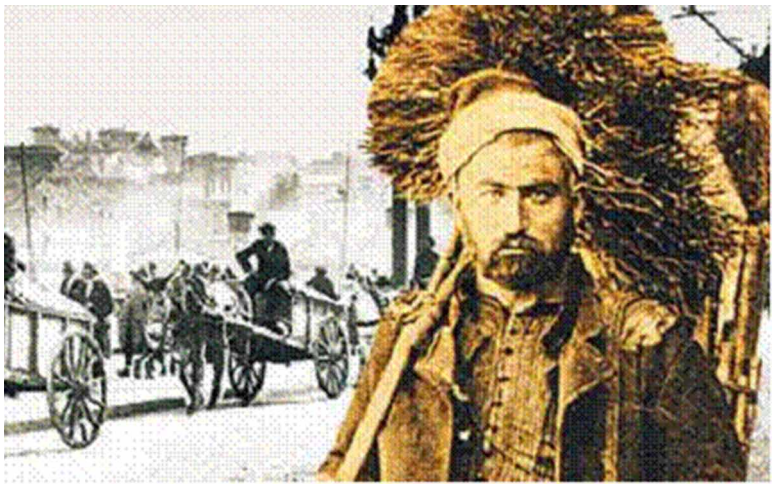
The history of waste generation and their disposal have always been interested by the people that produced it, and relationships between wastes and the environment they lived in affected the societies. In the primitive nomadic life, which continued with hunting and gathering, the need for solid waste management could not be observed due to the fact that wastes were organic and there was no problem of population density. In time, the transition from nomadic life to settled life, the selection of a specific area to live and the increase in population every day have started to require a solid waste affairs, although not systematically (Barles, 2014). In the literature, it was found that even in Mayan civilizations, garbage were sometimes collected in some corners and therefore they accumulated in time, and sometimes exploded and burned (Sedef, 2016).

Probably the first place that can be called a landfill in history was in Athens, in 400 BC. It was established and the idea of keeping wastes in these areas located at least 1.5 km away from the city was realized. In addition, the streets and lanes of the city were cleaned daily by washing. Lately, 144 public toilets were installed in Rome and the wastes collected in the soil vases were removed to the sewerage system at regular intervals (Sedef, 2016). From the old French word "*vastum*", which means empty or desolate, it was first used to define a remote, ruined or neglected places or areas. Later, the term was used to describe a wasteful. It finally developed to its current meaning in the 15th century (Barles, 2014). The issue of waste has long been closely related to the issue of "*salubrity and sanitizing of urban space*" and the "management of urban urine and excrement". Until the industrial revolution, the subject remained mainly the management of urban excreta, especially linked with city people's health and except big and crowded cities the problem did not dominantly disturbed the majority of the people. As the cities getting bigger, waste generation increased and the methods for collection and discharge it became unsatisfactory, which caused to complaints about urban dirtiness. Due to the medical developments and changes in the medical concepts, tainted environment and considering the principal causes of urban excess mortality, new approaches and management applications of waste affairs in medieval Europe were supported the cleaning up the cities.

Similarly in the Ottoman world, the first steps were taken for the collection of solid wastes during the reign of *Fatih Sultan Mehmet*. He has made efforts to clean the streets and lanes of Istanbul using the income of his own foundation, and appointed two people to each street, thus implementing the idea that the streets should be cleaned from disease-spreading elements such as saliva and garbage (Sedef, 2016). In the Ottoman Empire, there were also practices based on the altruism of the people living in houses and shops in order to clean up trash and dirt.

Cleaning and keeping the regularity of the streets were belonged to the neighbors and pouring garbage into the streets and bazaars forbidden. Garbage used to collect at certain times by official street cleaners and left in a pre-determined landfill areas (Figure 1). For example, the garbage of the Janissaries was left to the Marmara Sea from the Langa region in Istanbul for that time. Later leaving the garbage there was

Figure 1. Garbage collection in the late Ottoman times (Osmanli'da Temizlik Anlayisi, n.d.)



forbidden after people lived around disturbed by the litter. In addition, artisans such as painters, saddlers and cooks were obliged to leave their garbage in uninhabited areas (*Osmanli'da Temizlik Anlayisi*, n.d.).

Waste in Industrialization Period

After starting the industrialization period, from the 1870s to the 1960s, the waste, as abandoned residuals and other kind of materials had been increased continuously due to increase in population especially those in the big cities and metropolitan cities. Finally, since the 1960s and 1970s, the environmental problems has turned to a wasting crisis and many waste management approaches having some imperfections had been applied. Industrialization and urbanization increased the need to raw material and food consumption over the time. Increase in population increased the number of crowded settlements and their populations thus increased the agricultural production. Within this context, human and animal excreta and other food residues were attempted to be used as fertilizers. Due to the abundance of production of wastes, any organic waste that was collected in the cities could be used as fertilizer to the countryside (Barles, 2014).

On the other hand, wastes were almost totally deposited in proper areas in that time and caused city dirtiness and bad health problems. Between 1831 and 1873, 380 000 people in Prussia and 9 000 people in Hamburg in 1892 perished from waste-producing diseases. Scientists in London found that people living in the lower part of the city were more likely to be affected by cholera and similar diseases than those living in the upper part of the city, and thought it was due to rain water and waste water as well as trash transported to the lower part of the city (Sedef, 2016).

Although nowadays successful integrated solid waste management applications are exist in developed countries, it was not easy to reach these stages. In searching the history of integrated solid waste management it is seen that many primitive disposal methods, which result in destruction of nature, have been applied in the historical process. As it is known, until a short time ago due to rapid development of the number and populations in coastal cities in the USA and the increasing amount of wastes with each passing day, municipalities used to load the city wastes into large barges and the workers disposed them into the sea (Figure 2). Many people became aware of this situation with the shedding of these

Figure 2. Disposal of big city wastes into sea in coastal regions of America (Sedef, 2016)

wastes over time and complaints and objections about this method started. Unfortunately, this illegal waste disposal method was applied by many countries in time (Sedef, 2016).

Previously mentioned cleaning habit gained from the Ottoman Empire began to be lost in time. Upon this, in May 1919, the Mayor of Istanbul, *Cemil Topuzlu*, issued a declaration to be published in city newspaper in Armenian, Greek and Turkish languages. In the declaration, it was mentioned that the residents of the quarters and regions should assist the municipality in the cleaning of the streets, lanes and quarters, pay attention to the cleanliness of the food, clothing and streets. It also was declared that, the garbage should put in a container until the collecting vehicle arrive, during the collection the garbage paper, packaging and newspaper and trashes should be collected in certain places and baskets. Particularly the separate collection of paper, packaging and newspapers showed that there was a gradual attempt to separation of the waste at source (Sedef, 2016).

Aydin Boysan who was a founding member of the *Turkish Chamber of Architects* of between 1957 and 1972 and also has many publications, tells about garbage collection and disposal of Istanbul into the Marmara Sea charmingly in his memories. He told; "*the litters used to collect by workers with horsed-wagons (Figure 3), brought to a small garbage wharf at the coasts of Marmara Sea and poured into the sea. They sometimes floated toward the seaside, causing flies of billions invasion*" (Beyazoglu, 2007). This type of disposals continued until 60'ies in even Europe.

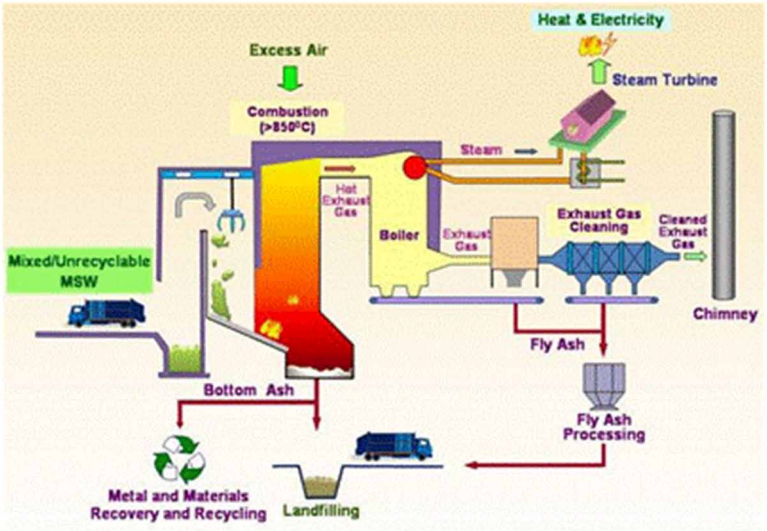
Historically first solid waste management facility is disposal of the solid wastes to pre-determined areas near the cities, land filling. This type of solutions have got various problems including water pollution nearby, dirtiness to scenery, bad odors and even worst landfill explosions and life loss. Solid waste management system, which has to develop due to the bad results of city dirtiness, environmental accidents like garbage yard explosions and diseases in Europe and America, has undergone similar processes in our country and is still being developed. Waste incineration is a valuable mean of waste management with energy generation, and has been applied to big cities.

Accordingly, the world's first waste incineration plant was commissioned in 1876 in London (Sedef, 2016). The first waste incineration center in the USA was established in New York in 1898 and is capable of meeting the needs of 116 000 people. These facilities were followed in Berlin, Hamburg and Munich (Barles, 2014). A typical incineration flow chart is shown in Figure 4.

Figure 3. Horse wagons for garbage collection in Istanbul (Beyazoglu, 2007)

In such a complex, mixed and unrecyclable solid waste are burned in the combustion chamber with excess air taken from the environment and heat is produced as hot exhaust gasses around 900^{0}C. Produced heat is used to produce steam in boiler in order to produce electricity with steam turbines. Boilers exhaust gasses are cleaned in order to lower the harmful effect to the environment. Land-filled wastes of an incineration plant are negligible amount with respect to wild landfill applications acted before.

Figure 4. Typical flow-chart for an incineration plant (Advanced Incineration Technology, 2019).



Landfill Disasters

As mentioned earlier, land-filling as the oldest type of solid waste management has been using in many countries. These types of solutions are causing various problems including water pollution around them, dirtiness, bad odors, landfill fires and even the worst, explosions and life losses. In May 2016, inhabitants of several settlements of the Spanish community of *Castile-La Mancha*, a total of about 9 thousand people were evacuated because of a fire at Europe's largest junkyard tires (Figure 5).

In recent history, on April 28 1993, uncontrolled wastes accumulated in a landfill area exploded due to methane gas accumulation in *Umraniye* district of Istanbul for a period of 4.5 years, and many people living in the vicinity of the scene were badly affected. As a result of this incident, 27 people lost their lives and 12 people disappeared. The bodies of these 12 people who were thought to have been buried during the explosion could not be reached. This bad phenomenon occurred because of the unpredictable accumulation of methane gas in the garbage dumped idle in the landfill and the lack of necessary gas discharge chimneys. This event was headline for many newspapers and based on this unfortunate event in the local elections in 1994, election promises to solve the solid waste problem of Istanbul were used by many parties (Sedef, 2016). Although there are many legal regulations in Turkey nowadays, there are still incomplete and wrong practices regarding solid waste management. Although land-filling was abandoned in developed countries for many years, unfortunately, similar bad and tragically results are continuously being happened in underdeveloped and third-world countries. These news and people reactions forced the scientists and politicians to find permanent and effective solutions.

MAIN COMPONENTS OF WASTE MANAGEMENT

After occurrence of such disaster-like bad events in order to decrease the negative effects, or in other word to manage the wastes, high income countries in Europe and North America have been working on solid waste management for almost 50 years. Today's formations and solutions are not the projects decided overnight. Within this context, societies lived various problems, many ecological and economical costs

Figure 5. Fire at a waste tires landfill in Spain (9000 people were evacuated in Spain because of a fire in a landfill tires, 2016)

were paid and some engineering solutions were tried to apply. Over times, some negative results have also been seen and recorded. Especially developed countries follow each other's work and still continue to work with the responsibility of "what can be done" about waste disposal.

Waste material accumulation is a general subject for almost all communities due to its effect on the living environment. It is an important issue directly related to the societies' productions and consumptions so it concerns everyone. Good practices affect positively the communities and vice versa. Thus, encountering with good waste management practices is a basic human desire and may also is accepted as a basic human right.

The results of doing wrong or even nothing about waste treatment can be very painful to societies and their economy. When there are no official waste treatment regulations or no proper implementation of the existed ones, waste generators will tend to use the cheapest available methods and activities like discharging industrial liquid wastes into the nearest lakes, other watercourses, or dumping the household solid waste to the streets or burning them in order to decrease the disturbance of accumulated piles of waste. Thus the main concerns of waste material are public health and environmental pollution.

About the first issue it can be mentioned that, absence of a solid waste collection service directly affects negatively the health of the residents, especially the children. The uncontrolled burning of waste produces pollutant particles and other organic substances that are highly damaging for local and global environment. Piled up waste and blocked water drains increase micro-organisms' breeding resulting in the increase of spreading speed of infectious diseases such as cholera, and are powerful contributors of flooding. Uncontrolled land filling having hazardous and other dangerous wastes can cause disease both in close settlements and waste workers. On a larger scale, side effects of uncontrolled dumps and burnings are serious indirectly on public health.

For the second issue; dumpsites can pollute air, surface and groundwater, soil and the coasts and seas. Erosion in dumpsites on the coastal regions is one of the sources of marine litter. Decrease in tourism due to polluted beaches and fishery losses originated marine littering are other potential costs. Uncontrolled waste, by its definition, is not 'managed' due to its immeasurable nature, importing difficulties in estimating the size of the problem and the scaling the associated costs. In related literature there are evidences, in middle or low income cities, reaching the costs of side effects of uncontrolled waste onto societies and their economies up to 10 times what expended for solid waste management (SWM) per capita *(Elagroudy et al., 2016).*

At this point, waste management expresses a lot of methods and processes relating the waste at all stages starting from generation to final dispose. Waste should properly be managed in order to prevent the people or their close environment contact. Efforts and activities of keeping the humanity, animals and in general the environment away from the bad and harmful effects of the wastes are defined as waste management. Therefore the main goal of waste management is to isolate the waste from the people and the environment, and as a consequence, to save individuals and community's health. In addition, waste management supports the aesthetics and a better outlook and cleaning the physical environment. Among the waste total, municipal waste is on the first rank and has continuously been increasing over years.

The wastes are examined in three groups as gaseous, liquid or solid wastes depending on the physical state. Grouping the wastes in two as hazardous or non-hazardous is another option. Main interest in this option is their potential to cause harm or danger instead their physical state. Hazardous wastes have, in general, one or more of the properties of being corrosive, ignitable, toxic, reactive and infectious. Corrosive wastes, like acids, can cause damage on contact. Ignitable, like fuels, are easily burned with or without open flame. Toxic wastes can be poisonous for humans and animals if they are inhaled or swal-

lowed or contacted. Reactive wastes can cause to form harmful chemicals if they are reacted with other substances and finally, infectious wastes are capable of causing infection (*Introduction to the Principles and Concepts of Waste Management*, n.d.).

On the other hand, wastes may also be classified as "biodegradable" and "non-biodegradable". Wastes that can be decomposed so their components are obtained by bacteria and other microorganisms are classified as biodegradable. The property belongs to both liquid and solid wastes. Human and animal wastes, food wastes, paper, and agricultural wastes are in the biodegradable group. In contrast, many plastics are in the non-biodegradable group and create serious environmental problems because they are not changed during many years, some up to thousand.

Bacteria that manage the biodegradation process are aerobic which they require oxygen, or anaerobic those do not need oxygen to survive. Breaking down or decomposition of biodegradable wastes by anaerobic bacteria is sometimes called "digestion". Human waste, which is in biodegradable group, if enters a biological digestion process by bacteria is decomposed. This digested waste matter is called sludge *(Introduction to the Principles and Concepts of Waste Management*, n.d.).

Waste management has several components. They can be found in related "waste hierarchy" studies in detailed. Waste management components are ordered from most to least preferred ones as; prevention of the wastes means making no waste is the best (the first component), then reusing them the second component), or recycling the wastes (the third component), using in other recovery methods (the fourth component) like in energy production and disposal of the wastes (the fifth component). Gaseous wastes are excluded in this chapter due to its great difference in nature and its chemical importance from the others.

Liquid Waste Management

The waters on earth are in a continuous cycle with the energy provided by the sun. This cycle is called "hydro-cycle". For their vital and economic needs, humans take water from this cycle and bring back it to the same cycle after use. During these processes, the substances that are mixed with water change the physical, chemical and biological properties of the water and reveal the phenomenon called "water pollution. The use of water, which is intensified as a result of increasing population and developing industrialization, is a factor that accelerates water pollution. As it is known, man-made domestic liquid wastes produced by the people living in the municipal areas and produced by the enterprises in the industrial zones cause environmental problems.

Accelerated water pollution due to increasing water demand causes water quality deterioration over time as well as decreasing water quantities. As a result, the usable part of the water is gradually decreasing. In order to prevent these negative developments, it is necessary to control the water pollution seriously and to return the water whose quality is deteriorated as a result of its use only after sufficient treatment (Akata, 2002). Human waste, storm-water or floodwater, sludge, industrial wastewater and other forms of wastewater from different sources are the liquid wastes. When human waste, which sometimes is called "excreta", mixes with wastewater is known as "sewage" and also sometimes known as "black-water". Runoff is mainly rainwater collected on the ground in urban area and they are transported by channels or ditches to the rivers and sea. After collecting the liquid wastes, a proper and effective cleaning and treatment are desired to accomplish the management of the liquid waste.

Solid Waste Management

Any wastes material that remain same by shape unless they pressed or squeezed is defined as solid waste, and is discarded by people. A great deal of solid waste come from general housekeeping as residential waste, refuse, household waste or domestic waste. Other groups of wastes originated in industrial, commercial, institutional or agricultural activities, or street sweepings.

The term "municipal waste" refers to solid waste that is collected by local government (the municipality) and covers household, commercial, industrial waste and street sweepings. Kitchen wastes or "garbage" which also are municipal waste, are produced during food preparation, or after eating as "residuals".

Design and implementation of an appropriate solid waste management method are closely related to the characteristics of the waste and therefore to its source. A bad waste management is to dispose the waste directly or with a little treatment to the environment, whereas a good practice is leaving them after proper treatment to environment with a little or no harmful components. The change in municipal waste management percentage for developed countries between 1992 and 2009 is given in Figure 6.

Similarly in Figure 7, global solid waste management applications and approaches in percentage are given indicating the great difference in environment-friendly solutions.

According to both Figure 5 and 6, recycling and energy generation from waste materials increase for developed and industrialized countries as the landfill decreases or almost disappears. As it was mentioned in previous sub chapters, environmental crises like accidents and disaster-like bad events caused the waste management approaches were changed in such developed countries.

On the other hand although "bad events" are continuing to happen, the waste management approaches are not being changed satisfactorily rapid in majority of underdeveloped countries. Although there are various source of resistance to "change in approaches", the cultural aspects and management of "change" are explained in next two sub chapters.

Figure 6. Variations in the Municipal Solid Waste Strategies in Developed Countries over Time (Elagroudy et al., 2016)

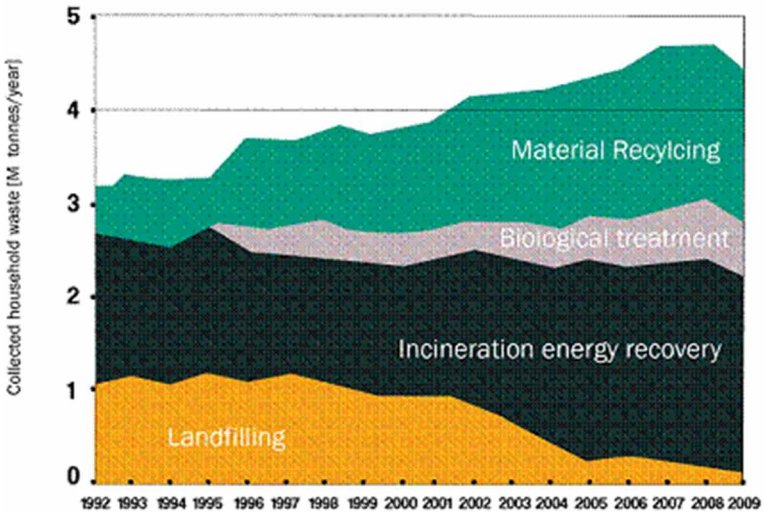
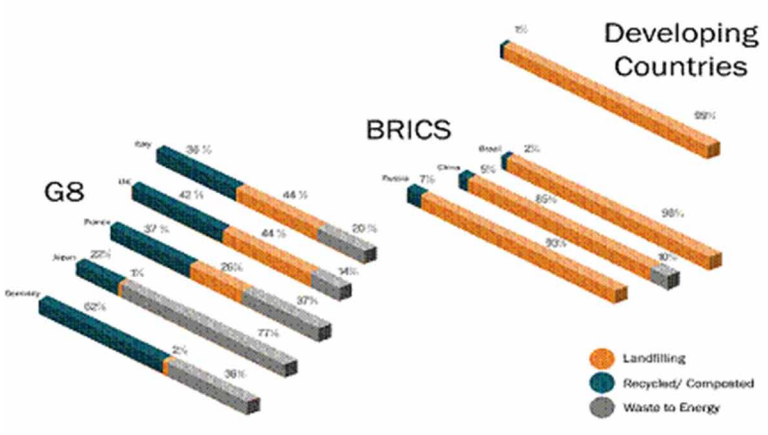


Figure 7 Management Practices of MSW (Elagroudy et al., 2016).

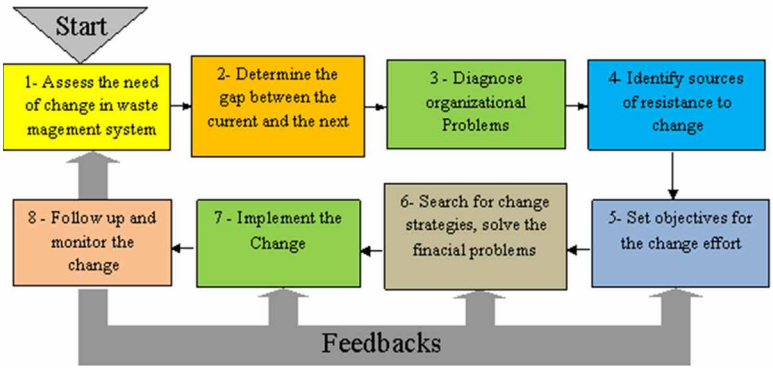


Planned Change Model

As mentioned in the previous sub chapters, waste management practices and approaches have always continuously been changed historically. The concept "change" has always a tension between "the current" which has a level of problems and "the next" that is aimed to reach a better situation. "The current" resists to changing and "the next" forces it to change. Therefore this process itself needs a proper management. There are various models for change management of which one is "planned change model". The model bases on the management of driving forces between the actors. In Figure 7, a planned change model for such a change for waste management inspired by a previous article is given (Akata & Akata, 2009).

First four activities in the upper half of the figure interest with analyzing of the current and targeted situations, organizational problems, resistive and encouraging forces of the process for the organization. Other activities are in the lower part and establish the progression of the process. There are close relationships among them and effects each other, therefore essential feedbacks should be given. All the activities in the process and the process itself can be regarded as matrices having several interrelated variables

Figure 8. "Planned Change" model for "Organizational Change"



and information. Matrices and matrix equations are extensively used for solution of such multivariable relationships sets. Using matrix terminology, above eight activities can be explained as follows.

1. Assessment of the need of change in waste management system can be modeled by determination of the "Current Status Matrix" and the "Target (the next) Status Matrix". Comparison points of the two statuses or evaluation criteria should be decided in this stage according to points of interest.
2. Determination of the Performance Gap then can be completed by determination of the "Difference Matrix" with a matrix subtraction operation of these same order matrices.
3. Diagnosis of the Organizational Problems can be criticized by analyzing the elements of the difference matrix. Resistance sources and driving forces for the change may be modeled by multiplication coefficients.
4. Identification of the Sources of Resistance to Change can be stated by mathematical modeling and determination of the "Resistance Matrix".
5. Setting the Objectives for The Change Effort can be completed by obtaining the incremental change matrices to obtain "The next Status Matrix" starting from "Current Status Matrix". Various change strategies can be modeled in order to obtain incremental change matrices.
6. Searching for Change Strategy again is the establishment of a matrix equation form using above matrices and coefficients. Some software can be designed to manage the change loop.
7. Implementation of the Change is running the designed software and making evaluations after predetermined intervals. This can give feedbacks to redesign the software, constructed models and determined coefficients. Last two stages will be consisted of various matrix calculations.
8. Following-up and Monitoring The Change means continuation of the loop of the change process using redesigned mathematical models and therefore the software.

As it has been explained briefly in above sub chapters, planned change is a complex and dynamic process. Mentioned eight activities that are interrelated each other should be examined and detailed properly. Although it is thought that using matrix calculations may supply a tool for planned change processes, a reliable and ready to use example has not been obtained yet and should be developed with various approaches. Comparison criteria are to be chosen properly in order to help to determine the preceding planned change process.

Effect of Culture Types

Waste management systems are activated and monitored by the "organizations". As it is known, although some common points exist, each organization has its own "way of doing" or with another word "culture" that differs from the others. According to the related literature, all organizations has a "mix of four different types of organizational cultures" under one dominant culture type. There also is a useful evaluation instrument called "Organizational Culture Assessment Instrument (OCAI)", to assess the organizational culture of the organizations. In related Works, organizational cultures are classified in four as Clan Culture, Adhocracy Culture, Market Culture and Hierarchy Culture. The types can briefly be explained as follows, and details can be found in related literatures (Akata, Akyol, & Ataman, 2002).

The Clan Culture, as a concept of rely the members of the group that belonged, bases on the collaboration. Members share the common values and accept themselves are part of a big family. Leadership of the Clan turns to form of mentorship, and the organization is held together by commitments and

traditions. The main values are teamwork, communication and consensus. Founders of big international companies, during building the brand, built also respectful relationships with employees, customers, suppliers and the environment itself. According to the Cambridge Dictionary "**ad hoc**" means "made or happening only for a particular purpose or need, not planned before it happens" referring a general term after the name of volunteer groups in the Crusade. Thus the "Adhocracy Culture" is based on activation and creativity. Employees as the members of the group are promoted to take initiatives, and leaders are accepted as innovators or entrepreneurs. The principal values are those emerged by change and agility. Growing and creating new resources are the most important goals. Obtaining unique and new products or services is the success.

The "Market Culture" is referred to the dynamics of competition and gaining valuable results. The organization is held together by a succeeding feeling for reaching to a common and accepted target and beating the competitors. The principal motivation concerns are market share and profitability. Long-term competition and achievement of measurable goals and targets are characteristic aspects of the culture type. The fourth culture type is Hierarchy Culture and is based upon structure of the Organization and control. Founded rules and formally defined procedures of the Organization are to be followed in all cases. Leaders work very hard to be good and efficient coordinators and organizers. Formal policies are the tools that hold the group together. Stability, performance, and efficiency are the long-term targets. Management wants security and predictability (*The Four Types of Organizational Culture* (2019)).

SOLID WASTE CATEGORIES

As it was mentioned in previous sections solid wastes are the majority of the wastes that have been continuously increased due to increase in population and consumption habits of human. Thus the solid waste management is the most important issue in sustainability and development of the human life and industrialization world. The "sustainable development goals" are listed in seventeen highlights by UN. Connected with reaching the goals, design and implementation of a proper "Management System" is crucial. On the other hand wastes vary in types and appearance, hence have different properties and effects on the environment. Table 1 categorizes the solid wastes into two broad groups. First five rows are closely related to urban areas and can be regarded as "Municipal Wastes"; whereas last three rows are originated at manufacturing stages thus can be examined in "Industrial Wastes" category.

"Residential" waste or domestic waste, especially in countryside, is regarded as non-hazardous wastes. Wastes generated within food, beverage and drink service business activities or in shops or markets are the "Commercial" ones. They may include other types such as packaging goods, electronics, timber, wire, metals, and plastic bags and so on. They are, in general, in non-hazardous nature. "Institutional" solid wastes are those produced by public or governmental institutions, offices, sporting fields, healthcare and educational establishment such as school and universities. Healthcare facility wastes are composed of both hazardous and non-hazardous wastes.

"Agricultural" types may include food residues, animal dung, crop residues, grass and leaves. They are usually non-hazardous and biodegradable wastes although some are hazardous such as pesticides container for families and sprayers. "Industrial"," process" and "construction and demolition" wastes can be produced in all size entrepreneurs from small to large scale industries. These types of wastes are due to the raw material consumption and residues of the industrial processes. Then they may be hazardous or non-hazardous, depending on the process.

Table 1. Waste Types, Sources and Examples (Redesigned using the table in the source (Transforming our world: the 2030 Agenda for Sustainable Development, 2015)).

	Source	Typical waste generators	Types of solid wastes
Municipal Solid Wastes	Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants.	Street sweepings; landscape and tree trimmings; general wastes from parks, beaches, and other recreational areas; sludge.
	Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes.).
	Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes.
	Institutional	Schools, hospitals, prisons, government centers.	Same as commercial.
	Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms.	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g., pesticides).
Industial Solid Wastes	Industrial	Light and heavy manufacturing, fabrication, construction sites, power and chemical plants.	Housekeeping wastes, packaging, food wastes, construction and demolition materials, hazardous wastes, ashes, special wastes.
	Process (manufacturing, etc.)	Heavy and light manufacturing, refineries, chemical plants, power plants, mineral extraction and processing.	Industrial process wastes, scrap materials, off-specification products, slay, tailings.
	Construction and demolition	New construction sites, road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.

Municipal Solid Waste (MSW)

MSW is one of the major waste groups that produced during human activities, and rapidly being increased due to increasing population and urbanization. MSWs are also being increased in volume and complexity increasing a need to a proper and complex management system. “Municipal Solid Waste Management” and “Sustainable Development Goals - SDGs” interact each other. The relations are briefly explained below (*Sources and Types of Solid Waste*, n.d.).

- The increase in solid waste creates many risks for ecosystems and human health. The total amount of MSW generated globally has continuously been increased over years. The Gross Domestic Product (GDP) and the solid waste generation of a nation’s citizens are closely interrelated. Waste generation increases as GDP increased.
- In order to make a good waste management, creating a green waste sector is important. On the other hand creating a green waste sector strongly depends on financing, economic instruments,

policy and official regulations and organizational structure. The situations about these factors force the municipalities to adopt and develop new Technologies recovering resources from it.

- There is no unique approach for creating a green waste sector thus it is normal to be encountering different approaches in different countries. Mistakes and/or success stories of other countries and nations offers a good opportunity in creating and development of SWM methods. The" three Rs" approach or method is increasingly being adopted in greening the waste sector as "Reuse, Recycle, and Recover the wastes.
- Increasing resource shortages and the emerging new technologies support the creation of green waste sector. Reuse, recycling, and energy recovery are considered useful and effective. In order to change MSW approaches long-term waste management and investment strategies, specific to each municipality/region, are to be considered.
- Greening the waste sector significantly contributes creation of new jobs, slowing down environmental and health problems thus supports the economy. Improper waste management negatively affects public health and local and global environment. Greening the waste sector therefore has a potential to improve the economy as a whole.
- Reusing or up-cycling the discarded objects with creative modifications can create new product of higher quality or value. Up-cycling can result in creating new job opportunities instead land filling or incineration. This approach benefits the "No Poverty" goal by generating more jobs.
- In developing countries collection, processing and redistribution of solid wastes are usually done by street collectors with poor facilities and little or no training or education. This is potentially risky situation about their jobs and health. Thus improving the labor conditions in the sector indirectly contributes positively social and medical problems and expenditures of such countries.
- And finally promoting the innovation works in MSW management is important to meet long-term Sustainable Development Goals (*Sources and Types of Solid Waste*, n.d.).

Industrial Solid Waste (ISW)

As it was mentioned in previous sub chapters these type of wastes are generated during production by small, medium or large-scale enterprises. They may be hazardous or non-hazardous depending on the process used. Waste types vary depending on used raw material and the product of the process.

Non-hazardous wastes are originated from industrial processes having no harmful and dangerous or toxic properties residential type substances. Hazardous industrial wastes are explosives, easily burned and materials which produce toxic or eco-toxic wastes when mixed with water and don't accepted by municipal landfills. These type of wastes originated by chemical, dying, leather, medicals, metal processing and coating, glass production, petroleum and petro-chemistry, textile products, paper processing, automotive and electronic sector.

Special processes are needed during the managements of the hazardous wastes. Decreasing the amounts and harmful levels of these types of waste has the prime importance. This process should be accomplished in the unit or factory which is produced itself or a proper treatment facility designed and constructed for this purpose. Storage, transportation and separation of the hazardous and dangerous wastes are to done according to the related regulations (*Sources and Types of Solid Waste*, n.d.).

DEFINITIONS AND CONCEPTS IN INDUSTRIAL WASTE MANAGEMENT

In order to design and develop a proper waste management system, some concepts should be taken into account and activated in various sequential work steps by related parties. Generation of the industrial wastes starts with the design of the goods and continues to increase during all its life or product life cycle until the "retirement". In this sub chapter this sequence is explained briefly.

Product Life Cycle of Artifacts

According to Webster dictionary, the term "artifact or artifact" refers something created by humans usually for a practical purpose, thus is related with our needs, having a proper life and should be retired after this period. Because of they are "created" by humans beginning of an artifact is a need to it, due to any actual solution fulfill the need. Then the "design" stage comes to fulfill the need. Design is a fully mental activity which is processed by designer's minds. In this stage "the designer" considers the needs and constraints, searches the present solutions and develops some solutions and finally decides the most suitable solution. A design process is a systematic problem-solving methodology, with some criteria and constraints, to develop a lot of possible solutions in order to satisfy them and to narrow down the possible solutions to one final choice.

After this decision is made, the artifact is manufactured and sold to the user. The user or owner uses or operates it causing wear and performance lost. In order to cure the performance lost some maintenance should be done then artifact reaches the end of its economic life and is turned to waste. In each stages of the artifact's life cycle, some feedback are obtained in order to develop the artifact itself.

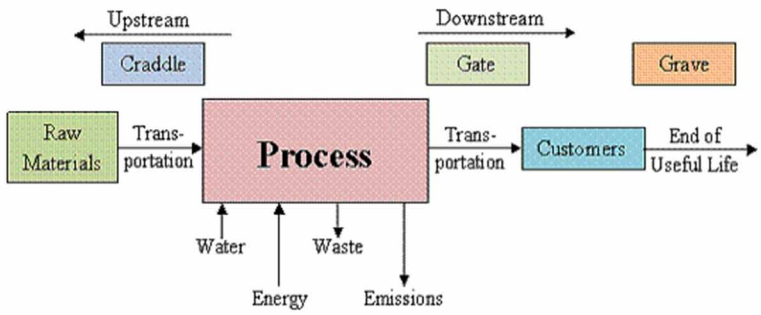
This process is warmly explained with a flow chart in Wrigth's "*Notes on Design and Analysis of Machine Elements"* (Wright, n.d.). In the mentioned "life cycle" various people including the designers, the manufacturers, the salespeople, the operators, the maintainers and the eventual dismantlers carry out completely different tasks.

Later, this issue was developed as "Product Lifecycle Management PLM" concept. In industrial world PLM is a process manages the all stages of the life cycle and responsible to the development of the product too. Product Lifecycle Management (PLM) is an integrated strategy that speeds up the innovation and launch of successful products using its information-driven property. As a business strategy, PLM lets distributed organizations innovate, develop, support, and retire products throughout their lifecycles as a single company.

PLM is closely related to the "*sustainability*" in terms of "*business continuity*" due to the dependence of the main company's success to sub-contractors' via design, development, production and service connections. Thus, sustainability requires adoption of a holistic perspective to manage the true short-term and long-term impacts of a business activity. Life cycle perspective is a useful tool in sustainability to consider the total impacts of a business activity. This is somehow different from conventional business practices just focused on cost, quality, and availability in the supply chain. Life cycle thinking still takes into account these factors but considers them over a product's lifetime. Life cycle thinking in a business space is symbolized as "cradle to grave" continuity.

"Cradle" is started raw material usage for the production considering transportation of inputs including raw materials to the company. Then the "holistic" approach considers first manufacturing process and transportation the products from the organization, the "gate", through the use or service up to the ultimate disposal. Finally the "cradle" means the end of useful life of the products and mostly collection

Figure 9. Life-cycle stream and key components in PLM (Life Cycle Management and Sustainability. (n.d).



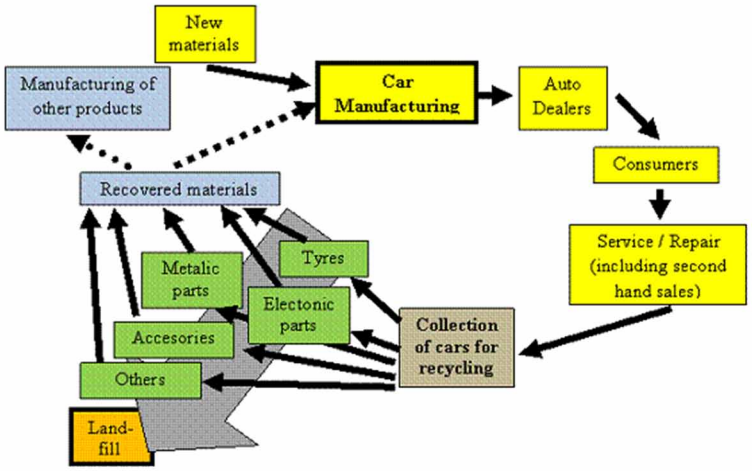
back for "recycling". Figure 8 explains the "cradle to grave" stages and elements. For example, timber delivery to a furniture company is the "cradle", then packaging the furniture for shipment or sent to the retailer is the "gate" and the "grave" is collecting them back for reutilizing or recycling.

Waste Generation in Product Lifecycle

As it was mentioned earlier all life cycle stages produces feedbacks to the beginning "*the design*". This concept may also be used in explanation of waste generation, thus waste prevention activities and their interactions in the cycle. Two main waste generation stages are manufacturing and retirement although there are some waste productions during the operation and the maintenance stages. Waste of manufacturing is respectively small to those of retirement, and can be managed by the design stage using the feedbacks between the two.

On the other hand the waste after retirement is the most important and thus interesting for the environment due to the need to be managed of the artifacts which are at their end of usable life. All artifacts or industrial goods are produced to sell to the customers in order to obtain both finance of the produc-

Figure 10. Waste generation and process flow chart of car manufacturing life cycle.



tion costs and growing the business. That means the customers are the main force behind all industrial production activities. For this reason, consumers play a crucial and very important role in the waste management system and chain. Consumers' behaviors determine the purchase and disposal of products, and effect their use and lifespan. The role of consumers also increases by reverse logistics, even directly to manufacturers and distributors in the case of lease constructions.

Within this context, around 75% of a car is recycled and recovering and recycling level in aluminum contents of a vehicle reaches up to 90%. Contribution of car recycling to ferrous metal producers is significant. Car tires are viable for recycling too. Almost 100% of Car batteries can be recycled. In addition to these recycling highlights, taking off the old cars from the actual traffic for recycling contributes to reduce accident rates. Figure 10 explains briefly the waste flow for car manufacturing life cycle. Table 2 gives some "waste prevention" approaches.

RECYCLING OF INDUSTRIAL WASTE

Waste Hierarchy

At this sub chapter, it should be mentioned the name of a Dutch Parliamentarian *Ad Lansink* who is often named "Father of waste hierarchy". *Ad Lansink* is the most famous name in the systematization of waste management internationally as creator of "waste hierarchy concept" or "Lansink's Ladder". The waste management hierarchy defines an order of preferences in waste management process from most favorable to least favorable methods or actions. A true application of the hierarchy helps to prevent greenhouse-gas emissions, reduces pollutants, saves energy, conserves resources, creates jobs and encourages the development of green technologies. Using the "original waste hierarchy of Lansink's Ladder" the most known modern format of "*Lansink's Ladder*" was developed.

Table 2. Waste prevention at different stages in product life cycle (Wilson et al., 2015).

	Waste Prevention				
	Sustainable Production		**Sustainable Consumption**		**Waste Management**
Life cycle stage	Production	Transport/ Purchase	User/ Consumption	End-of-use	Collection
Key Stakeholders	Manufacturer/ Importer	Distributer/ Retailer	Consumer	Consumer/ Community	Local authorities/ Waste companies
Qualitative prevention	Elimination or reduction of hazardous substances content	Product-service systems; Eco-labels	'Green' purchasing choices by citizens, businesses and governments	Segregation at source	Education & information programs; second hand shops
Quantitative prevention	Design for repair, reuse, disassembly & recycling; Reduced packaging; Remanufacturer	Product-service systems; Reduced packaging, refill	Purchasing choices; no food waste; repair & reuse	Reuse; donation; exchange (Free-cycle, dismantling); buying second hand, also online	Reverse logistics for remanufacture; reuse awareness campaigns; second hand shops and events; swap events

Figure 11. Waste Hierarchy, "Lansink's Ladder", (Waste Hierarchy-Lansinks' Ladder, n.d.).

As it can be seen from the figure of *The Lansink's Ladder*, "*reducing*" is the first step and means "*quantitative and qualitative prevention and avoidance*" of waste. Replacing pollutant products with biodegradable alternatives is an example of "reducing". The second step is "reusing" reduces the total waste production by using the products and materials again if possible. This condition can be fulfilled by a proper "design". Reusing and reducing go hand in hand. "Recycling" the third step action reduces raw material consumption in "manufacturing" of "artifacts" replacing the great amount of "raw materials" by "recycled material". Recycling is preferable when waste can't be reused. In the following section "recycling of plactics" will be explained. This subject was chosen as the plastics are the most used materials in amount and the probably the most effective pollutant for the environment.

The next step "energy" is also known as "waste for energy conversion". By burning the waste materials in a proper "incineration plant", energy can be generated. The fifth step "incineration" is also a form of burning waste materials. But in this case no energy is produced during burning. The purpose of incineration is to dispose waste in order to eliminate or decrease the landfill. The last and least preferable step in the waste hierarchy is "landfill". A landfill is a site for the disposal of waste materials by burying them in the ground or left into the sea. As it was mentioned earlier "uncontrolled" burying, without proper precautions and preparations, causes "disasters". Landfills are one of the causes of the amount of plastic waste in our oceans.

Recycling of Plastics

As mentioned earlier due to its amount and effects to the environment, "recycling of plastics" will be explained in this section just briefly. Recycling of plastics is a process with different types of plastic material in order to reproduce plastic raw materials and using them in plastics again. Recycling of plastics is possible by using different types of machines in the process. Briefly in a plastic recycling system there

are subsequent operations including; sorting, washing, shredding or breaking, and extruding. Elements of a typical plastic recycling system are shown in Figure 10.

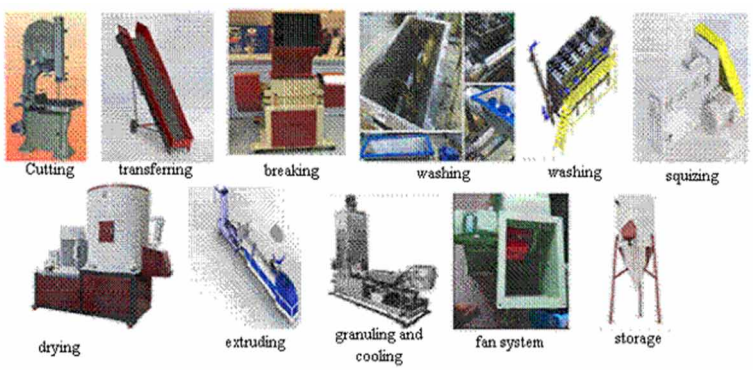
The system in figure 12 starts with cutting operation. Sorting and separation of collected waste plastics is made in order to grouping them for the subsequent processes. Big, long or heavy plastic wastes such as great barrels or plastic sheets are cut into suitable shape and dimensions for the "breaking" and shredding machines. Shredded plastics are transported into washing pools for cleaning in order to increase the recycled product quality. Then they are transferred to squeezing machines and drying machines. Dried plastic burs are extruded and cut into granules. During cutting process, granules are cooled by water stream and must be dried again before sending to storage units by means of a fan system.

Economy of Recycling

As it was mentioned and explained in the previous sections, recycling creates benefits in both waste management and product life cycle such as decreasing energy lost, producing materials and creating new jobs. Thus recycling is closely related with the concept of "circular economy or circularity". Circular economy is an economic system aims to minimize waste and produce the most of resources. This approach is in contrast to the traditional economy which has a 'take, make, dispose' model of production. The European Commission defines circular economy as a transition "where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of waste minimized" (*Circular economy in Europe-Developing the knowledge base* (2016)).

According to this definition, recycling can play an important role in economic activities with various means, such as providing new business aspects for innovative companies, having positive impacts on the society and the environment where acted in and contributing to circular economy too. In addition to decreasing landfill portion of waste materials, recycling strengthens the economic development of the countries by providing new jobs and saving costs on manufacturing new goods. Recycling also supports the local and national economy. As the population and global economy continues to grow, the demand for finite natural resources will increase. As the globalization and competition is being increased, local economies are to become more productive and less natural resource consuming. At this point recycling acts an effective and productive player in enhancement circular economy efforts. Recycling of plastics has various benefits in this context. A few of them are explained below.

Figure 12. Typical plastic recycling system elements (Yalman & Akata, 2019).



- **Contribution to Decrease the Amount of Plastics:** Production and consumption of plastic goods is very high as reaching 90% of the waste accumulated by the municipal corporation and continuing to increase
- **Conservation of Energy and Natural Resources:** Recycling of plastics will decrease natural resources for it while not decreasing the production of plastic and taking care of the environment. The recycling of plastic also helps to save a lot of energy.
- **Decreasing the Landfill Space:** Increasing the recycling of plastics causes to decrease the landfill need thus the related space. Recycling of plastics not only supports proper utilization of plastic waste but also helps to conserve the environment, making it cleaner and greener (*Circular economy in Europe-Developing the knowledge base*(2016)).

SME's in Recycling

As mentioned earlier, at least in collection and sorting stage, recycling is a dirty and disturbing activity and does not need to make big investments. This fact emerges a great amount of SMEs acting in collection and sorting area. Especially the number of "the street collectors" in a metropolitan city reaches as high as half a million or higher in developing and underdeveloped countries. This means a great contribution to "creating new jobs" (Figure 13).

These people also work as "sorters" in waste collection even in daily basis. Collected and basically sorted waste materials are brought to SMEs' "junk yards" in order to deliver to recycling plants which mostly are SMEs too. Although waste plastic recycling "regulations" and occupational health and safety rules have sometimes not been properly obeyed, SMEs in recycling industry are continuously being increased. Despite the increase in the number of recycling facilities each year, there is still a huge loss due to the lack of collection of waste plastics.

On the other hand, there are meaningful connections between environmental issues, cultural participation and awareness, and organizational structures according to research works (Alessandro et al., 2015). Thus considering the advantages and disadvantages of SMEs by means of finance, structure and flexibility and the issues of barriers to change, supporting or promoting the SMEs can contribute to greening the waste management systems.

Figure 13. "Street collectors", "transportation" and "breaking (shredding)" of plastic barrels at Istanbul (Yalman & Akata, 2019).

CONCLUSION

As a result, managers of all kinds of companies including SMEs are required to consider the increasing the reputation of the companies and being responsive to various public interests and concerns. These publics include employees, customers, suppliers, shareholders, as well as media, business and local community, and non-governmental organizations. Therefore while managers try to improve the companies' profit, they also need to be sensitive to societies' interests and social and environmental impacts of their actions. Since consumerism and environmentalism mature globally, international trade barriers come down and global businesses expand, environmental issues including waste management have increased impact on international trade. Successful managers should balance to meet customers short term wants and needs with societies long term welfare and waste management is an important part of this movement.

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Chapter 17
State Interventionism in Foreign Trade:
A Response to Market Inefficiency

Ewa Szymanik
Cracow University of Economics, Poland

ABSTRACT

The chapter refers to the literature to show how the state mitigates the effects of market failures in foreign trade through intervention in response to inefficient markets at national and international levels. The research study leads to several conclusions. Firstly, theoretical research focuses on the effects of market inefficiency on the domestic market, apart from the analysis of an international perspective, which implies that in the conditions of globalization there is a need for extended research in an international context. Secondly, state interventions are necessary in creating administrative and legal conditions for facilitating trade exchange in the context of the role of transnational corporations in the global economy, as well as in reducing the adverse impact of international turbulences on the competitiveness of national entities through the use of export supporting instruments.

INTRODUCTION

The concept of market mechanism inefficiency is not accepted by classical economic theory. Its founder, A. Smith, claimed that the market mechanism, incorrectly referred to as ”invisible hand”[1] (Rothschild, 1994), ensures self-regulation of prices, the volumes of goods and services as well as revenues, and that its efficient functioning relies exclusively on unrestrained activities.

However, the Great Depression highlighted the weaknesses of a free market economy, reminding economists about the inefficient market hypothesis developed by C. Launhardt (Ritzmann, 1983) at the end of the 19th century (also referred to as market inefficiency or market failures), as well as about mercantilists' postulates regarding the protection of markets against foreign competition and state support for industrialisation (Bochenek, 2010, p.72). Of course, it was just a starting point for further analyses and new proposals for counteracting negative phenomena. The recovery measures were proposed by Keynes,

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who recommended transforming the state into an active investing entity. Government programmes were to be treated not as permanent components of an economic system but temporary measures in those areas in which private enterprises were not inclined to engage. Such views were also accepted after the war, attributing to macroeconomic policies, referred to as adjustments, the ability to support market mechanisms[2] (Bochenek, 2010, p.73).

State interventions were also designed to support foreign trade activities. The views advocated by mercantilists were abandoned (at least officially), but protectionist activities have recurred in the recent years (Szymanik,2017c), which implies that entrepreneurs who operate in overseas markets require state intervention. Economic realities are trading conditions which are not created by a free market but international agreements, as well as by an increasing impact of international corporations which exert pressure on particular countries, resulting in the opposition of smaller market players who require state intervention.

The paper and its second part present a review of literatures to show the ways in which the state attempts to mitigate the effects of market inefficiency in foreign trade through interventions, thus responding to market failures at national and international levels.

A HISTORICAL OUTLINE

The concept of market inefficiency or market failures was introduced by a German researcher at the end of the 19th century. The opinion that markets were not able to cope with violent economic changes was to be justified by the Great Depression.

It is believed that the first macroeconomic analysis of market inefficiency is the 1936 publication of Keynes' *General Theory of Employment, Interest and Money*. The author identified the main causes of the phenomenon – inflation and unemployment. If such phenomena exist, it is necessary to identify the limitations of market mechanisms and seek solutions for mitigating the effects of market failures.

Interventionism had led to positive effects by the end of the 1960s. The first oil crisis of 1972 undermined the belief in the state's ability to eliminate or mitigate the effects of economic disturbances. Ultimately, the occurrence of stagflation and slumpflation led to the rebirth of neoliberal concepts. M. Friedman claims that all economists – monetarists, the followers of Keynes, and all the others recognise the existence of market inefficiency (Snowdown, Vane, Wynarczyk, 1998). Therefore, even his criticism of state intervention as a threat to individual freedom did not indicate the denial of the existence of market failures – it only implied the need for reducing the government's role, which was to lead to economic growth and stability. However, Keynes claimed that state interventionism could not be justified only by the necessity to correct market failures. Similar views were held by the representatives of the neoclassical school, advocating the state's conscious self-restraint in its economic activities. This view was rejected as unrealistic (Bochenek, 2010, p.74).

The advocates of the state's active role believe that interventions are necessary despite a number of ineffective government programmes. Because interventionism is a permanent characteristic of contemporary market economies (Markowski, 1992), correcting market mechanisms should be based on reasonable and effective economic policies (Leszek, 2010) rather than on the total rejection of such policies. Therefore, economic debates should focus on defining an appropriate scope of intervention for the benefit of markets – not on the issue whether markets are efficient or not.

THE MAIN AREAS OF MARKET INEFFICIENCY

The basic types of market inefficiencies are defined by J. Stiglitz (Mańczak, 2011):

- **Competition** – Its limitations (monopoly, monopolistic competition, patent protection, etc.) lead to economic inefficiency (as understood by Pareto), related to reductions in production and resulting in losses of prosperity,
- Public goods,
- External effects related to the impact of activities on entities, not carried out by these entities (including both benefits and costs),
- Incompleteness or lack of a given market (insufficient supply or shortage of certain types of goods),
- Resulting from incomplete information, leading to negative selection or the risk of abuse of knowledge by a better informed entity (Giza, 2013, p.104),
- **Macroeconomic:** Unemployment, inflation, budget deficit, or market disequilibrium.
- B. Frey identifies various types of inefficiencies. In his opinion, they result from the following situations (Bochenek, 2010, p.81):
- The imposition by a given entity of the level of costs which is not accepted by a business partner (as a result of a strong position),
- The state's guarantee of access to specific resources – other entities cannot affect it and, consequently, exert influence on the market,
- Monopolisation of a given market as a result of economies of scale achieved by particular companies,
- Fear of the effects of excessive risk, leading to the low dynamics of market development,
- Lack of full access to information.

STATE INTERVENTIONISM: A RESPONSE TO MARKET INEFFICIENCY

The state's impact on an economy was to be treated as a response to the above inefficiencies. Although B. Frey claims that it is the domination of private markets that is a source of social prosperity, the effective functioning of a price system results from the existence of relevant institutions which introduce and execute specific rights (e.g. ownership rights), and such activities are conditioned by the existence of a strong state. He also stresses that state interventionism is not always appropriate in the case of market failures. He claims that in a given situation it is necessary to carry out a comparative analysis of market- and state intervention-related costs, because such intervention is not designed to directly and manually steer an economy but to establish the rules of an economic game – framework conditions for the activities of private entities (Frey, 1992), (Bochenek, 2010, p.83).

This approach fits in perfectly with the principles of the functioning of foreign trade. Market inefficiency resulting from the imposition by a given entity of unacceptable costs or trading terms in its relations with business partners (accompanied by the lack of transparency resulting from cultural differences or various interpretations of a given clause of an agreement) indicated the need for introducing unified principles and regulations, which was only possible at a state level. It applies not only to various clauses (e.g. the most-favoured nation clause, which indicates that goods from a given country should not be treated less favourably than those which are offered by the most-favoured partner) but also to

technical standards and terms of delivery (e.g. Incoterms).[3] Such measures taken by the state facilitate the process of negotiations with foreign partners.

The main reason for implementing export policies as a response to inefficient market mechanisms in a global scale and to market distortions can be referred to J. Bhagwati's theory (Bhagwati, 2013). It identifies two basic groups of distortions: domestic and international distortions, and economic and non-economic ones. According to this classification, distortions occur both in domestic and global markets. The first category can be related to government economic policies (especially customs and tax policies), internal market mechanisms, or high inflation rates. The other category of distortions can be caused by protectionist or dumping policies.[4] Such conditions necessitate implementing export-oriented policies – the lack of state interventionism can lead to exporters' discrimination in world markets.

Excessive interventionism, on the other hand, is a great mistake regardless of the region where it is adopted. According to (Wróblewski, 2013), a number of economic terms lose their original meaning – for example, export, until recently regarded as a major indicator of the state's international position, is of much less significance today in favour of the quality of concluded transactions. The author recommends that the significance of trade be measured on the basis of intellectual value added. He does not propose any measuring methods, which diminishes the value of his research, but his reasoning seems to be correct.

STATE INTERVENTIONISM IN FOREIGN TRADE

Market inefficiencies, especially those resulting from external factors, necessitate state interventionism in the area of foreign trade. Because one of the state's tasks is to create favourable conditions for corporate development, state intervention is fully justified in this field.

It should be noted that debates on foreign trade conditions go back to Smith's works. He was in favour of free trade exchange, and rejected the main concepts of mercantilism, claiming that the balance of trade was less significant than the balance of production and consumption – the major factors affecting current business cycles. He believed that protectionism led to economic inefficiency and reductions in, or even loss of, competitive advantage in domestic companies enjoying state protection. In such conditions only free trade could be beneficial for countries, facilitating development and economic growth. A. Smith was also against levying duties on less expensive imported goods, accepting such exemptions as countervailing, repressive and fiscal duties as measures against the threat posed by overseas companies to national security, production and labour markets (Kundera, 2011).

It should be stressed that foreign trade should not be referred to only one type of market inefficiency. A number of factors overlap: inefficient competition (an increasingly significant role is played by transnational corporations which impose their business terms not only on particular enterprises buy also entire countries), the above mentioned external factors related to more expensive imported goods (especially consumer goods), or macroeconomic distortions resulting from one of unemployment types (caused by low internal demand levels). Another significant issue is asymmetric access to information.

Empirical data indicates that after World War II the scope of state interventionism has increased considerably, and this trend seems to continue. This problem was addressed by M. Friedman. In a number of countries (mainly highly developed nations) a large portion of income is spent as a result of state administrative decisions. According to (Giza, 2013, p.137), it results from the combined impact of economic policies and the evolution of the determinants of a broadly understood social and economic system.

This trend is also visible in foreign trade. Global trade volumes rise, and the number of business relations between geographically and culturally distant countries increases steadily. It is the state that initiates negotiations aimed to ensure better trading terms for small companies.

Obviously, it does not imply that trade transactions cannot be concluded without agreements between countries. Usually, business relations are initiated by business cooperation between individual enterprises, but then they carry the burden of negotiations with much larger entities, having to accept the rules and principles imposed by a foreign country's administrative decisions. They range from the imposition of high customs duties (preferential or discriminatory) to non-customs regulations (which can be even more harmful).

It should be noted that even entering into trade liberalising international or bilateral agreements does not fully protect exporters and importers against discriminatory measures – a prevailing trend to protect own markets and apply various non-tariff barriers (Szymanik, 2017a), (Wajda-Lichy, 2014). It should be stressed that as a result of the economic downturn a number of researchers, witnessing particular countries' tendency to protect their own markets, changed their original definitions of protectionism (Bown, Crowley, 2012), (Kee, Neagu, Nicita, 2013), pointing to such trade restrictions as tariffs, quotas, import bans, and export taxes. The role of such restrictions gains in significance as compared with the pre-crisis period, when more importance was assigned to such instruments as government procurement, technical standards, competitive tendering, or requirements related to preferences to the purchase of domestic goods (Kee, Neagu, Nicita, 2013), (Evenett, Vines, 2012), (Baldwin, Evenett, 2012).

Numerous barriers are internal restrictions, hindering trade exchange. They include technical obstacles, export subsidies, administrative regulation related to competitive tendering, sanitary and phytosanitary regulations, restrictions resulting from environmental activities, etc.[5]

It should be noted that EU member states, as compared with other countries, have not made a frequent use of protectionist policies.

The most severe restrictions include those justified by the protection of trade and security issues, government aid programmes, and the taxation of imported goods. Because barriers are adopted simultaneously and their impact accumulates leading to further restrictions, the competitiveness of particular countries decreases, hindering international trade, the process of economic recovery, as well as reducing the pace of economic growth. The long-term consequences can hardly be estimated.

It should be noted that the use of trade barriers does not stimulate economic development and competitiveness, hence the inclination to protect domestic markets, accompanied, however, by the need for liberalising entry regulations. Because the significance of bilateral and multilateral agreements increases in the global economy, EU countries have also decided to engage in this process. In this context, one of the most important initiatives is an agreement on establishing a free trade zone between the EU and Japan (negotiations started in March 2013), aimed to increase the EU's GDP by 0.21% (Bednarczyk, 2000). This slight increase is likely to result from the lower competitiveness of EU products, especially technologically advanced goods.

In this context, it would be worth a while to refer to controversial CETA and TTIP agreements (Szymanik, 2017a). However, a broader analysis of this issue would go beyond the scope of this work.

The problem of increased protectionism can be related to unequal access to information – one of the causes of market inefficiency. There are a number of factors which affect companies' access to information about overseas markets. Simultaneously, companies differ in terms of their ability to overcome market entry barriers. Obviously, the greatest obstacles are faced by companies entering into international cooperation for the first time. Some other barriers (especially in developing countries) include frequent

changes in economic and government regulations, direct government intervention, difficult access to reliable information, and, in some cases, cultural differences and business practices, as well as political risk. Large companies have a greater ability to overcome such barriers, while smaller entities frequently abandon their plans to penetrate new markets for fear of unexpected difficulties and the high costs of reaching new customers, as well as the risk of the takeover of their customers by competitors (Gawin, 2008).

EXPORT SUPPORTING INSTITUTIONS

All countries, to varying degrees, undertake efforts to implement export-oriented policies, which indicate governments' influence on international exchange. In a narrow sense, such policies can be understood as sets of regulations, methods and tools adopted by governments with a view to boosting exports (Rosati, 1990) (a type of state interventionism), while in a broad sense, they are treated as economic policies aimed at achieving a country's accelerated sustainable development thanks to export activities (Bombińska, 2014, p.88). There are various types of export support tools (some of them were identified by A. Smith). Currently, they are implemented by export supporting institutions.

Such institutions operate in a number of countries, e.g. UNCTAD identifies export supporting entities in more than a hundred or so countries. Some of these institutions are also engaged in trade promotion, foreign investment and the development of entrepreneurship (Gawin, 2008, p.33).

WTO members are required to implement relevant export support policies which relate, in particular, to the use of export subsidies (similarly to accession to the EU). In practice, it indicates easier access to overseas markets but, on the other hand, the necessity of abandoning, or rigorous restriction of, some of the previously adopted tools (Bombińska, 2014, pp. 91 and 99). It should be noted that we deal here with, so to say, market failures which are secondary in character – in the beginning the state reacted to the inefficiencies of international trade exchange, and then it turned out it was necessary to make adjustments to the already implemented changes.

In the context of the complexity of such correlations, attention should be given to the government's major foreign trade intervention tool – the promotion of exports. The institutions which deal with these issues carry out activities in all EU member states. Their tasks can be divided into four categories:

1. Building a country image,
2. Providing services in support of exporter activities,
3. International marketing,
4. Advisory services and information.

The effectiveness of promotion expenses depends on a number of factors such as a country's social and economic situation and its economic development potential (a country's economic advancement should be considered), economic policy objectives, corporate sector expectations, the assessment of hitherto pro-export activities, and external economic conditions. Also, it should be borne in mind that despite a positive correlation between the volume of export support expenses and the size of exports, research studies indicate that after achieving a certain level the effectiveness of such expenses is limited (especially in the case of highly developed countries) (Gawin, 2008, pp.37-40).

This issue gains in significance in the context of an increasing number of countries (as already mentioned) which implement trade restricting policies. WTO data indicates that from 2008 to May 2016, such restrictions amounted to 2,835, with a mere 708 being lifted. It also applies to EU member states, e.g. Hungary's quality assurance tax (being, in fact, a hidden retail sales tax), or Romania-imposed regulation which states that more than half of the assortment of products in retail chains should originate from domestic businesses and be appropriately displayed. Another example is the requirement imposed in several countries to implement minimum wages for transport services in their territories (Wedziuk, 2017).

The issues of effective export support policies are discussed in literatures, also playing an important role in business practices. Therefore, they deserve attention from the perspective of the adopted tools, which can be divided into two main groups (Gorynia,1996):

- Foreign trade policy (trade and FX policy tools),
- General economic policy (tax and credit policies, reflected in supporting export activities through tax and credit preferences, without discriminating business entities or specific goods).

Another common classification identifies treaty-related activities, economic and financial instruments, and information and promotional support tools (Pierzchlewski, 2011). The first group of instruments, implemented by government superior bodies, comprises those of strategic significance, affecting access to overseas markets as well as the legal framework for implementing foreign trade policies (their justifiability is discussed above). They include the following:

- Establishing political and treaty relations at the governmental level,
- Membership in international organizations,
- Entering into trade and group integration trade agreements.

The other category of export support instruments includes the following economic and financial instruments:

- Exchange rates,
- Subsidies and tax exemptions,
- Lending instruments (e.g. governmental export preferential loans, loans granted by commercial banks to importers or their banks (so called combined aid programmes), trade credit, and interest subsidy payments,
    - insurance instruments (including insurance companies' guarantees granted to the institutions which offer credit export facilities, foreign investment insurance, and risk hedging (higher production costs, exchange risk, etc.) (Bednarczyk, 2000), (Mańczak, 2013).

The third type of export support measures comprises promotion and information tools. On the one hand, they comprise activities aimed to promote a country in a macroeconomic dimension, that is to create its positive image as a business partner, and to support the promotion activities of particular companies through co-financing exhibitions and promotion campaigns, and, on the other hand, undertakings aimed to provide comprehensive information about market conditions through, among others, relevant publications of collected information. Such activities are usually carried out by dedicated agencies.

Financial risk protection can be based on three systems (Nikołajczuk, 2009). Under the first system, the state supports exclusively risk protection, while private market institutions finance their transactions, which indicates the state's limited impact on correcting market failures. The second system consists in supporting one institution both in financing and protecting export transactions, while the third system relies on two or more institutions supported by the State Treasury – one of them supports financing, and the other one is responsible for risk protection.

As already mentioned, market failures in foreign trade are corrected by specialised institutions. In Poland, the original initiatives in this area are undertaken by the Ministry of Investment and Development (MID). The Ministry has developed a project which sets priorities for industrial policies for the years 2015–2020+ (Project, (http://konsultacje.gov.pl/node/3692). It includes a plan for expanding activities in overseas markets through a more effective access to the EU's internal market, which is facilitated by creating appropriate administrative conditions.

The table below presents a list of selected priorities and entities responsible for implementation.

Attempts to correct market inefficiencies are mainly vested in the hands of the MID. It appoints entities which implement relevant programmes, or commissions tasks to existing institutions. In accordance with the above presented classification of the types of support, two groups of institutions can be identified (https://www.mpit.gov.pl/).

The first group comprises the organizations which offer professional support (some of them):

- Overseas Commercial Offices of the Polish Agency for Investment and Trade: Similar tasks to those above, and supporting Polish investors abroad and foreign investors in Poland,
- Association of Polish Exporters,

Table 1. Selected development priorities in Polish foreign trade in 2014–2020.

Entrepreneurs	Leading organisations	Cooperative organisations
Improvement of the foreign markets expansion	Entrepreneurs, entrepreneurs' organisations	MID Ministry of Foreign Affairs Export Credit Insurance Corporation
Administration		
Improvement of the access to the internal EU and external markets efficiency	MID Ministry of Infrastructure	entrepreneurs' organisations
Creation of the stabile legal and fiscal environment to the company's	MID Ministry of Environment Ministry of Finances Ministry of Justice	entrepreneurs' organisations
Creation of the Poland's image as an innovative country and long-term investments friendly	MID Ministry of Foreign Affairs Polish Investment and Trade Agency	entrepreneurs' organisations
Rating of the using support instruments efficiency	MID	entrepreneurs' organisations
Trade development barriers identification	MID	entrepreneurs' organisations

Source: own research based on: Project of 5 May 2015, http://konsultacje.gov.pl/node/3692

- National Chamber of Commerce, cooperating with the Government (accompanying business delegations representing the MID and the Ministry of Foreign Affairs) and its agencies under international projects,
- Centres for Investor and Exporter Services (COIE), offering professional assistance to exporters - 15 entities which offer various forms of free information-related assistance,
- Polish Agency for Enterprise Development (PARP), engaged in implementing national and international projects financed by structural funds, state budget and European Commission long-term programmes,
- Polish Chamber of Commerce of Importers, Exporters and Cooperation, representing the interests of companies operating in these business areas.
- The other group comprises institutions which offer financial support:
- Ministry of Finance, responsible for granting government loans for financing the supplies of goods from Poland,
- Bank Gospodarstwa Krajowego/Bank of National Economy is a state bank for development, engaged in financing major infrastructure investment projects, and stimulating corporate development in the domestic and overseas markets,
- Polish Development Fund – a state capital group mainly engaged in supporting export activities and entrepreneurship as well as advising and promoting Polish enterprises in international markets. The major programme implemented by the Group in its export support activities are De Minimis guarantees for SMEs,
- Korporacja Ubezpieczeń Kredytów Eksportowych S.A./Export Credit Insurance Corporation, offering trade insurance to Polish entrepreneurs as well as services ensuring secure trade transactions in Poland and overseas markets. Its activities focus on insuring deferred payment trade receivables and granting insurance guarantees. It is the only insurance company in Poland entitled to offer export insurance guaranteed by the State Treasury, ensuring the security of trade transactions in high political risk markets. The Corporation is the only entity in Poland which insures long-term export investment projects with two-year or longer maturities,
- Regional Financing Institutions – the regional partners of the PARP – cooperating in the implementation of schemes which target micro businesses and SMEs.

January 1, 2017 – the establishment of the Polish Investment and Trade Agency for the purpose of making an effective use of the existing pro-export, pro-investment and promotion resources. The Agency will be responsible for developing export and foreign investment support strategies, implementing Polish economy promotion policies, developing advisory services for exporters, and expanding the scope of export activities. Moreover, the liquidated Trade and Investment Promotion Departments are to be replaced by Trade Offices, which are designed to effectively meet exporters' expectations (https://www.mr.gov.pl/) – it is planned to establish 69 outlets, especially in "prospective non-European markets" (Algeria, India, Iran, Mexico and Vietnam), and the programme is to be enhanced by intensified promotion campaigns, partially relying on proven solutions (e.g. Expo fairs) (Osiecki, 2016). In addition to that, the MID has launched (or is planning to do so) promotion campaigns for 12 selected sectors, and an on-line information campaign dedicated to promoting the Polish Economy Brand, aimed at creating a positive image of the Polish economy in overseas markets (https://www.mpit.gov.pl). The effectiveness of all these measures, however, depends on entrepreneurs' willingness to take advantage of them. The results of long-lasting research studies conducted by IBRKK point to the limited awareness of particular support

instruments, especially institutional ones (Szymanik, Szymanik, 2005). A research study conducted by the University of Economics in Poznań indicates that 30% of the analysed entities make use of the offered support instruments (a similar proportion is recorded in other countries). Exporters are more inclined to rely on their own experience or Internet information. A number of enterprises are not even aware of the fact that major government institutions (Export Promotion Portal, Polish embassies and PARP) offer assistance in carrying out international operations (Bartosik-Purgat., Mruk, Schroeder, 2013). It is a major barrier to the state's effective activities aimed to correct market inefficiencies in foreign trade.

The effectiveness of newly established institutions can be hindered by a number of factors, reducing their ability to correct market failures. The most frequent adverse factors – which also occur in export promoting institutions in other countries – include unfavourable external conditions (the above mentioned business partners' protection of their own markets), the lack of information about available assistance programmes, excessive bureaucracy, management errors, or the excessive authority of various institutions. Also, what is missing is something that can be referred to as economic diplomacy – politicians' failure to understand their indispensable role in establishing a great number of trade relations (Bryła, 2017).

CONCLUSION

The above presented analysis leads to several conclusions. An analysis of theoretical works indicates that they focus on the effects of market inefficiency on a country's internal market without consideration given to a broader international perspective. It is an analysis of the selected types of market failures that could allow for presenting the international aspects of the problem, referring them to such an area as foreign trade. Therefore, it would be necessary, in the conditions of increasing globalization and the interdependence of particular economies, to broaden the scope of research by analysing various types and impact of market inefficiency in an international dimension.

An ever-increasing role of transnational corporations is one of the reasons for which state interventionism in creating administrative and legal conditions for developing trade exchange should not be assessed only negatively. Without responsible government policies economies would be dependent on corporations' arbitrary decisions. Although a free-market economy is regarded to be the most efficient regulator, it tends to behave in a disorderly manner, not giving consideration to social and economic goals. Therefore, state interventions can put various situations in some sort of order, setting desirable directions for strategic and social development. However, it does not imply that the state is the only expert – decision-makers *do* make mistakes, so the state should focus on improvements in administration and law, which is recommended by Polish entrepreneurs (Horbaczewski, 2016). Enterprises in Poland often stress the need for extending the scope of state activities and providing easier access to economic tools and credit facilities as the major drivers of the development of export. However, the achievement of these goals is hindered by such factors as the fear of dependence on overseas markets and their business cycles (the case of small countries or those without diversified export potential, e.g. Iceland (Szymanik, 2017b), a great burden on the central budget resulting from financial incentives, or possible overseas business partners' retaliatory response.

It should be borne in mind that because market inefficiencies occur at national as well as international levels, and governments – acting independently – have limited impact on transnational market distortions, countries are often forced to resort to export support instruments to enhance the competitiveness of domestic enterprises (Mańczak, 2011). Without state interventionism, trade exchange would be car-

ried out in less favourable conditions. It also applies to creating a friendly environment for foreign direct investment – for example, Poland's accession to the EU indicated the inflow of foreign capital, which had implications for further international trade exchange. Without trade agreements and state regulation breakthrough changes would not have been possible.[6]

The above considerations can be concluded by two quotes. The first one (Carden, Horvitz, 2014) is a statement of general character: the criticism of market failures does not justify *ipso facto* government intervention, and the only reliable way of defining a market failure as the actual "failure" is referring it to an unachievable theoretical ideal markets are not always perfect. The other quote comes from (Giza, 2013, p.155), who claims that a market, similarly to all other mechanisms, has its limitations – they can be identified on condition that we identify the indications of their failure; in some cases they are so significant that it seems desirable to implement correcting and restricting measures in specific areas.

Foreign trade seems to be such an area.

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ENDNOTES

1 This term is used by Adam Smith very rarely, and it refers to factors which distort a given order. It never applies directly to markets.

2 Some economists claim that Keynes was against economic "adjustments".

3 INCOTERMS (International Commercial Terms) are a set of international principles set forth by the International Chamber of Commerce in Paris, applied in purchase-sales agreements. Due to economic changes, the rules are subject to continuous modifications (first published in 1936). The implementation of the rules depends exclusively on mutual agreements between business partners. The last version, binding as of 1 Jan 2011, is referred to as INCOTERMS 2010. The rules define activities, costs and risk related to the delivery of goods. They do not cover such areas as terms of payment or transfer of ownership. It is assumed that the moment of delivery implies the transfer of risk from seller to buyer. Currently, INCOTERMS refer to those which apply to all modes of transport and those related to sea and inland water transport.

4 Non-economic distortions include embargoes resulting from political decisions.

5 For example: public aid, commercial finance, export subsidies, investment support, local requirements and regulations, non-tariff barriers, state enterprises, migration restrictions, other service sector restrictions, state trading companies, import subsidies, protection of intellectual rights (Global Trade Alert database), 13.09.2018.

6 Also, attention should be given to other factors, not affected by the state, including growth stimulating business cycles.

Chapter 18
Using European Carbon Dioxide Emission Allowances for Investments in Storage Technologies

Domagoj Vulin
Faculty of Mining, Geology, and Petroleum Engineering, University of Zagreb, Croatia

Maja Arnaut
Faculty of Mining, Geology, and Petroleum Engineering, University of Zagreb, Croatia

Lucija Jukić
Faculty of Mining, Geology, and Petroleum Engineering, University of Zagreb, Croatia

Daria Karasalihović Sedlar
Faculty of Mining, Geology, and Petroleum Engineering, University of Zagreb, Croatia

ABSTRACT

European Trading Scheme should encourage the idea of CO_2 utilization and/or underground storage. Despite the large estimates of CO_2 storage capacities, cost-effective storage has not been performed in the EU. As EU ETS went through several phases and is tested to the level that it can be called mature, the trends of CO_2 allowance market prices can be analyzed. CO_2 reduction can be achieved by simultaneous injection for CO_2 Enhanced Oil Recovery (EOR) commercially, which is proved outside the EU. The technology is well developed as a part of the oil and gas business, and the mover for implementing such technologies might be CO_2 allowance price. As investments in those technologies are long-term and extremely capital intensive, this chapter discussed CO_2 utilization and storage in the context of EU ETS. Additionally, the chapter presented statistical analysis that helps long-term CO_2 price understanding; the connection of CO_2 price with oil, gas, and electricity price; and guidelines for risk mitigation in assessing the feasibility of applying CO_2 utilization and storage (CUS) technologies.

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INTRODUCTION

European Trading Scheme (EU ETS) has been established to encourage projects for CO_2 emission reduction. This represent cap and trade method of CO_2 pricing. The opposing method to ETS is carbon taxation.

By combining cap and trade with carbon taxation, the companies can be (1) sources of CO_2, without a possibility to cost effectively capture or significantly reduce CO_2 emission, (2) large point sources that already separate CO_2 or are able to implement CO_2 capture during the production process and (3) those who can physically reduce CO_2 by utilization in production process.

The EU ETS can include about 50 percent of CO_2 emissions from the power sector and other energy-intensive industries, and should have the following features:

- EUAs are allocated for free
- EUAs can be auctioned
- Emitters are encouraged to lower the reduction costs below the EUA price
- Heavy GHG emitters can buy EUAs and postpone the CO_2 reduction

Buyers and sellers at EU ETS should be allowed to trade directly (without brokers) through exchanges

Trading with CO_2 emissions makes the idea of CO_2 utilization and/or storage underground an attractive option for the research community and companies to consider different technologies and to make underground storage of CO_2 feasible. However, through the history of EU ETS, it can be concluded that CO_2 price volatility i.e. the market stability is the key issue for stopping CO_2 investments (Figure 1). The implementation of EU ETS is planned in three phases, which are in the literature followed by criticism (Borghesi & Montini, 2016; Karpf, Mandel, & Battiston, 2018):

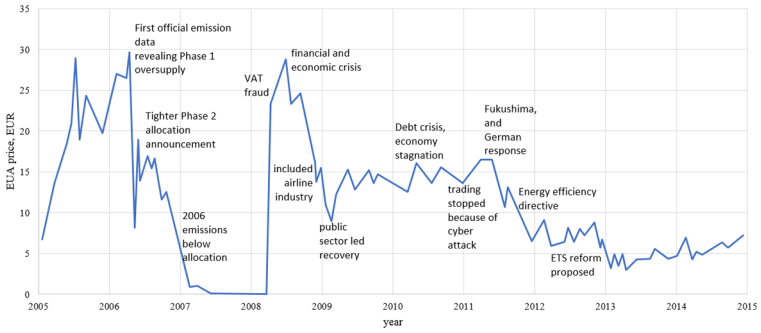
1. 2005-2007. First Phase that was considered as testing phase. It ended with price collapse because of over-allocation.
2. 2008-2012. Second phase coincided with the Kyoto Protocol commitment period of 2008-2012. National allocation plans overcome over-allocation issues but determined allocation cap on the EU level. Traded market volume increased several times as well as the market liquidity.
3. Third phase is ongoing and active from 2013-2020.

Allowance trading is dominated by demanders and EU ETS, whilst supply and demand are vulnerable to the distribution of the free allocation as static parameter (Y. P. Liu, Guo, & Fan, 2017).

Observed in general, EU ETS should negatively affect the energy-intensive industries. However, some analyses show that there is not significant impact on management and profitability of companies in EU (mainly Germany and France) and that power companies profited from freely allocated EUAs (Jaraite & Di Maria, 2016; Y. Liu, Tan, Yu, & Qi, 2017; Martin, Muûls, & Wagner, 2016; Y. J. Zhang & Wei, 2010). What is confirmed in many cases, such companies response to EU ETS system by paying for insufficient EUAs at the end of each reporting period.

The CO_2 storage potential has been assessed in several EU projects for depleted hydrocarbon fields or regional aquifers. However, despite the large storage capacities that are in some countries available for storage of CO_2 that is available from point sources in the country (or in neighboring countries), the intensity of investments to CO_2 injection for underground storage is too high. As for commercial implementation CO_2 markets are generally the sole source of income for CO_2 capture and storage (CCS), that

Figure 1. EU ETS market fluctuations (the figure arranged according to Borghesi & Montini, 2016; Karpf et al., 2018)



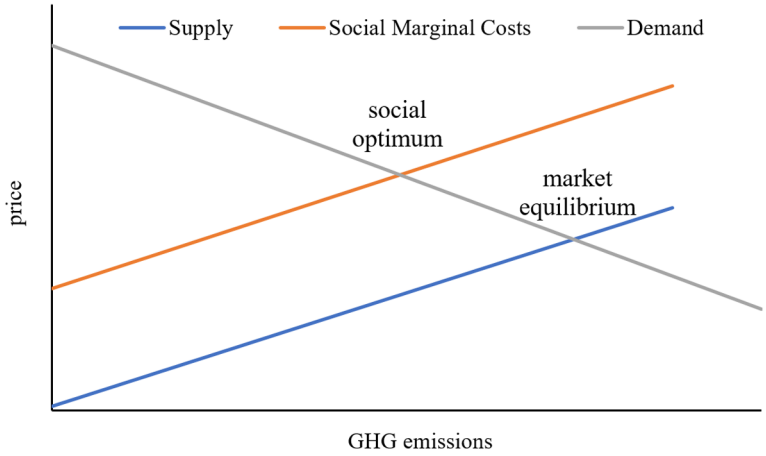
income is insufficient to cover capital and operating costs, and some sort of "market pull" (in form of CO_2 market, electricity market, enhanced oil recovery etc.) and "technology push" (in form of direct subsidies, tax credits, loan guarantees etc.) to create revenue streams to partially aid in the financing is required (Herzog, 2017).

As EU ETS went through several phases and is tested to the level that it can be called mature, the trends of CO_2 allowance market prices can be analyzed. CO_2 reduction can be achieved by simultaneous injection for more efficient oil production (i.e. for CO_2 Enhanced Oil Recovery, CO2-EOR) or by using it as geofluid for so-called engineered geothermal energy (enhanced geothermal systems, EGS) production. In both cases, technology is well developed as a part of the oil and gas business, and the mover for implementing such technologies should be CO_2 allowance price. Because investments in those technologies are long-term and extremely intensive, the analysis of CO_2 price is needed. This chapter will deal with factors that affect the CO_2 price in EU, statistical methods that are used or applicable for long-term CO_2 price analysis, the connection of CO_2 price with oil, gas and electricity price, and guidelines for risk mitigation in assessing the feasibility of applying CO2 utilization and storage (CUS) technologies.

BACKGROUND

The amount of greenhouse gases (GHG) that can be emitted by the power plants, factories and other fixed installations (i.e. emissions that can be defined as "point sources") is connected with EU ETS in a manner that is limited by a "cap" on the number of emission (of one tonne of CO_2 or the equivalent amount of two more powerful greenhouse gases, N_2O and perfluorocarbons - PFC's) allowances (European Comission, n.d.). There are many authors who detected different number of parameters that should govern the ETS price, sorting out allocation of permits, trading ratio, banking, monitoring, environmental benefit, policy goals, costs of abatement to realize the goals, emissions cap etc (Burtraw & McCormack, 2017; Holt & Shobe, 2015; Narassimhan, Gallagher, Koester, & Alejo, 2018). The fact that the EU ETS is strongly related to policy goals and public awareness, motivated some authors to analyze and to try to quantify social cost of CO_2 (SCC) as the economic optimum level of pollution and emissions levelized with marginal abatement cost (Figure 2).

Figure 2. Social cost of carbon



Main method of allocating EUA are auctions within the EU-ETS, which are organized through the private services. The largest volumes are traded at the European Energy Exchange (EEX) and the Inter-Continental Exchange Futures Europe (ICE). The mechanism is arranged in a such way that 50 percent of the revenues from the auctions should be invested in further climate mitigation and adaptation development, including the energy efficiency development. Companies can make a deal between one another (which is called over the counter, OTC contract) and also trade on the ICE and EEX.

Two most important climate policy instruments, called flexibility mechanisms (FM) are also closely connected to the EUA trading and EUA price are Clean Development Mechanism (CDM) and Joint Implementation projects (JI) for GHG reduction.

Developing countries can be supported through investments and knowledge sharing by developed countries to assist the developing countries in sustainable development and both sides in GHG emission reduction. The result of such projects are generated (and banked) tradeable Certified Emission Reductions (CER). CERs can be converted to EUA. Investors can claim EUA carbon credits for the GHG reduction or CCS by financing JI projects. Allowances that can be obtained from JI emissions reductions projects are equivalent to CERs and called Emission Reduction Unit (ERU).

The market equilibrium is defined by private marginal costs i.e. supply, and by demand. For example, the increased need (demand) for transportation by fossil fuel cars will tend to decrease the fossil fuel vehicle supply, but only if it is above market equilibrium point and GHG emissions from fossil fuel vehicles will be reduced by the market force. Social costs (and benefits like environmental climate benefit) are not included at that observation. Social optimum can be reached at higher price and lower quantity produced and the objective is to reach the social optimum by reducing GHG emissions and at the same time to decrease the distance between social optimum and market equilibrium, which is possible by increasing prices of critical technologies that increase the emissions.

In other words, SCC opposes environmental damage cost and abatement cost (Verbruggen, Laes, & Woerdman, 2019).

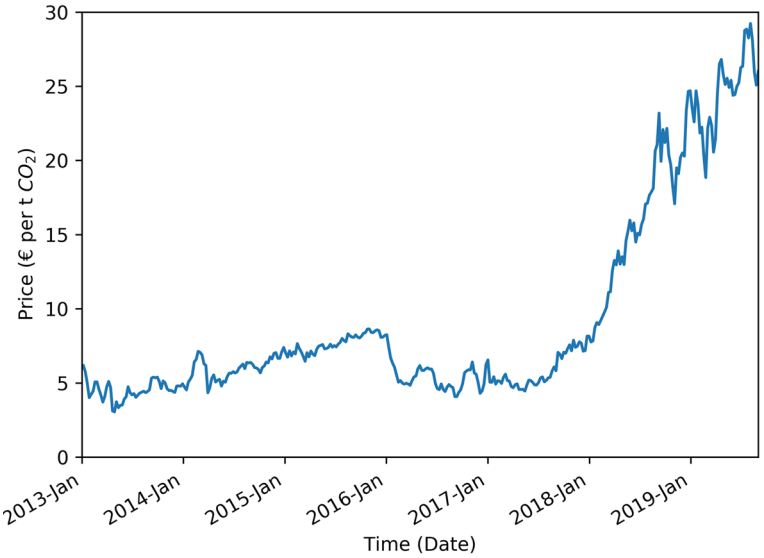
The quantification of SCC is proposed by the analysis of GHG concentration: as the slope of environmental damage cost gets steeper, carbon prices go higher. Some simple models (like capital asset

pricing model, CAPM) shows strong dependence between project uncertainty and risk-adjusted discount rate (Weitzman, 2013).

That leads to the question about the optimal CO_2 price that would lead to cost-effective GHG reduction or would be dominated by price manipulation or some other kind of intentionally caused price instability. The great example is the second period, when more than needed carbon credits, i.e. European Union Allowances (EUA) have been issued, resulting with surplus of 2100 Mt (Zhao et al., 2019) at the end of the phase two (2012). While there are some effects of the Great Recession that affected EU states almost all the time during the same period (due to less industrial activities, CO_2 emissions at point sources were decreased) the amount of traded CO_2 allowances has increased several times, and) at the beginning of the phase three the price reached its minimum (EUA price less than 4 €). Such EUA price shock, caused by EUA surplus, exhibited the need for price balancing, which was approved in July 2013 by EU Parliament as the so-called back-loading measure (Chaton, Creti, & Peluchon, 2015). 900 million EUA has been back-loaded by amendment to regulation EU No. 1031/2010 (approved by Climate Change Comittee), with 400 million in 2014, 300 million in 2015 and 200 in 2016. However, this was just the short-term measure that would avoid surplus and reduce imbalances between demand and supply, but to make the market more stable, with optimum traded EUA volumes in longer period, the reforms of EU ETS that would annually adjust the EUA price are considered. In third phase, especially from year 2017 (and because of regulatory control of the market), the volatility at longer time-windows decreased and trends of EUA price showed more stability (Figure 3). The nature of CO_2 price movement also increased more space for intensive (and more risky) investments, because of probable available compensation at the market in that period.

Distribution of allowances through industrial sectors and across different regions in developed and developing countries can affect the CO_2 market. By providing paid allowances for power industry, trading volumes should increase leaving the positive impact on the CO_2 market (Fan, Jia, Wang, & Xu, 2017).

Figure 3. The EUA prices in 3rd phase (image generated from data acquired by Quandl API, accessed on 29 August 2019)



Fan et al. (Fan et al., 2017) used the method of event study and listed the events that are connected with the announcements of the EU ETS regulatory policies. They used the mean-adjusted model i.e. the average returns within the some period to calculate EUA price returns in the chosen event window and referred to the conclusion of Brown and Warner (Brown & Warner, 1985) that there is no apparent difference in the quality of assessment of event impact by using mean adjusted model and using other models. According to their analysis, among 43 events in phases two and three, 23 events have significant impact on EUA returns.

Makridou, Doumpos, & Galariotis (2019) analyzed companies that are engaged in EU ETS (mainly from manufacturing and electricity sector) and concluded that companies with more development energy efficiency strategies might be more profitable at EU ETS, because in that case implementation of greener technologies is more feasible investment even when intensive investments are needed. The response of public, i.e. customers is more positive to greener companies, which makes additional boost for such companies acting within the EU ETS.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

Efforts to fulfill the EU commitments to reduce their GHG emissions until 2020 by 20% relative to 1990 resulted with energy efficiency measures and increase of renewable energy sources with target to lower the energy consumption by 20% and increase the share of renewable energy sources to 20% until 2020 (Odenberger & Johnsson, 2010). However, the energy demand rises and, despite the progress in development of renewables it is necessary to develop CO_2 storage facilities, which can provide the largest storage capacities in deep saline aquifers and depleted oil and gas fields. CO_2 capture and transport price is the important limiting factor for CCS technologies. Large CO_2 producers should be forced to invest in CO_2 reduction which is regulated through allocation tables. In phase two, Member States issued to each installation allowances according to the National Allocation Plan Table (NAP). In Phase three, National Allocation Tables were formed according to National Implementation Measures (NIMs). For each EU state preliminary calculation of the number of free allowances allocated to each installation in the state is made.

After all assessments are done, European Commission (EC) evaluates them by preparing National Allocation Tables (NAT). Then, the national administrators allocate free allowances in the Union Registry.

In practice, many allowances are issued for free to industries that might be disadvantaged relative to those that are within the EUA allocation scheme (Eichhammer, Friedrichsen, Healy, & Schumacher, 2018). Such system is more centralized, and, according to some authors (Betz, Rogge, & Schleich, 2006; González, 2006), it reduces transaction cost at EU ETS and prevents large surpluses. However, these papers are rather outdated, but maybe accidentally guessed correctly the outcomes after the phase two. Non-compliance penalties, which are significantly higher than predicted (or desired) EUA prices are forcing all obligated parties to reduce the emissions or to engage in EU ETS system.

In the case of oil and gas production, the features of oil and gas price movements are extensively examined (Finn, 2006; Kim & Loungani, 1992). Demand for goods and services that are affected by the price of energy, and which are energy-intensive is usually reduced when energy (primarily oil) price shock occurs (Kilian, 2009). The fact that energy price is heavily affected by structural breaks in the

relationship between oil price and other economic parameters (Ewing & Malik, 2005; Kilian & Vigfusson, 2011) the assessments of risk in the case of any technology that is related to oil and gas industry might be very unreliable. In this work, the hydrocarbon prices and electricity price were examined to detect the fluctuations on energy market price that might discourage or motivate the investments in CO_2 capture, transport and sequestration (storage, CCS). Oil and Gas companies are candidates to be the key players in CO_2 Capture (Utilization) and Storage, CC(U)S technologies research and implementation, due to its long-lasting experience in oil and gas reservoir research, production and management of oil and gas reservoirs, and with experience in development and management of underground energy storage (e.g. seasonal natural gas storage) and geothermal fields. In other words - technology exists, and is already implemented in some parts of the world (Godec et al. 2011, Wright et al. 2009, Leung et al. 2014), but in EU it is uncertain to invest into CO_2 storage. Benefits of combined Carbon Capture and Storage and geothermal energy energy production are also detected as possible feasible CO2 utilization technologies (Gupta & Vashistha, 2016; Randolph & Saar, 2011; Randolph, Saar, & Bielicki, 2013; F. Z. Zhang, Xu, & Jiang, 2016).

Enhanced oil recovery by CO_2 injection (CO2-EOR) is one of the considered CCUS methods. By injecting CO2, the mobility of oil increases, resulting with additional recovery (compared with oil production scenario without CO_2 injection), but also with CO_2 retention in the underground. As the majority of injected CO_2 after EOR project is finished and the oil field abandoned stays underground, EU ETS price should lower the marginal oil price for CO2-EOR, which should attract the attention of oil and gas companies operating in Europe to the EU ETS (and CO2-EOR). US Department of Energy (DOE) already recognized that CO2-EOR projects can add the economic value to the CO_2 capture and transport for further injection underground. They estimated that the CO_2 from power plants used by economically feasible CO2-EOR projects would be sufficient to permanently store the CO_2 emissions for 30 years from 93 coal-fired power plants of one GW capacity. The estimate is done based on oil price of $85/barrel and CO_2 price od $40/metric ton and accounted 20 Gt of CO_2 stored as a part of CO2-EOR projects (Kuuskraa, Van Leewen, & Wallace, 2011).

In Europe, CO2-EOR is hard to implement globally because of (in some working groups over-pronounced) public acceptance issues, complex or non-existent policy and regulatory frameworks for CCS and CO2-EOR which would make and implement the standards for the measurement and monitoring of injected amounts of CO2 to make them eligible for emission allowances under the European Trading Scheme (Ombudstvedt & Gimnes, 2018). Recent published papers about the progress in International Standards Organization (ISO) project ISO TC/265 that should develop comprehensive international standards for CCS and CCUS reveal the problems and regulatory gaps caused by country-specific legislative elements (Ombudstvedt & Gimnes, 2018), but also reveal the necessity of such standard in order to clearly define parts of some specific jurisdictions or to simplify the process by integrating such standard into regulatory framework. The lack of standards that define the workflow for safe storage of CO2 reveals the technological risks that are surely affecting the interest in EU ETS involvement. The authors warn about the vagueness of CCS directives. For example they cite the EU CCS Directive, Article 18, that tries to specify the cessation of liability after monitoring and reporting period of no less than 20 years after the end of CO_2 injection, *"unless the competent authority is convinced that the criterion (all available evidence indicates that the stored CO_2 will be completely and permanently contained) is complied with before the end of that period."*. The problem is that national legislative systems will in most cases implement such directives, simply by just translating the text, without questioning the methods and techniques (technology) required to undoubtedly prove that there is no CO_2 leakage (i.e.

that CO_2 *is completely and permanently contained*). The lack of distinct definitions in this case would probably increase the uncertainty level both for investors (industry) and for authorities, and thus affect the CO_2 prices and stop the investments.

Eller et al. (2011) indicated that oil and gas companies often experience pressures that are affecting the investment strategies, like non-commercial government objectives (pronounced in the case of national oil companies). Their conclusion is that, if political objectives will overtake the control over the oil and gas industry, the production will decrease directly affecting the process.

Hartley and Medlock (2013) analyzed the revenue efficiency of national and partially privatized oil companies and shareholder owned oil companies. They emphasized that national companies, i.e. national owned companies are featured with overemployment and reduced productivity. However, they also found unidentified inefficiency sources. They found that the efficiency of merging firms did not raise, as it is expected from theory. They confirmed that is to expect that the oil and gas developments will be governed by political objectives in mind, because the national oil companies control more oil and gas resources.

Tendency to relate the emission costs with number of allowances has not resulted with significant success, and energy price or widely used economic indicators are not effective for prediction of EUA price movements. Structural break in allowance price was detected in first periods (Hintermann, 2010).

Regarding CCUS, several facts should motivate research of features of EU ETS prices in each phase:

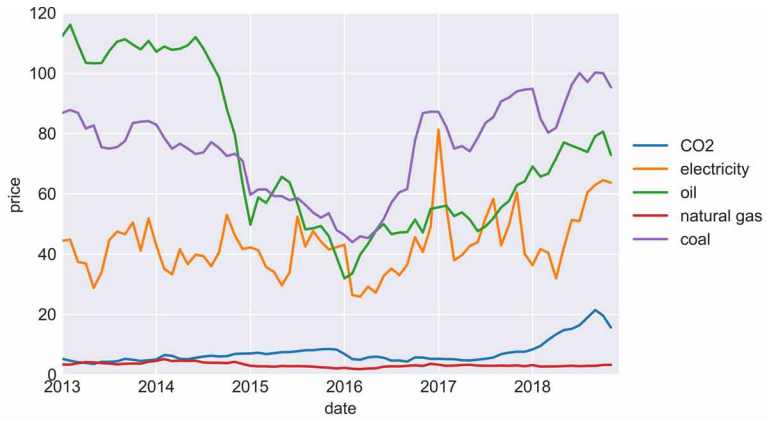
1. The investments in oil and gas industry, i.e. exploration and production of oil and gas are intensive;
2. The investment return period is measured in years, and often in in more than ten years;
3. Production lifetime of an oil field (and often of a natural gas field) is usually several decades. In other words, oil fields produce long time after research-team (along with all other expert and management teams) is retired. This is especially important because the credits for a profitable project are not given to specialists who developed them;
4. Carbon price is not at levels that encourage CCS investments. Moreover, the trust in the trading system is yet to be built, because it has been discredited with incident such as registry phishing and value-added tax frauds (Dhamija et al. 2018).
5. Oil and gas companies are not prone to subsidies, because they often constitute short-term benefits.
6. CO_2 underground storage by itself requires technologies known to oil and gas industry. However, the payback period is very uncertain because of several abovementioned facts.

As the long-term price predictions are impossible, in this chapter only the comparison of simple statistical parameters is given.

THE COMPARISON OF EU ETS PRICES AND COAL, OIL AND NATURAL GAS PRICES

The summary of EUA prices in third EU ETS period does not indicate any direct correlation with coal, oil or natural gas prices (Figure 4). Electricity prices heavily depend on demand, which is very unpredictable. They show slight positive drift in last six years. Some similarities in overall drift can be observed qualitatively for EUA prices, but only until 2018. Next step of the analysis was to determine monthly price differences (variations of average monthly prices, Figure 5). Because of nature of each parameter, values are normalized (Figure 6):

Figure 4. Energy and EUA prices (CO_2 - eur/t, Electricity - eur/MWh, oil - $/bbl, Gas - $/btu, Coal $/t)



$$price_{normalized} = \frac{price - price_{min}}{price_{max} - price_{min}} \tag{1}$$

Normalized price changes are taking into account the maximum and minimum price within the observed period (year 2013 to Nov 2018). If the period is representative for all observed parameters, it will give a proper insight into *relative magnitude* of price change (Figure 7). At this moment, the change of natural gas price can be connected with the change of EUA price, as the standard deviation *relative magnitude* of EUA price changes (EUA RMPC, that is standard deviation of normalized prices changes) decreased (or increased) every year when natural gas RMPC decreased (or increased).

Figure 5. Relative change of prices

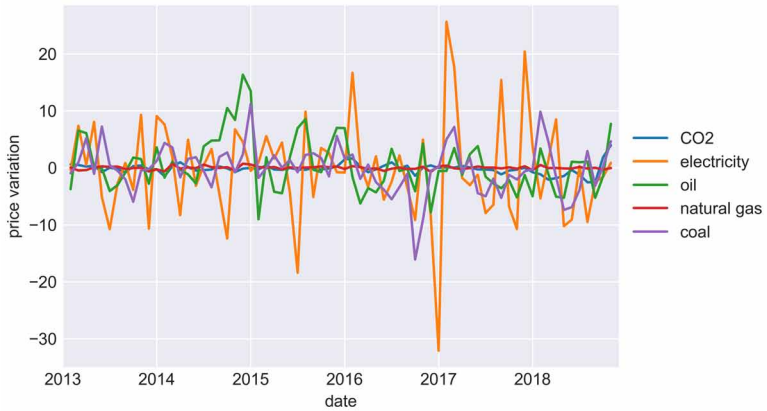
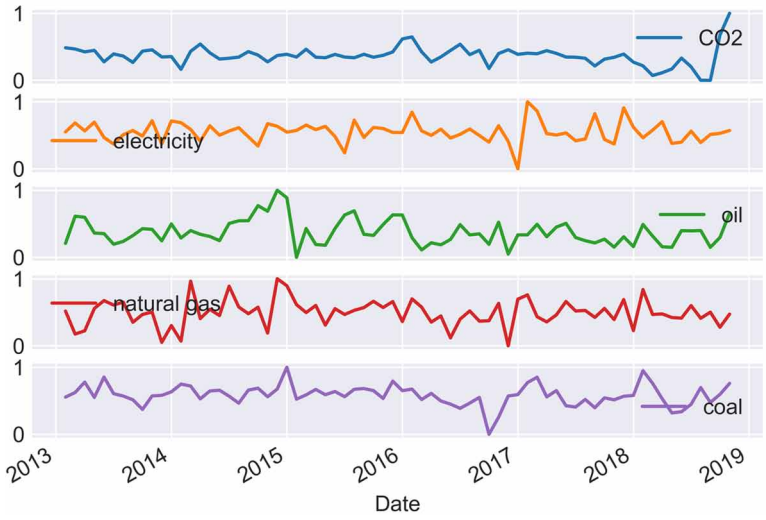


Figure 6. Relative change of normalized prices



SOLUTIONS AND RECOMMENDATIONS

The data processing and the analysis were focused on statistical distribution testing of monthly price changes. As the process was conducted automatically (by coding the function for distribution testing in Python programming language, and with *scipy.stats* library, Jones, Oliphant, Peterson, & Others, 2001), large number of distributions was tested. Distributions are evaluated by finding the best goodness of fit by Kolmogorov-Smirnov (K-S) test, i.e. the test statistic (D, supremum between CDF's of two samples) and p-values (the probability that the D statistic value will be larger than observed). Because every distribution testing method has its disadvantages, distributions are also checked visually by plotting (Figure 8). Top 3 distributions for every parameter are listed in Table 1.

Johnson SU distribution (Johnson 1949) shows in most cases the best fit. However, it must be mentioned that the distributions might be different if different time window (e.g. a weekly or quarterly) for the analysis of price changes was used. Extensive analyses were performed for purposes of ESCOM project, however, the distribution testing only gives insight to more detailed features of price changes and volatility in general but can not be used as a tool for predictions of risk of long-term investments such as CCS.

Figure 7. Standard deviation of normalized prices changes (left) and of absolute prices changes (right)

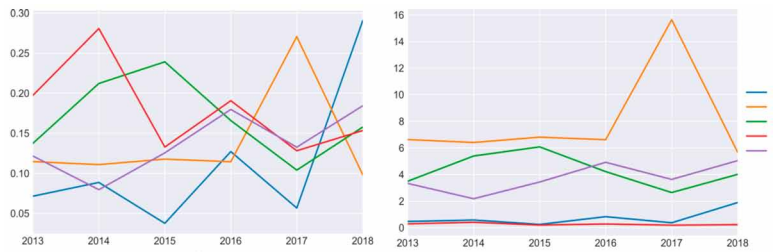
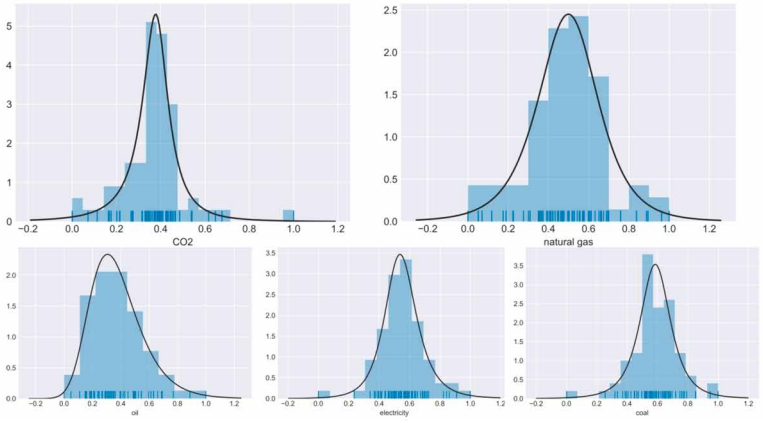


Figure 8. Normalized price changes and their fit to Johnson SU statistical distribution (first row: left - CO_2, right - natural gas; second row: oil, electricity and coal from left to right, respectively)



FUTURE RESEARCH DIRECTIONS

Stochastic behavior of EU ETS prices is widely investigated but further research is needed. The most of authors perform statistical and stochastic exercises focused on energy price movements or CO_2 price changes and many methods can be overviewed through their conclusions, such as, (1) for electricity demand forecast, ARMAX - autoregressive moving average with exogenous inputs (Darbellay & Slama, 2000), ANN - artificial neural network (Abraham & Nath, 2001), ARIMA - autoregressive integrated moving average (Erdogdu, 2007), GARCH and EGARCH - Exponential generalized autoregressive conditional heteroscedasticity (Bowden & Payne, 2008; Hickey, Loomis, & Mohammadi, 2012), (2) for renewables, ARIMA and SARIMA - seasonal autoregressive integrated moving average (Cadenas & Rivera, 2007; Jeong, Koo, & Hong, 2014), MA - moving average (Li, Su, & Shu, 2014), (3) for fossil fuels, SARIMA (Ediger & Akar, 2007), Brownian motion, GARCH and mean reversion (Meade, 2010), MA (Xu & Wang, 2010) and (4) for CO_2 allowances price GBM - geometric Brownian motion (Tian et al., 2017), autoregressive GARCH = AR-GARCH (Benz & Trück, 2009; Paolella & Taschini, 2008) etc.

In this chapter, approaches like event study were referred (Jong, Couwenberg, & Woerdman, 2014; Oestreich & Tsiakas, 2015; F. Zhang, Fang, & Wang, 2018). Connections between stochastic methods and events should be investigated. Many research papers that have been published are focused on fast (hourly, daily) price changes, and such research is applicable only for trading. On the other side, similar methods might be implemented and combined on larger time-windows.

For long-term investments in Carbon Capture, Utilization and Storage (CCUS) it is required to develop method or a decision workflow that would quantify and reduce risks of the implementation of the respective technology. Such methods and tools should detect the market stability level and EUA price should be reliable parameter in cost effective CO_2-storage scenarios. The authors of this chapter are strongly convinced that CO_2 has to be utilized, i.e. that CCS technology as pure storage will not be feasible for very high EUA prices. On the other side, if CO_2 injection is used to enhance oil, gas or geothermal reservoir production, large quantities of CO_2 will also be stored in such reservoirs, which eliminates much of the capital and operating expenses, from a CO_2 storage standpoint or from an additional (oil, gas or geothermal energy) recovery point of view. In other words, the possibilities for synergy between

Table 1. Summary of best fitted distributions

	distribution	D	p
CO_2			
	johnsonsu	0.071523	0.866390
	t	0.074513	0.831842
	laplace	0.082111	0.737905
Electric power			
	johnsonsu	0.040681	0.999825
	t	0.049481	0.995472
	fisk	0.051749	0.991975
Oil			
	johnsonsu	0.055165	0.983415
	exponweib	0.056375	0.979249
	johnsonsb	0.058606	0.969794
natural gas			
	hypsecant	0.041061	0.999789
	johnsonsu	0.042821	0.999532
	t	0.045671	0.998596
coal			
	johnsonsu	0.056213	0.979844
	t	0.058458	0.970495
	hypsecant	0.065114	0.927959

the economics of enhanced reservoir production methods and the economics of CO_2 storage needs to be better studied, with focus on price movements and marginal costs of all respective parameters (e.g. oil price and EUA price, or the price of electricity from renewables and EUA price etc).

CONCLUSION

Policies should motivate CCS through the early deployment phase which must include the integration of new technologies and mechanisms for all segments of CCS.

Oil and gas companies can immediately implement many of required technologies, but the changes of business policy in oil and gas companies are required.

Technological innovation in efficiency of carbon capture and CO_2 utilization technologies must be encouraged. For oil and gas companies - this leads to enhanced CO_2 oil recovery methods (CO2-EOR) that are proven as successful both for oil recovery and CO_2 storage (injected CO_2 retention).

As the oil and gas operators (companies) would receive EUA or other subsidies in some form of carbon credit for stored CO_2, these subsidies would become a new source of revenues. From the interest of climate policies, it may seem that this would support companies that produce fossil fuels which are the source of GHG emissions. However, by supporting CCUS technologies (in the case of oil and gas

production), the marginal cost of oil for CO2-EOR would be reduced, resulting in the widespread use of the CO2-EOR methods, and resulting in low oil prices. In that case oil production using other methods (e.g. by hydraulic fracturing) would be less cost effective.

In EU, there is no standard or a workflow for recording, monitoring, verifying and accounting of amounts of (anthropogenic) CO_2 that is stored during CO2-EOR CO_2 injection.

CCUS technologies need improved quality of CO_2 transport system, and research network, which might include merging of departments between different companies and cooperation with research institutions. However, the analyses of such merging already showed decrease of efficiency in most of aspects of CCUS (research, development of CO_2 capture and transport network, development of legal frameworks which are often too explicit or which are featured with too specific to implement under different operating conditions etc.)

In this work, based on statistical analysis following conclusions are drawn:

- CO_2 price and natural gas price have smallest standard deviations (which can be interpreted as volatility) of prices, i.e. price changes. However, CO_2 price jump in 2018, makes estimates of price changes unreliable.
- CO_2 price changes follow the natural gas changes which is notable from standard deviation of normalized prices changes.
- Electric power and natural gas monthly price changes show the best goodness of fit to Johnson SU distribution. This confirms that observation of natural gas price changes might be good indicator for assessments of EUA prices.

Generally, more data on EUA prices is needed, which means that the EU ETS market is immature and long-term investments in CCS, without big subsidies from governments, will not be attractive soon.

By summarizing, stability of natural gas prices (and natural gas seems to be the most important energy source for energy transition in EU) might accelerate the stabilization of EUA prices.

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KEY TERMS AND DEFINITIONS

Carbon Capture and Storage (CCS): The most used term for technologies where large amounts of CO_2 are captured from *point sources* (like coal-fired thermal power plants), transported and permanently stored in deep geological structures, such as depleted oil and gas fields or large deep saline aquifers. The strict criteria is applied for CCS regarding CO_2 leakage to the shallow formations with potable water, which the reason that CO_2 storage site must be selected carefully, and the CO_2 injection must be monitored for eventual leakage, which makes such projects cost-expensive. Regarding leakage risks, depleted oil and gas fields should be more reliable because they already contained fluids (produced oil or/and gas) for thousands of years.

Carbon Dioxide Equivalent (CO2e): The equivalent of the mass of carbon dioxide with the same global warming potential as the emitted weight of one (or more) of the greenhouse gases (evaluated by its estimated global warming potential).

Carbon Utilization and Storage (CUS): A more focused range of CO_2 capture, transport and storage technologies that is supported with some cost-effective method of underground (Energy) exploitation. Considered state-of-the-art technologies are enhanced oil recovery, enhanced gas recovery, and CO_2-enhanced geothermal systems.

Certified Emission Reduction (CER): CO_2 (i.e. GHG CO2e) reduction units (measured in metric tons) that can be transferred under the EU ETS because it is generated from a clean development mechanism project activity.

CO_2 Benchmarking: Workflow and system of protocols (usually implemented in larger companies) used to determine possibilities to improve energy efficiency or reduce CO_2 emissions, resulting with low-emission production and, possibly, free allocation in the EU ETS.

Emission Reduction Unit (ERU): The right to emit the same amount of carbon dioxide equivalent (metric tons) achieved through emission reductions accomplished in Joint Implementation projects.

Enhanced Geothermal Systems (EGS): Geothermal energy is usually produced from high-temperature geothermal water reservoirs. Even though the technology is detected early, there is increase of research of using CO_2 as geothermal fluid (by continuous injecting, heating underground and producing injected CO_2). Due to very high mobility compared to water, CO_2 might extract more geothermal energy, while some of CO_2 retention occurs, i.e. some of CO_2 is "lost" in the reservoir. There is also first period when injected CO2 is moving to the production well (during that period CO_2 is not produced) and that period can be considered as pure CO_2 storage.

Enhanced Oil Recovery (EOR): A tertiary oil recovery method that can yield additional oil recovery by injecting gas, polymers, surfactants etc. into oil reservoir. If CO_2 is injected and mixed with oil, the oil becomes more mobile. CO2-EOR method is attractive as CUS technology, supporting the feasible CO_2 storage, because the retention of the most of injected CO_2 in the oil reservoir and cost-effective oil recovery. About 90% of CO_2 projects is implemented commercially in USA, because of a well-developed CO_2 pipeline network, i.e. the CO2-EOR feasibility largely depends on CO_2 availability.

Greenhouse Gas (GHG): Six natural or anthropogenic gases that are mostly affecting the atmosphere are defined as GHG: Water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), hydrofluorocarbons (HFC), nitrous oxide (N_2O) and ozone (O_3). GHG absorb and emit radiation within the thermal infrared range and contribute to the greenhouse effect and global climate change. According to the Greenhouse Gas Protocol, the most important GHGs produced as a result of human activities are: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorinated compounds (sulphur hexafluoride, nitrogen triflouride, perfluorocarbons, fluorinated ethers, perfluoropolyethers, chlorofluorocarbon, and hydro-chlorofluorocarbon.

Chapter 19
Appropriateness of Standard Accounting Tools in Measuring Social Innovation in the New Global Economy

Sanja Franc
https://orcid.org/0000-0001-8787-4429
Faculty of Economics and Business, University of Zagreb, Croatia

Mirjana Hladika
https://orcid.org/0000-0003-3170-9138
Faculty of Economics and Business, University of Zagreb, Croatia

ABSTRACT

The global economy brings about new trends, challenges, and needs, which require new solutions. Social innovations can have a major role in satisfying unmet social needs and increasing overall well-being. Measuring social innovation is therefore an important task with the purpose of informing the stakeholders about the performance value that an innovation creates. Standard accounting tools often neglect social or environmental impact, and thus, new or adjusted methods need to be developed. The objective of this chapter is to analyze methods of measuring social innovation and discuss advantages and disadvantages of traditional measures versus new approaches with the purpose of better understanding the significance of social innovation in the global economy. The chapter consists of six parts. After the introduction follows the literature review. The third part of the chapter discusses different approaches to measuring innovations while the fourth part suggests some new approaches to measuring social innovations. The fifth part describes future research perspectives. The final part is the conclusion.

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INTRODUCTION

Globalization, industrialization, accelerating urbanization and development of technologies have brought many changes in the way people, businesses and countries communicate, interact and perform. New global environment is putting forth new needs and trends as well as many societal and economic issues that require new, or at least modified solutions. Unemployment, poverty, financial crisis, environmental pollution and growing inequalities remain major challenges for governments and communities around the world. In this changing global environment, social innovations can have a significant role in responding to unfulfilled social demands and achieving social well-being. In doing so, social innovations include economic, environmental and social aspects. The purpose of social innovations is to improve the quality of human life, and social well-being in particular. The primary goal of social innovations is systemic change and regeneration of society, and it represents long term changes affecting communities or systems (Dainiene & Dagiliene, 2016). In the narrower sense, social innovations include new products, services, programmes, organizational management, social entrepreneurship or processes that simultaneously meet social needs and create new social relationships or collaborations (Bureau of European Policy Advisors, 2011; Murray, Caulier-Grice & Mulgan, 2010). Cooperation and communication between all citizens, civil society organizations, local communities, entrepreneurs (businesses) and public servants is needed in order to achieve the goals of social innovations. In other words, there is a need for alliances between small organizations, individuals and groups that create new ideas, are mobile and respond quickly to changes, on the one hand, and large organizations, governments and non-profit organizations that are not so creative but have the capacity to implement and solid foundation, on the other. Both sides are mutually needed, and social change is the result of their alliance.

Social innovations are usually driven by a social mission and the value they create is necessarily shared value (social and economic) between all participants involved (Păunescu, 2014). Lubelcová (2012) has highlighted that social context of innovations has influenced the way innovation is perceived; that means not only as a tool and source of economic growth and competitiveness, but also as a potential tool for achieving social goals and social cohesion in society. When finding solutions to problems of modern society and improving life standard of citizens, the main driver of all innovations should be social rather than economic interest. Based on this, different definitions of social innovations have been derived and there is still no common definition of this concept. The European Commission (2013) defines social innovations as the development and implementation of new ideas (products, services and models) to meet social needs and create new social relationships or collaborations. Dawson and Daniel (2010) pointed out that social innovations are the main driver of development and implementation of new ideas for solving problems, improving social conditions and improving the well-being of people in a society. Phills, Deiglmeier & Miller (2008) define social innovation as a novel solution to a social problem that is more effective, efficient and sustainable than existing solutions, and for which the value created accrues primarily to society as a whole rather than private individuals.

Thus, the following criteria are considered as crucial for some innovation to be categorized as a social innovation (Spiesberger, Gomez & Seigneur, 2018):

- **Novelty:** It usually implies place, time and scope of action
- **Social Feature of the Intervention:** Involvement, participation of target groups and benefits
- **Sustainability:** Effectiveness after acceptance by users
- **Significant Impact on Society:** Duration, tangible changes and growth potential.

As said, in todays' global environment, more attention should be given to sustainability and social needs. The concept of social responsibility is becoming increasingly valuable and it is frequently used by many companies which are willing to gain trust, collaborate with society and the market on which they operate. Doing business in a socially responsible manner is becoming an imperative in a modern business environment. Socially responsible business performance contributes to the process of innovation and direct value creation. The European Commission (2011) defines corporate social responsibility (CSR) as a concept whereby companies integrate social and environmental objectives in their business processes and in the interaction with different stakeholders, in a voluntary manner. Today, corporate social responsibility entails organizational responsibility according to employees, society and environment. Weisenfeld (2012) highlighted that this type of responsibility can be described by the triple bottom line approach that incorporates three dimensions of companies' activity and responsibility, and those are social, environmental and economic (financial) dimensions.

In determining whether some social innovation is successful, that is, did it fulfill its role, it has to be measured properly. Measuring the impact of innovations in general, and especially social innovations, is a demanding process because it should include different changes that occur, which are not always immediately visible or tangible. There are different evaluation questions that can be asked when measuring output or outcome of some social innovation. Different stakeholders with different interests have different needs for evaluation and therefore, ask different questions. Also, the needs of particular interested parties, especially social innovators and social organizations, vary, depending on the stage of the process of social innovation and the environment. Due to different needs and different evaluation issues, different evaluation methods can be applied. When applying traditional accounting and management standards, environmental and social issues are usually neglected, and social impacts are not explicitly included in the evaluation. Measuring social innovation should inform about the performance value that an organization creates and this demands new and adjusted methods.

The objective of this chapter is to analyze different methods of measuring social innovation and discuss advantages and disadvantages of traditional measures versus new approaches. Accordingly, the purpose of the chapter is to establish specific features and significance of social innovations in the new global environment which put forward the need to develop new tools for evaluating their impact on the society as well on the economy. The main contribution is in systemizing different approaches to measuring social innovation and identifying challenges in developing appropriate indicators since there is no single accepted framework.

LITERATURE REVIEW

There are various sources of economic growth, although recently innovation and technological development have gained much attention. Besides technological innovation which have received much consideration in the past, social innovations are coming forth in current debates. As stated, there is no single definition of social innovations or social impact. But, it is agreed upon that the main purpose of social innovation is the increase of social well-being.

Some authors as Emerson, Wachowicz & Chun (2000) explain that social value is created when resources, inputs, processes or policies are combined to generate improvements in the lives of individuals or society as a whole. According to Gentile (2000) social impacts are wider societal concerns that reflect and respect the complex interdependency between business practice and society. Clark, Rosenzweig, Long

& Olsen (2004) define social impact as the portion of the total outcome that happened as a result of the activity of an organization, above and beyond what would have happened anyway. In their research, Maree & Mertens (2012) explain that the existing economic indicators of non-market production are based on the approach of optimization, that is, the objective is to assess the value of production and justify the use of resources. The most commonly used methods are cost-effectiveness and cost-benefit analysis. Other studies have proposed classifying social impact measurement according to different analytical criteria, assuming variables such as purpose/scope, time frame and orientation as key determinants for the most appropriate social impact measurement metric (Maas & Liket, 2011; Schaltegger, Hahn & Burritt, 2000; Clark, Rosenzweig, Long & Olsen, 2004).

In order to better understand the concept of social innovation and the issues of their measurement, it is necessary to define the notion of "social" apart from the notion of "innovation". While innovations relate to the ability to create new ideas that will bring value, the social part of the concept identifies the kind of value that innovations should provide. Social value is more focused on quality of life, well-being and solidarity, and less on profit. Phills, Deiglmeier & Miller (2008) consider something as a social innovation only if social value or benefit to the society as a whole prevails, rather than the benefit of the private sector, i.e. entrepreneurs, investors and customers. Murray, Caulier-Grice & Mulgan (2010) emphasize the importance of meeting unsatisfied needs, whereby social innovations are defined as new ideas that meet social needs and create new social relationships. Social innovations can also be described as social accomplishments that, compared to existing solutions, provide new improved solutions that are to a lesser extent defined in terms of absolute innovativeness and more in terms of the consequences they carry (Neumeier, 2012). The OECD (2010) emphasizes that social innovations are different from economic ones because they are not based on introducing new types of production or exploiting new markets but focus on meeting new needs that the market has not met or on creating new and better ways of "engaging" people, in terms of giving people a role in the production process.

Since social innovations are still rather new concept and there is no single meaning, there are risks of their misunderstanding or misinterpretation. Taking into account the abovementioned definitions and approaches, there is a risk of misreading the initiatives with certain social motives as social innovations. Social outcome, or effects on the society, is a necessary but not sufficient precondition for something to be considered as social innovation. There is also a risk of misunderstanding the role of the private sector. Social innovations should not be perceived as a way of privatizing public services. It is intended to encourage changes in the performance of existing institutions and individuals in order to find the best solutions for social needs. Involvement of the private sector follows the approach where equal values and quality, ethics and access to services must not be compromised. Thirdly, there is the risk of limiting social innovations only to "bottom-up" innovations or new initiatives. In many instances, social innovations are encouraged by actions at the local level, networking and different participants, and may also be triggered by market initiatives on social challenges.

Defining social innovations represents one important part of the literature, while the other part deals with measuring social innovation and discusses the indicators and methods of evaluation. A conceptual model was developed by Bund, Hubrich, Schmitz, Mildenberger & Krlev (2013) that seeks to present the process of social innovations and accompanying activities in a given environment in a clear and understandable way including the complexity of the task. The model is based on three levels determined by taking into account the internal cycle of making the most important decisions within the process of social innovation. Three different levels are: enabling framework conditions, entrepreneurial activity and field specific outputs and outcomes.

Considering the restrictions and limitations of measuring social innovation, Ametowobla, Baur & Jungmann (2015) have developed a customized methodological framework for social innovation indicators that takes into account indicators at the national and local level. According to their conclusions, the phases of the innovation process are the same for technological and social innovations, and because analytical levels are associated with the innovation process, it is possible to apply similar analytical levels in the evaluation of technological and social innovations. Accordingly, at the national level appropriate levels of analysis are: (1) environmental conditions, (2) entrepreneurial activity, (3) organizational output and social effects. Within these levels, indicators that will best represent the state of the resources, the institutional environment, political environment, social climate, cooperation and networking of enterprises, education, health, employment and similar social issues are selected. At the local level, the key systemic determinants of innovation systems include: the structure of social needs, financial resources, political management and support, social capital and networks.

The Economist Intelligence Unit (2017) has developed the Social Innovation Index that ranks political and business environment in which social innovations are developed. The index includes 45 developed and developing countries. Countries are ranked on the basis of four pillars, which jointly support their ability to develop social innovations: the institutional and political framework, the availability of funding, the level of entrepreneurship and the depth of their civil society networks.

The empirical investigation from von Jacobi & Chiappero-Martinetti (2017) conducted on the three comparative case studies here discussed provided some new, although preliminary and tentative, findings on the impact that social innovation may potentially have on the autonomy of beneficiaries. His study applies a conceptual framework (ESGM) that envisages multi-layered effects of social perceptions of participant's report improvements in autonomy and that social innovations mainly produce intangible outcomes such as knowledge and personal relationships, which are unlikely to be captured in synthetic measures such as average effects or money metrics.

Measurement of social innovations is still a developing area and therefore, new approaches to evaluation and modified indicators are needed, especially having in mind the complexity of this concept. Data and studies on social innovation and social enterprises are scarce and there are no statistical databases for continuous monitoring of these activities. More peer-reviewed empirical studies and a broader range of study designs are needed, including research on how evaluations influence social innovation processes over time, phases, space and scale (von Jacobi & Chiappero-Martinetti, 2017; Milley, Szijarto, Svensson & Cousins, 2018).

DIFFERENT APPROACHES TO MEASURING INNOVATION

Purpose and Methods of Innovation Evaluation

The main purpose of the evaluation process is to determine the effects of some intervention, that is, to identify the change that occurred due to the intervention. Evaluation includes an analytical approach and an attempt to find answers to questions about the final outcome of a policy, strategy, program, project or activity (World Bank, 2013). Evaluation is usually carried out by independent parties, which seek to make wider conclusions and recommendations on some intervention. When performing the evaluation, it is necessary to determine: what is being evaluated, the level and the time frame. It is important to establish a framework for monitoring and evaluation that includes answers to the following questions:

- What to monitor and evaluate?
- What are the activities required to monitor and evaluate?
- Who is responsible for monitoring and evaluation activities?
- When are monitoring and evaluation activities planned?
- Which methods are used for monitoring and evaluation?
- Which resources are needed and where are they targeted?

To evaluate whether some intervention has led to intended results or impacts, criteria and indicators need to be established. The main criteria usually include: relevance, effectiveness, efficiency, impact and sustainability (OECD, 1991). Furthermore, indicators are tools to measure the achievement of an objective (European Commission, 2015). Indicators are measurable target values and represent imperfect programming logic and reality display. The greatest challenge of an evaluator is to develop indicators that will show the logic of the applied interventions. The European Commission has adopted certain rules according to which indicators for monitoring and evaluation should be developed (Giljum & Lutter, 2009):

- **Relevant:** Indicators of measure of concepts with a certain value and reliability
- **Accepted:** All major stakeholders must accept the proposed indicators
- **Credible:** The indicators should be unambiguous and simple to understand
- **Simple:** Indicators are available and feasible from existing or available data
- **Robust:** Indicators are not subject to manipulation.

Measurement approaches mostly use analytical levels that reflect different stages of the innovation process to a great extent, although some stages are often merged. Most indicators are categorized along the following levels (Ametowobla, Baur & Jungmann, 2015):

1. Input/framework (associated with invention/idea generation)
2. Throughput/activities (associated with development/sustaining) and
3. Output/performance (associated with penetration into markets/scaling/systemic change).

There are many overlapping indicators of technological and social innovations. In the last two decades the technological innovation system of indicators has developed significantly and the same indicators are applied for the analysis of the effects of both technological and social innovations. Social innovations are different from technological ones but they share certain features and factors that affect them. In general, guidelines for innovation research are contained in the Oslo Manual prepared by the Eurostat and the Organization for Economic Co-operation and Development (OECD, 2005) and are considered fundamental for organizing the research process. However, this manual recommends a subjective approach to innovation research within an organization and innovations are defined in terms of technological innovations. Concerning social innovations, it is more difficult to apply subjective approach and to determine who has developed them or who is responsible for their effects and dissemination. In other words, in the case of social innovations, the effects and outcomes cannot be measured by market growth rate, profit rate or customer satisfaction. Difficulties in evaluating the full effect of social innovations often make it problematic for non-profit organizations, social entrepreneurs and social enterprises to find sources of capital. Some describe this situation as the gap between social and financial returns.

Table 1. Most commonly used methods of analysis

Method	Description
Input-output analysis	Method used to analyze the interaction between the sectors over a given time period and to predict reaction to a simulated event.
Cost-benefit analysis	Procedure for determining the economic efficiency of a program expressed by a comparison of costs and outcomes, usually measured by monetary value.
Econometric analysis	Use of econometric methods to evaluate the impact.
Counterfactual analysis	The method of comparing the situation without intervention and the situation with the intervention applied. It can include the use of control groups where the user's data is compared to the data of non-users.
Case study	Methods of collecting detailed data and their analysis, usually directed at a limited number of participants.
Network analysis	Analysis for the purpose of understanding social and other forms of interaction between assessment subjects, including the beneficiaries of the intervention..

Source: (Mannik, Miedzinski & Reid, 2011)

Evaluation methodology involves a clear definition of data collection methods based on which the evaluation questions will be answered, and methods of data analysis and interpretation which will enable conclusions on the intervention and further recommendations.

There are different methods of generating primary data, depending on whether new data is collected by observing a phenomenon in the material world or information obtained through simulation of modeled events. For the aforementioned, the most common tools for collecting primary data are: questionnaires, interviews, workshops or focus groups, observation or archival analysis.

Before deciding on data collection methods it is important to determine the purpose of the evaluation. It is then necessary to define key evaluation questions. Responses to evaluation questions should ensure fulfillment of the evaluation purpose (Bilas & Franc, 2018).

After data collection follows data analysis. Data analysis collects evidence in a given sample, either by isolating important data (analysis) or by combining information sources to achieve a greater degree of understanding (synthesis). Different evaluation methods require a separate analysis of each element and the synthesis of all sources in order to examine the patterns of agreement, convergence or complexity. Data analysis plan is an important tool for evaluating how the collected information will be organized, classified, interconnected and compared with evaluation issues, including multi-source integration.

Some methods respond to specific questions better than others. Quantitative measurement approaches are usually more complex and expensive, and none of them cover all outputs and inputs in relation to overall evaluation. In addition, some features cannot be quantified, even though they are critically important (such as the consequences for the society or the environment and product quality improvements). Therefore, qualitative approaches to evaluation are frequently used, although they may lack the objectivity and are less suitable for measuring the results of research and development (R&D) or economic impacts. Therefore, these methods are often considered the most suitable for measuring the quality of production and the degree of achieving precise technological goals. In practice, a combination of different methods is used for evaluation.

The Use of Standard Accounting Tools in Measuring Social Innovation

Majority of currently used tools in social impact measurement practice were not developed expressly for social impact assessment, rather they are based on standard economic methods and tools of financial accounting and reporting (Weaver & Kemp, 2017). These tools are more focused on perspectives and needs arising in social finance than with needs arising from mission-oriented social organisations concerned to improve or to track the effectiveness of their activities and actions.

The process of measuring social innovation impact has its own sequence: first, a template is created, then data are collected, analyzed and interpreted, finally, key information are summarized, reported and discussed. It is necessary to measure economic (financial), social and environmental performance of organizations' activities. Financial and non-financial indicators are used in the evaluation process. Financial information can be extracted from financial statements, while non-financial information can be obtained in several ways. Today, some of the most recognizable tools and methods for measuring and reporting on social impact include: social return on investment, social or sustainable balanced scorecards, social cost-benefit analysis, and many others. The goal of all this methods is to compare benefits and costs of certain activity, project or investment as well as to measure the impacts of corporate activities on society. Choosing the right tool and method depends on the type of organization that wants to measure the social impact, sector, organization size, and a like.

Return on investment (ROI) is a traditional tool and financial metric which is used for measurement of profitability of projects and investments. Return on investment is calculated on a basis of quantitative data (net return on investment and costs of investment). The advantage of this metric is simple calculation when economic (financial) impacts of certain activity are measured, but its disadvantage is the fact that it does not include a social impact of certain activity. Social return on investment (SROI) includes broader social and environmental benefits of certain activity, investment or a project. Social return on investment is based on ROI methodology, but it takes a broader view of returns, incorporating social benefits beyond project earnings, as well as investments that have no quantifiable financial earnings (Kousky, Lingle, Ritchie & Tierney, 2017). Furthermore, Moody & Littlepage (2013) highlighted that SROI require the inclusion of stakeholders in identifying the outputs and outcomes of investments (projects), and that the stakeholders' views are important in verifying the SROI metric.

In the 1990s, Kaplan and Norton (1992) introduced a methodology that combines financial and non-financial measures into a performance measurement system, and this methodology is named Balanced Scorecard (BSC). The Balanced Scorecard is based on four performance measures: financial perspective, customer perspective, internal business perspective and learning and growth. The purpose of Balanced Scorecard is to provide communication and implementation of an organization's mission and strategy as well as to translate the organization's mission and strategy into tangible objectives and measures. Today the sustainable environment is one of the vital elements of organization's strategy. So, in modern business environment where business decision often include issues related to sustainable environment, to meet the social needs and to responsible spending and use of assets and resources, "traditional" Balanced Scorecard does not satisfy the need for measure the impact of this social decisions. Accordingly, the Balanced Scorecard measure needs to include environmental and social aspects as an essential measure of a sustainable business in its original model. The sustainability perspective can be added as a fifth perspective in the Balanced Scorecard model. The sustainability perspective consists of social and environmental performance indicators and highlights the importance of economic, social and environmental responsibility as an organization's goal (Kalender & Vayvay, 2016).

Cost-Benefit Analysis (CBA) is well-established method for analysis of public investments with a goal to compare the benefits and goals of certain investment (project). The costs and benefits of investment (project) are discounted to present values, and then is calculated the cost-benefit ratio. Cost-Benefit Analysis is a tool to measure the total change in individual well-being as a consequence of policy intervention, which is measured by economists as a persons' "willingness to pay" for this policy (Krupnick, Toman & Kopp, 1997). Today, Social Cost-Benefit Analysis (SCBA) is increasingly used as a technique for including environmental factors in investments (projects) (Crookes & de Wit, 2002).

Accounting methods for measurement of impact of different activities provide crucial information for managerial decision-making. Nevertheless, social innovation is a much more complex process with specific dynamics and multidimensional effects. Many of the methods based on standard accounting practices are not designed to measure social effects. Besides entrepreneurial activity, it is necessary to capture framework conditions, societal outcome and organizational outputs as well.

SOLUTIONS AND RECOMMENDATIONS

New Approaches to Measuring Social Innovation

Social innovation strategies often cross sectors, involve changing dynamics, roles and relationships between many actors and challenge conventional wisdom about the nature of the problem and its solutions (Preskill & Beer, 2012).

Usually, two types of evaluation are applied to understand the processes, outcomes and impacts of different interventions. Formative evaluation is performed during an intervention and is meant to improve and standardize it, while the summative evaluation is aimed at analyzing the final effect of the intervention and is performed after its completion. However, social innovations imply a different approach to change from the standard model with a well-known set of elements. Standard methods of innovation evaluation and decision-making models often start from the assumption of linear relationships between causes and consequences. Measuring the effects of social innovation has to include the overall performance, from economic and financial aspect to social and environmental aspect that arise through the implementation of activities. While the long-term goals of social innovations can be clearly defined, the way to achieving them is less clear, which means that it is often not known exactly where, under what conditions or how are they going to be developed. Instead, the primary task of the decision-maker is to identify what activities will cause change; keeping in mind that they are constantly changing. Formative and summative evaluation approaches are usually not structured in such a way to provide decision-makers with real-time information or information about new and unknown events. Such approaches do not support experimenting, research and finding new ways of action.

An alternative approach to evaluating social innovations is developmental evaluation aimed at evaluating social innovations as a process, not just as a product or service. The concept of developmental evaluation is based on the knowledge of complex dynamic systems, insecurity, non-linearity and development (Patton, 2011). Developmental evaluation is a different and opposite process to formative and summative evaluation, as they aim to test the intervention. As said, formative evaluation helps to improve performance, while summative evaluation helps to determine the success and effectiveness of the intervention after its completion. Developmental evaluation monitors new and changing conditions,

clarifies the actual state and provides real-time feedback, thus supporting the innovation process. The purpose and application of developmental evaluation can be summarized as follows:

- Permanent adaptation of interventions to new conditions in complex dynamic systems
- Adapting general principles to a new context while relocating and developing ideas and innovations in a new environment
- Rapid response to changes, real-time solutions and development of new social interventions
- The development of scalable innovations in a way that can be evaluated by summative and formative evaluation
- Feedback on how changes take place, providing evidence of potential problems and necessary changes or adjustments once the diffusion begins.

Developmental evaluation is a good way to evaluate an innovation process, but it can use a wide range of methods, forms and data. It is based on several key considerations, namely (Weaver & Kemp, 2017):

- Social innovators have a strong vision and dedication
- There is readiness and ability to act and develop innovations in conditions of uncertainty
- Using data and providing quick feedback to understand new phenomena during research and innovation process and apply this new knowledge
- Sponsors are ready to try and trust the innovation process and developmental evaluation as a way of following what is being developed
- Evaluators are capable of working without predetermined clear and measurable outcomes or a clearly defined logical model.

To sum up, developmental evaluation provides answers about (Preskill & Beer, 2012) what seems to be working and not working; what elements merit more attention or more changes; how is the larger system or the environment responding to the innovation?

In addition to developmental evaluation, there is also a reflexive or dynamic evaluation resulting from different research and practices for improving the innovation process. It is based on the learning approach. In other words, instead of focusing on studying the impact of innovation on people, environment, or the system, this approach focuses on how stakeholders can jointly achieve transformational innovations. The advantage of using dynamic evaluation lies in the "generative potential" of people, more specifically, in increasing the effectiveness of attempting to change their motives for interaction with others (Vahl, 2014).

Overall, in planning the evaluation process of social innovations there are several key steps (Sridharan, Mayne & Nakaima, 2011). First, there is a need to learn from existing experiences. Although social innovations are specific, outcomes of similar innovations conducted in a different environment or field are known and it is necessary to study the existing literature and evidence. It is also important that the evaluation provides information on the expected time-frame of the social innovation impact. Understanding what effects are expected and when is an important contribution to evaluation. Given the complexity and uncertain nature of social innovations, there is a need to incorporate continuous learning into the framework of evaluation to understand how innovations are developing and what activities are successful. Different forms of learning about social innovations can arise from evaluation. This includes learning about the impact and dynamic processes that could be of key importance for the success of social

innovations or the recognition of the organizational environment needed to develop social innovation. The basic step of the evaluation is to decide on the methods and measures that will be used to understand whether social innovation has given the desired outcomes. Learning about the theory of change behind social innovations is crucial in the evaluation process. The purpose of the evaluation is also to provide information on the type of knowledge that needs to be expanded. The evaluation determines which social innovations should be encouraged and implemented in other fields or framework. Evaluation also contributes to deciding what innovations are sustainable.

FUTURE RESEARCH PERSPECTIVES

Although it is rather unexplored, the field of evaluating social innovations is developing rapidly in response to a widening interest for social innovations, their outcomes, impacts and the context within which they operate and with which they interact. The growing importance of social innovations within policy circles and academia makes it necessary to explore ways how metrics can be applied (Reeder, O'Sullivan, Tucker, Ramsden & Mulgan, 2012; Wobbe, 2012) and to overcome the narrow focus of metrics on economic issues (Hoelscher & Schubert, 2015). This changed standpoint should be at the center of future research.

What is known so far is that the measurement of social innovations can be done from different perspectives: (1) innovation performance can be evaluated, (2) the innovativeness of organizations can be measured, (3) the innovativeness of spatial units, i.e. societies as a whole, can be analyzed at the national (macro), regional (mezzo), or local level (micro). Depending on the selected perspective, evaluation questions and methods differ. Stakeholders with different interests have different needs and therefore ask different questions. Also, the needs of particular interested parties, especially social innovators and social organizations, may diverge, depending on the level of social innovation process and the environment. Regardless what is being measured and how, a systematic approach to evaluation is needed.

A systematic approach to evaluation should provide comparability of data and results. This is especially important for social innovations since they have been modestly explored and there is a growing need for systematization of results. Primary intention should be to compare different outputs and enable comparisons at national and international level. Thus, social innovations require a systematic but tailored approach to evaluation stemming from a multitude of different definitions of the very meaning of social innovation, vague boundaries, and a host of actors involved. The evaluation of the effects of social initiatives has so far been largely carried out as informal, qualitative, ad hoc activity, if implemented at all. However, the area of monitoring and evaluation of social innovations is rapidly evolving in accordance with key issues to be answered: what are the outputs, what are the impacts, who are social innovators, and a like.

Based on the abovementioned, experts agree that future development of this area should be focused on the issue of identifying social innovators, ensuring data availability and creating adequate indicators for capturing social innovations outputs and outcomes. Data availability is a challenge with regard to the different framework conditions, specifically when it comes to denoting value-based and normative dimensions included mostly in the societal climate framework and the political framework. The reason for it is that these are not as well explored as, for instance, resources needed for innovation, which can often be measured in financial terms. There are key figures describing the social economy or public social expenditures for example, yet they are not as well established and identifiable as their commercial counterparts (Krlev, Bund & Mildenberger, 2014). The difficulty in assessing framework conditions is

generally increased by the unanswered question of what is the main driver of social innovation. The level of output and outcome of social innovations often relates to welfare indicators, which are themselves only just emerging.

There is also lack of indicators in the field of organizational output (as measurable results of social innovation activities). This is due to the fact that we cannot capture the performance of social innovations by patent-related metrics (Krlev, Bund & Mildenberger, 2014).

Agostini, Viera, Tondolo & Tondolo (2017) conclude that some questions/propositions could be raised for further studies. To analyze the context in which social innovations occur, the following preposition and questions could be raised: a) the context influences the social innovation, how and to what extent?, b) how is the interference of political, economic and social factors in social innovations initiatives? and c) are there differences in social innovation initiatives in different social contexts? Mostly used methods of analysis so far have been case studies due to the fact that social impact is still challenging area to assess and there is lack of statistical data. A combination of standard evaluation methods (quantitative and qualitative) with the development of new indicators and tools is seen as a potential way to improve and expand the evaluation process of social innovations.

CONCLUSION

It is clear that social innovations is a broad term and cannot be confined to a single definition that involves specific group of participants, objectives and instruments. It is also clear that social innovations are a part of a wider movement of knowledge-based society in which they are created, widespread and shared. The basic step of every evaluation is to decide on the methods and measures that will be used to understand whether the innovation has resulted in desired outcomes. It is necessary to estimate when and how to conduct evaluation with the aim of achieving maximum efficiency. In order to capture the impact and final results of social innovations that would capture social change, new indicators are necessary. Given the complexity and uncertainty of social innovations, there is a need to incorporate continuous learning into the framework of evaluation to understand how innovation is developing and what activities are successful. Learning about the theory of change behind social innovations is therefore crucial. Different forms of learning about social innovations can arise from evaluation. This includes learning about influences and dynamic processes that could be of key importance for the success of social innovations or the identification of the organizational environment needed to develop social innovation. The purpose of the evaluation is to get information on the type of knowledge that needs to be expanded. The evaluation helps to determine which social innovations should be encouraged and implemented in other areas or environments. Evaluation of social innovation should inform on the expected time frame of the social innovation impact. Understanding what effects are expected and when, is an important contribution. Measuring innovations contributes to deciding what innovations are sustainable. Taking into account all the features and expected results from measuring social innovations, it is obvious that new information systems and processes capable of measuring the creation of value in this changed global context are needed. This means it is necessary to look beyond the traditional financial, monetary and quantifiable measures of impacts of activities, and start to study existing, develop new or incorporate methodologies from other disciplines.

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KEY TERMS AND DEFINITIONS

Corporate Social Responsibility: Business concept that include companies' responsibility to the employees, environment, and whole economy.

Developmental Evaluation: Type of evaluation where social innovations are analysed as a process.

Evaluation: Process of measuring the result of some intervention.

Evaluation Indicators: Measures of output, outcome, or impact.

Global Trends: Current changes in the global environment.

Social Innovation: New products, services, or processes that contribute to social well-being.

Triple Bottom Line Approach: Entrepreneurship' approach that lies on and respects three pillars, and those are society, economy, and environment (planet).

Chapter 20
Analysis of Quality of Services in Higher Education Institutions

Ivana Jošanov-Vrgović
Novi Sad School of Business, Serbia

Ana Jovičić Vuković
Novi Sad School of Business, Serbia

Nataša Papić-Blagojević
Novi Sad School of Business, Serbia

Dragana Bolesnikov
Novi Sad School of Business, Serbia

ABSTRACT

An overview of domestic and foreign literature shows that the concept of quality of services at higher education institutions (HEIs) is the focus. Quality of service is one of the main factors of competitive advantage. Perceived quality of services in HEIs can be defined as the difference between what students expect to receive and their perceptions of what they really get. If HEIs get acquainted with students' expectations, they will have the opportunity to adjust their behavior to what is expected of them, and thus to positively influence on the students' perceived quality of services. Globalization has created a more competitive environment and opened market for HEIs. It affected on ensuring high quality in HEIs. The quality of HEIs is of key importance for a society because the students, employers, and society have the benefits of it, and quality education contributes to economic development of the country.

INTRODUCTION

The environment brings big changes that are more dynamic, numerous and diversified on a daily basis. Management of the organization should prepare for the upcoming changes, and to provide its users with the best possible product or service in order to survive in the modern global market. Moving the focus from national to global level also brings a major challenge to survival. Providing high quality

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services has become one of the main factors of the competitive advantages that institutions can have. The existence of higher education institutions in the global market can be ensured by the high quality of services provided by institutions and openness to other countries (student mobility, teacher exchange, knowledge exchange, cooperation with other highly educated institutions, etc.). The quality of services in HEIs depends largely on students' expectations and their perceptions of the performance of service received. Higher education institutions should agree on the level of service received with the expected service in order to meet students' expectations, and that students will be satisfied with the quality of received services.

The aim of the paper is to show through the theoretical review the importance of providing and maintaining a high quality of services for user satisfaction, where special attention will be paid to quality in higher education. Also, the paper will show the level of student satisfaction in the case of three higher vocational schools in Autonomous Province of Vojvodina through the presentation of empirical research results. In addition, the study will identify differences in perception of service quality among students of first, second and third year of study.

QUALITY OF SERVICE

The occurrence of the concept of quality relates to the occurrence of human civilization. One of the first examples of quality assurance (Janovac, 2014) in written form can be found in the records of Hamurabi's Law, from the time of ancient Babylon from the period of about 2500 years. BC. The ancient Egyptians emphasized the importance of the quality of the products, which testify to the pyramids and various writings written on papyrus. The large number of craftsmen in the Middle Ages led to the establishment of guilds, craft associations, who were active in terms of planning and quality management. The beginning of the industrial revolution has caused the need for quality management in large systems. At the beginning of the 20th century, there was a culmination of quality that represented a civilization response to an industrial society.

In the seventies of the 20th century, Japan took the world's leading position in quality and became world powers. The culture of constant improvement (kaizen) has led to the biggest changes, with the greatest emphasis on the education of quality experts and the introduction of mass training programs. The Western approach was created in response to kaizen defining a quality improvement strategy. In 1987, Malcolm Baldrige "The National Quality Award" was founded, which became the highest level of national recognition for the business excellence of American companies.

The quality of services issue is present in the theory and practice of management for many years, and in today's conditions of business it is especially evident. The ISO quality system is widely accepted in Europe. Today, quality is the most important type of business and it is one of the key factors of competitiveness. The turbulence, complexity and diversification of the business environment imposes the need for the development of products and services that will satisfy consumers, but also provide profit, while creating a positive reputation of the organization. The quality of products and services becomes a critical factor in the success, acquisition and maintenance of a competitive advantage. Organizations strive to improve the quality of their products and services, processes and employees in order to meet demand, but also provide more than the expectations of clients (Jovičić et al, 2013).

Quality in modern business concepts has become a tool for achieving business goals, which before the management of the organization sets the task to achieve in a balanced way the highest level of satis-

faction of the requirements of interested parties. The basis of such a management system is the Quality Management System (QMS), which is built on the basis of eight principles. These principles are the result of the experience of the world's best companies and are translated into the requirements of the ISO 9001 standard, which are (Kosar, Rašeta, 2005):

1. **Customer Orientation:** The organization depends on its users and it needs to understand their needs, to meet their demands and to provide them more than they themselves expect.
2. **Leadership:** A leader creates and maintains a climate in an organization that enables employees to participate fully in achieving the goals of the organization.
3. **Employee Involvement:** Employee involvement allows optimal utilization of their ability to achieve the benefit of the organization.
4. **Process Approach:** The management of appropriate activities and resources should be realized as a process for the efficiency of the organization's operations.
5. **System Approach to Management:** Identifying and understanding a system and managing that system contributes to the effectiveness and efficiency of an organization in achieving its goals.
6. **Continuous Improvements:** Continuous improvements in overall performance of an organization should represent its permanent goal.
7. **Factual Decision-Making:** Effective decisions are based on data and information analysis.
8. **Mutually Beneficial Relationships With Suppliers:** The organization and its suppliers are independent, and mutually beneficial relationships increase the ability of both and others to create value.

Quality management includes quality management and assurance, as well as additional concepts of quality policy, planning and quality improvement. Total Quality Management in these concepts introduces a long-term, general management strategy, as well as the participation of all employees. It needs to be pointed out that quality management should enable companies to create products and services which will satisfy and exceed customers' expectations, ensure the employees' satisfaction, lower the cost, increase profit and improve the company's image and reputation. However, in order to achieve this it is necessary to have experienced, flexible, proactive, innovative and knowledgeable management.

In the broadest sense, quality has become the everyday human needs for the present and future development of a whole human society. Starting from the fact that quality is present in everyday life, there was a need for his comprehensive study and definition. Authors who have written about quality have given numerous definitions of quality. The quality of services is defined in the simplest way as a company's ability to satisfy or exceed customer expectations (Rashid, Raj, 2006). Deming defines his philosophy of quality in 14 points, whose aim was to change the old way of doing business as well as to become oriented towards quality, increase of productivity and lowering the cost. Crosby defines quality as adjustment to demands while Juran defines it as a convenience for use (Ivancevich et al, 1994). A consultant at McKinsey Company provides an interesting definition of quality and states that a unique definition does not exist, but that quality changes throughout life, from one generation to another and depends on numerous aspects of human activity. Quality certainly is a feeling that something is better than something else (Stoner et al, 1995, 210). The International Organization for Standardization in the ISO 9000:2000 standard defines quality as a level up to which the sum of characteristics requires demands (Koprivica, Jovičić, 2014).

Determining the essence and meaning of quality within the service sector is very complex as when defining it we start from the consumer, that is, their understanding and perception of quality. In support to this claim are numerous definitions which can be found in domestic and international literature. Quality is an integral part of the service features as well as means of its usefulness, that is, appropriateness to satisfy the consumers' demands (Parasuraman, et al. 1985).

QUALITY OF SERVICE AT HIGHER EDUCATION INSTITUTIONS

According to certain authors, the perceived quality of service is defined as an attitude which is taken when we compare expectations and perceptions of the performance of the service received (Parasuraman, Zeithaml, Berry, 1988), while the perceived quality of service in higher education is defined as the difference between what students expect to get and their own perception of the real gain (O'Neill, Palmer, 2004), as well as students' assessment related to the level of performance of services offered by the HEIs compared to their real expectations (Sumaedi et al., 2011). Quality of service at higher education institutions mostly depends on expectations of its students and their perception of the performance of the service received. From the point of view of HEIs it is highly important to coordinate the level of the service received with the expected service, that is, to manage their students' expectations efficiently.

Numerous stakeholders, such as students, employers, the labor market, parents, society and others are involved in the process of ensuring quality in higher education, and in accordance to this the system of higher education should meet their demands and expectations and ensure the quality of the educational process. According to author McKimm (2009) maintaining quality is the key responsibility of higher education institutions, and one of the ways to transfer the learning process from the teacher to the student and his/her needs, quality of knowledge and abilities acquired during studies (Kennedy, 2007). A change of direction, where students are pushed into the foreground, their engagement in learning, taking responsibility of their own education, active involvement in the lesson, choosing courses and orientations, significantly contribute to quality control of higher education.

Quality assurance in higher education has not only one purpose and there is not the same methodology for all. The quality assurance system is based on the autonomy of each higher education institution. Each highly educated institution is responsible for the quality of education that it provides to its students. Higher education institution establishes, maintains and improves quality in all areas of work through various mechanisms, processes and activities. In this way, HEIs are developing a concept of sustainability and gaining competitive advantage. The establishment of an effective quality system is based on a system approach and requires the engagement of all employees.

In order to increase the quality of education having quality teachers is of utmost. The quality of the teaching staff is primarily influenced by a well-developed system of their professional development and encouraging further improvement. In this context, examining the quality of service in higher education institutions is of the greatest importance in order to define the plan and the program of the development of teaching competencies more clearly, which would, consequently, contribute to the increase of the level of students' satisfaction.

Quality in higher education is subject to change due to constant changes in the environment and because of the increase in knowledge within the higher education system. The need for European cooperation in the field of higher education occurs at the end of the 20th century. The first step was the Great University Charter, which was brought in Bologna by the rectors of the most respected European universities,

marking the 900th anniversary of the University of Bologna. Followed by the Sorbonne Declaration, passed in 1998, which places the student at the center of harmonization of higher education,the Bologna Declaration was created in June 1999 when the Ministers of Education of 29 European countries signed a joint declaration called the European Higher Education Area. The Council of Europe recommendation has established the European Network for Quality Assurance in Higher Education (ENQA).

Serbia joined the Bologna Process in 2003. Since that year, our higher education has been continuing to adapt to a European academic course. The reform of higher education has influenced the raising of the quality of services in higher education. The 2005 Law on Higher Education (Zakon o visokomobrazovanju, 2005) defined the obligation to develop a quality system for highly educated institutions.

At the center of the mission of higher education institutions are the qualifications that students acquire and their higher education experience. Standards and guidelines for quality assurance in the European Higher Education Area were adopted in 2005 by ministers responsible for higher education. They were revised in 2015 to raise clarity and their application. Guidelines include areas of vital importance for the successful provision of quality services in higher education.

In the Report on the Implementation of the Bologna Process in Serbia in 2015 (European Commission/EACEA/Eurydice, 2015), the European Higher Education Area, standards and guidelines for quality assurance of services for higher education institutions on our territory have been defined. European standards and guidelines cover three areas. Those are:

1. **Internal Quality Assurance:** Organized and established by the institution of higher education itself,
2. **External Quality Assurance: –** Self-evaluation and external evaluation,
3. **Work of the Quality Assurance Committee:** They must be independent, fully responsible for their work and the results of their work.

The matter of quality in higher education is clearly defined in the Strategy for Education Development in the Republic of Serbia up to 2020 and the action plan for its implementation (Strategy for Education Development until 2020). In the above-mentioned Strategy, the quality of the process and outcome of education is set as one of the main national objectives up to the maximum level achievable, that is, the level which comes from scientific research on education and respected educational practices.

Although in the last ten years or so a lot has been done for maintaining the system of quality assessment on all levels of education in Serbia, this system still does not offer enough information based on which reliable conclusion can be drawn on the quality of the outcome of education. In this context the effects of different measures taken on the plan to improve the quality of education, cannot be seen in terms of measurable indicators of improvement, except in some aspects of relevance of education, as a segment of the quality of education (Progress report on Action plan, 2018).

MEASURING QUALITY OF SERVICES ON THE HIGHER EDUCATION INSTITUTIONS

Pleasure by studying provides an important perspective on the quality of the study from the student point of view. According to the latest data collected in 2017 in the framework of the European research project Eurostudent (EUROSTUDENT VI, 2017), more than half of the students were satisfied with

the quality of teaching, while every sixth student dissatisfied in this respect. Slightly less satisfaction is expressed in relation to the organization of study, 43% of students were satisfied or very satisfied. Three of the five students would recommend their course to others, but every fifth student would not do that. The most unfavorable results are obtained when students assess the teachers' interest for their progress; every fourth student believes that the teachers are interested in it.

The research also shows that the majority of students of the first year are very satisfied, but during the years, the level of satisfaction is getting down especially in the areas like medical sciences, social sciences etc. where they expect much more practical knowledge. According to the new Law on Higher Education, the role of employers in HEIs should arise through forming Employers' Council in every institution, so the better connection with the practice is expected in the near future. The level of students' satisfaction is not only related to their opinion about teachers and lecture quality, but also to the organization of studies and schedule of lectures, the possibility of selecting a large number of courses, the relationship with teaching and non-teaching staff, the equipment of HEIs and so on. For measuring several dimensions of their perception of quality of services that HEIs offer, different instruments could be used. The most common instruments used to measure the quality of service at HEIs are *Servqual*(Service Quality), *Servperf*(Service Performance) and *Ipa (*Importance-Performance Analysis).

Developing a model to assess service quality in higher education is a complex issue due to the main problem which is identifying quality dimensions. Although there are different approaches to resolving this issue, the SERVQUAL model is the most commonly used for assessing quality of service in higher education (Đonlagić,Fazlić, 2015).

Servqual presents a multidimensional scale (five dimensions of quality) that compares the perceptions of users and their expectations about the quality of the services provided. First, respondents answer questions related to an ideal institution, world-renowned institution, and then examining the attitudes of respondents about the quality of the received services at a particular institution. In order to analyze the results of research, the gap between the expected quality and perceived quality should be calculated. According to the gap-based principal (Saliba, Zoran, 2018) the service quality is calculated with the equation (Sánchez Pérez, et al., 2007):

$$GSQ = \frac{\sum_{i=1}^{n}\left(P_{ij} - E_{ij}\right)}{n_i}$$

where the P_{ij} is the perceived (experienced) level of service for the *i-th* aspect at the *j-th* dimension, E_{ij} is the expected level of service for the*i-th* aspect at the *j-th* dimension and n_i is the number of observations.

Parasuraman, Zeithaml and Berry (1988) offered the Servqual as a model based on a multiple item scale for measuring consumer perceptions of service quality. They referred to this model as the gap model because the gap which is identified between customer expectations and customer perceptions needs to be closed in order to offer excellent quality (Đonlagić,Fazlić, 2015).

On the other hand, Cronin and Taylor (1992) created an alternative to the measurement scale called SERVPERF (Service Performance), who measured expectations than perceptions of remarks perceived performance of the services. Quality of service is measured as an attitude rather than the difference between expectations and perceptions. They also claimed that the application of the SERVPERF scale contains

only performance items that explain more variation in the quality of services than all SERVQUAL items. On those grounds they opine that SERVPREF can provide reliable, valid and useful tool for measuring overall service quality levels or attitudes (Rodrigues et al., 2013).

IPA scale (Importance Performance Analysis) (Martilla, James, 1977; according to Brochado, 2009) [17] by scale performance includes the scale of importance of individual service attributes. It was developed in order to get insights into which product or service attributes deserves more attention. IPA identifies those attributes that (a) are most important to the customer and have the highest impact on customer satisfaction and (b) have a low performance and need to be improved (Matzler,Pechlaner, 2012). Therefore, IPA is a very useful tool for identifying priorities that should be improved. Positive and negative results are the guideline for improvement of low quality aspects.

RESEARCH METHODOLOGY

For the purposes of research of quality service and satisfaction of students in higher vocational schools in the territory of the Autonomous Province of Vojvodina, in the first phase of the project, the field research was conducted. 272 students from those schools participated in it.

As a research instrument it was used SERVQUAL, a questionnaire modeled on previous research in higher education institutions (Arambewela, Hall, 2006; Bahadori, et al., 2011; Barnes,2006; Chua, 2004; Dado, et al.2011; Faganel, 2010; Gallifa, Batallé, 2010; Legčević, 2009; Oliveira, Ferreira, 2009; Rósza, 2010; Shauchenka, Buslowska,2010; Sherry, et al., 2004; Sultan, Wong, 2011; Zafiropoulos, Vrana, 2008), taken and adapted from Rodić Lutkić (2015). The questionnaire was designed in a way that includes all five of the SERVQUAL dimensions of quality of services related to the perceived quality of the services, which are:

- **Reliability:** The ability to perform the promised service dependably and accurately,
- **Assurance:** The knowledge and courtesy of employees and their ability to convey trust and confidence,
- **Tangibles:** The appearance of physical facilities, equipment, personnel and communication materials,
- **Empathy:** The provision of caring, individualized attention to customers,
- **Responsiveness:** The willingness to help customers and provide prompt service.

Students were tight-lipped on a Likert scale of 1 to 5, to what extent is determined by the quality of quality represented on their higher education institution. After the carried out field research in three higher schools, data were prepared and analyzed. Data were processed using the IBM SPSS 20.0 statistical package. Statistical data processing methods included frequency analysis in the case of sample analysis and descriptive statistics for analyzing the quality of the services of higher education institutions.

In this survey, of the total number of respondents, 63,6% are male and 36,4% female, where most of them live in the village (63,1%) and a smaller number in the city (36,9%). Most respondents attend the second year of study (43%), followed by respondents from the first year of study (33,5%) and then respondents from the third year of studies (23,5%). Regarding the higher education institutions, the highest number of respondents attends the Novi Sad School of Business (52,6%), followed by respondents from the Higher Technical School of Vocational Studies from Novi Sad (37,1%) and the School

Table 1. Socio-demographic characteristics of the respondents

Variable	Category	Number of respondents	Percentage of respondents (%)
Gender	Male	173	63.6
	Female	98	36.0
Place of living	City	99	36.9
	Countryside	169	63.1
Year of study	I	91	33.5
	II	117	43.0
	III	64	23.5
Higher education institution	Novi Sad School of Business	143	52.6
	College of Professional Studies in Management and Business Communication, SremskiKarlovci	28	10.3
	The Higher Education Technical School of Professional Studies in Novi Sad	101	37.1
Student Status	Budget	176	64.7
	Self-financing	96	35.3

of Management and Business Communication (10,3%). Most respondents study on the budget 64,7%, while 35,3% are self-financing students.

RESEARCH RESULTS AND DISCUSSION

Based on the results of descriptive statistics on a sample of 272 respondents, the mean of the total quality of services provided by four higher education institutions in AP Vojvodina is moderately positive and amounts to M = 4.04.

Observing the dimensions in particular, mean values of all dimensions are very similar ranging from the Empathy dimension (M = 3.99), which estimate is the lowest, up to the Assurance dimension (M = 4.20), which was rated at the highest mean value (Table 2-6).

Tensile dimension in the case of perceived quality of service shows that the highest mean value has a statement regarding the appearance of employees (M = 4.31), while the lowest mean value has a statement regarding the organization of additional activities (M = 3.53).

In the case of the Reliability dimension the highest mean value has perceptions about how the teaching staff shows understanding for students' problems (M = 4.08), as well as the provision of the agreed service (M = 4.07), while the lowest mean value has a statement refers to the perception that students have regarding the level of understanding that non-teaching staff shows for their problems (M = 3.87).

In the case of the Responsibility dimension, the highest assessment is the statement pertaining to the perception that students have about the willingness of the teaching staff to help students (M = 4.23), while the lowest estimated perceptions pertaining to the accessibility of non-teaching staff (M = 3,90).

Table 2. Descriptive statistics - Tensile Dimension

Statement	N	Min	Max	Mean	SD
Modern equipped school	272	1	5	3.97	.921
Modern advertising material	272	1	5	3.87	.863
Neat employees	272	1	5	4.31	.686
Attractive interior	272	1	13	4.00	1.078
Attractive exterior	272	1	5	3.97	.894
Good location	272	1	5	4.25	.856
A good atmosphere suitable for learning	271	1	5	4.03	.851
The quality of the service and the program satisfy the needs of students	272	1	5	4.04	.892
Organizing additional activities	272	1	5	3.53	1.139
Tensile - total	271	1.00	5.00	4.0021	.58525

Table 3. Descriptive statistics - Reliability Dimension

Statement	N	Min	Max	Mean	SD
Providing the service within the agreed time	271	1	5	4.01	.945
Non-teaching staff shows understanding for students' problems	272	1	5	3.87	1.039
Teaching staff shows understanding for students' problems	270	1	5	4.08	.807
Employees provide agreed services	272	1	5	4.12	.822
Reliability - total	269	1.00	5.00	4.0242	.72783

Table 4. Descriptive statistics – Responsiveness Dimension

Statement	N	Min	Max	Mean	SD
Non-teaching staff is always ready to help students	272	1	5	3.91	.915
Teaching staff is always ready to help students	272	1	5	4.23	.773
Non-teaching staff is always accessible	272	1	5	3.90	.938
Teaching staff is always accessible	271	1	5	4.17	.775
Employees always respond to students' demands	271	1	5	3.93	.946
Employees know how to answer on student questions	271	1	5	4.12	.888
Responsiveness - total	271	1.00	5.00	4.0461	.68435

The Assurance dimension shows that the highest assessment is the statement that relates to students' sense of security (M = 4.35), while the lowest assessment is the statement pertaining to the perception that students have in terms of knowledge of non-teaching staff to provide answers to students' questions (M = 3.97).

Table 5. Descriptive statistics - Assurance Dimension

Statement	N	Min	Max	Mean	SD
Employees are kind	271	1	5	4.33	3.073
Non-teaching staff have the knowledge to provide answers	266	1	5	3.97	.929
Teaching staff has the knowledge to provide answers	270	1	5	4.23	.769
A sense of student safety	270	1	5	4.35	.750
Employees are trusting	270	1	5	4.13	.788
Assurance - total	263	1.00	5.00	4.2046	.83765

In the case of the Empathy dimension, the lowest mean perceptions of students have a statement related to the provision of individual attention by non-teaching staff (M = 3.73), while the highest mean is a statement that students perceive that the highereducation institution they attend is focused to provide the highest quality services (M = 4.17).

Observing individual statements, the highest mean values are noticed within the Assurance dimension and the statements related to the students' sense of Assurance (M = 4.35), while the statement about the organization of additional activities within the Tangibility dimension has the lowest value.

A lower estimate of Empathy's dimension (Table 6) suggests that students' perceptions about providing personalized services by higher education institutions are bad, while the highest level of Assurance dimension (Table 5) estimates confirmed that students have a perception about knowledge and skills of employees, and material and physical security as well.

Similar results were also obtained in the Eurostudent survey conducted in 2017, where more than six dimensions were measured related to the quality and organization of lectures(lectures quality, organization of studies and lectures, the possibility of selecting a large number of courses), employee attitudes according to students (attitudes of employees in administration to the students, attitudes of teaching staff to the students) and equipment of higher education institutions (library, computers, buildings, classrooms). In this way, justification of this type of research is additionally confirmed.

Table 6. Descriptive statistics - Empathy Dimension

Statement	N	Min	Max	Mean	SD
Non-teaching staff provides individual attention to students	271	1	5	3.73	.996
Teaching staff provides individual attention to students	271	1	5	3.90	.924
Convenient working hours	271	1	5	4.14	.833
Employees understand the specific needs of students	271	1	5	4.03	.858
The HEI is focused on providing better services	271	1	5	4.17	.794
Empathy - total	271	1.00	5.00	3.9948	.69077

Based on this research, it was concluded that more than half of students are satisfied with the teaching quality (54.6%), while 16.4% express their dissatisfaction. It has also been shown that undergraduate students have exhibited a higher level of satisfaction than their colleagues from higher levels of study.

When it comes to professors' satisfaction, opinions are divided - 40.4% find that they are inspired by lecturers, and 30% do not agree. This finding is somewhat complemented by the fact that almost half of the students consider that their professors are not interested in their progress. Less than 60% of students would recommend their study programme to others, and 71.5% have no doubts whether the programme they have chosen was the right choice for them.

Some authors, Durkin et al, 2012; Sharma et al. 2012; Maringe, Gibbs, 2009) point out that those students should be viewed as users who expect to receive from educational institutions an adequate value for their investment in education. Higher education institutions in this regard should find a way to manage relationships with students, to understand their needs and expectations, and to ensure a higher level of satisfaction, dedication and trust through the constant research and inspection of service quality.

By using the One-factor Analysis of the Variance the effect of age of study on the level of quality of educational services was examined (group 1: 1st year students, group 2: 2nd year students, group 3: 3rd year students).

Results of descriptive statistics show that mean value of quality of educational services increases with years of study in case of all dimensions (Table 7), as well as in case of overall perception of quality of educational services, except dimension Assurance, which mean value shows lower values in case of 3rd year students then mean values of service quality perception of 2nd year students.

The results of ANOVA test have shown that there are statistical significant differences $p>0.05$ in case of dimensions Reliability, Assurance and Empathy among three groups of students (Table 8).

The results of additional post hoc test show slight differences between the three groups of students in case of dimension Reliability. In case of dimension Assurance results of post hoc test showed significant differences of mean values in perception of educational service quality between 1st year students (M=4.03) and students of 2nd (M=4.3, M) and 3rd year (M=4.12). In addition, the results show statistically significant differences between mean values of dimension Empathy in case of 1st year (M=3.87) and 3rd year of study (M=4.17).

SOLUTIONS AND RECOMMENDATION

Results of the perceived level of quality of services of higher education institutions show satisfying results. The lowest mean value of perceived quality is given on the Empathy dimension, primarily in the case of individual attention that students should receive from non-teaching staff. The Empathy dimension seen as the provision of caring, individualized attention to customers is extremely important to be satisfied for the students to feel well, accepted and to have the impression that employees recognize their emotional states. In accordance with the above, it is necessary to introduce some forms of informal education for non-teaching staff in the development of soft skills, such as learning assertive communication, active listening and asking questions, verbal and nonverbal communication, communication styles, emotional intelligence, coaching principles and feedback, PUSH & PULL techniques, conflict resolution and conflict resolution, team problem solving, etc.

Also, the results of individual statements within the Responsiveness dimension show that non-teaching staff should be more accessible to students, ready to help and answer all their questions. The Respon-

Table 7. Descriptive statistics according to year of study

		N	Mean	Std. Deviation
Tangibles	1st year	91	3.9170	.55644
	2nd year	117	4.0228	.59021
	3rd year	63	4.0864	.60971
	Total	271	4.0021	.58525
Reliability	1st year	91	3.9698	.65174
	2nd year	116	3.9591	.77596
	3rd year	62	4.2258	.71533
	Total	269	4.0242	.72783
Responsiveness	1st year	91	3.9872	.59589
	2nd year	117	4.0470	.69888
	3rd year	63	4.1296	.77335
	Total	271	4.0461	.68435
Assurance	1st year	90	4.0311	.55922
	2nd year	111	4.3117	1.05819
	3rd year	62	4.2645	.68499
	Total	263	4.2046	.83765
Empathy	1st year	91	3.8747	.61221
	2nd year	117	4.0000	.73203
	3rd year	63	4.1587	.69483
	Total	271	3.9948	.69077
Overall	1st year	90	3.9540	.49036
	2nd year	110	4.0530	.61274
	3rd year	61	4.1730	.59238
	Total	261	4.0469	.57221

siveness dimension seen as a willingness to help customers and provide prompt service is extremely important to be satisfied. Students want to know that they always have someone to contact and that most of their problems will be resolved. Achieving this can be realized by increasing the satisfaction and motivation of non-teaching staff, by setting more precise rules and procedures, different working conditions, delegating and empowering non-teaching staff, learning time management techniques, as well as by developing certain skills that will facilitate the placed requirements.

FUTURE RESEARCH DIRECTIONS

Recommendations for future research are to include a large number of higher education institutions and to examine a larger number of students in terms of examining the quality of services. A more comprehensive analysis would give a detailed overview of the factors that could influence the increased satisfaction of

Table 8. Results of ANOVA test

		Sum of Squares	df	Mean Square	F	Sig.
Tangibles	Between Groups	1.157	2	.579	1.698	.185
	Within Groups	91.323	268	.341		
	Total	92.480	270			
Reliability	Between Groups	3.282	2	1.641	3.147	.045
	Within Groups	138.686	266	.521		
	Total	141.968	268			
Responsiveness	Between Groups	.756	2	.378	.805	.448
	Within Groups	125.696	268	.469		
	Total	126.451	270			
Assurance	Between Groups	4.205	2	2.102	3.043	.049
	Within Groups	179.630	260	.691		
	Total	183.835	262			
Empathy	Between Groups	3.008	2	1.504	3.204	.042
	Within Groups	125.825	268	.469		
	Total	128.833	270			
Overall	Between Groups	1.750	2	.875	2.708	.069
	Within Groups	83.380	258	.323		
	Total	85.130	260			

students with the quality of service provided by the institution itself, its teaching staff and non-teaching staff. A better and more comprehensive insight into the satisfaction of students with the quality of service has benefits for both providers and service users.

Also, it is necessary to include in the future research the part SERVQUAL which refers to the students' expectations regarding the quality of the service and thus to obtain clearer results about the gap between the expected and the perceived quality. Recognizing the gap that exists between expected and perceived quality indicates to possible improvements in student satisfaction with the quality of services obtained in higher education institutions.

CONCLUSION

The issue of quality of service and its further improvement has become one of the priority goals of the service economy. Service organizations have realized that meeting the needs and expectations of the users of their services, and ensuring their satisfaction, has become possible only with the implementation of a long-term, systematic approach in building the service quality. In this sense, quality as an extremely complex concept has become known as one of the most interesting in the theory of management.

Concern for quality has become an imperative for every service organization that strives for success, which has led to the development of different quality management systems. Their basic function is to

enable the increase of ability of the service organization to attract new ones and retain existing users, on the one hand, and to increase the satisfaction and loyalty of service users, on the other. When it comes to the role of quality in achieving business success, quality is now increasingly seen as a strategic strength and a significant source of sustainable competitive advantage, as it affects on the organization's performance, that is, the growth of market share, total financial strength and profitability of operations. The above indicates that it is necessary to work on improving quality, which first step is measurement (Vranješ, et al., 2014).

In conditions of a competitive environment and an open market, higher education institutions have to work to improve the quality of services provided to students. Understanding, satisfying and overcoming the needs and expectations of students is essential for achieving competitive advantage, achieving long-term success and effective positioning in the academic world. Higher education institutions should be familiar with the expectations of their potential and current students, as they then have the opportunity to adjust their behavior to what is expected of them. If higher education institutions examine the students' expectations then they can positively influence on the perceived quality of their services.

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Chapter 21
Decentralization of the Water Industry in the Context of Economies in Transition:
On the Example of the Czech Republic From 1992–1998

Michael Fanta
Jan Evangelista Purkyně Universtiy, Czech Republic

Radek Soběhart
https://orcid.org/0000-0002-4179-5546
Jan Evangelista Purkyně University, Czech Republic

ABSTRACT

This research focuses on network industries, specifically on the water industry in the context of the Czech economy in transition between 1992-1998, the state of the water industry towards the end of the 1980s, key legislative changes between 1991-92 that touched upon key administrative questions, and the future ownership of the water network and water market. The Czech Republic chose a specific way to approach the transformation of the water industry by gratuitously transferring the ownership of the previously state-owned infrastructural properties to individual cities and municipalities. The next part outlines the effectiveness of such (de)regulation process based on development of key industry indicators. Very slow development of industry indicators and lack of state financial support for capital investment in water infrastructure led to the subsequent privatization of water companies, which can be considered as a completely rational outcome of unsustainable market developments.

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INTRODUCTION

The water industry is one of the pillars of the so-called network branches and is one of the key segments of the economy. The distribution of drinking water and conducting away of sewage water via public piping is nowadays considered to be a matter-of-course service without which we could hardly imagine our day-to-day lives to exist. That is why providing this crucial infrastructure is one of the fundamental duties of the public sector. However, in the context of this infrastructure, many market failures and high costs for the government when rectifying potential damages are often pointed out (Klien, 2015; Cave, Wright, 2010). There are different opinions as well, based on the fact that even the water industry is a classic area of the so-called mixed economy, in which private and public interests clash (Mejstřík, 2004). Experiences from other network branches, such as railway transportation or energy industry, also show that the participation of the private sector provides many benefits in the form of higher efficiency and level of provided services (Klien, Salvetti, 2018; Cavalho, Marques, Berg, 2012; Amos, 2004). The Czech Republic at the end of the 1990s took this route since it allowed the private sector to enter the water industry and the transfer of water infrastructure into private hands (Hlaváč, 2006). This was however preceded by a rather complicated transformation process in the 1990s which directed the entire branch towards its current highly fragmented form. The analysis of this fragmentation process is the core of this text.

DECENTRALIZATION OF WATER INDUSTRY:THREE MODELS

At the start of the 1990s, there was a general consensus that it is necessary to decentralize state-managed economy, including the so-called network branches – such as e.g. the water industry. Foreign models were researched, examining how privatization and transformation of water infrastructure worked. In general, there are three fundamental models – the British, American, and French (Lipka, 2003).

The British model – based on the experiences in England and Wales where British government at the end of the 1980s decided to change the previous constellation of local water industry since local public administration was no longer capable of financing the water industry from its own sources due to the dynamically growing costs caused by the necessity of complying to the environmental directive of the European Union. The model is based on private investors being allowed to enter the market who does then not only own the actual water networks but also operates them, however only in a certain geographic location which was previously defined by the state. The state fulfils its regulative role via a licencing procedure at two regulative offices. The new subject had to acquire a licence not only from the main regulative office – the Office of Water Services (OFWAT) – but also from the Regional Water Authority, from whom the private investor acquires the licence to draw water from local water sources. In principle, it is a state-guaranteed local monopole since it is not free competition and the key obstructions happen during market entry. This specific approach to privatization generated ten large private enterprises that provide complex water services. A new enterprise could gain a licence for 25 years if it met the following three fundamental requirements: a) it was willing to provide services in an area where there was no other enterprise already operating; b) the previous holder of licence agreed with the market entry; c) it was able to provide services to customers whose minimal water consumption was at least 25,000 m3. The previously stated clearly shows that state regulators supported the inception of large water enterprises that would have enough capital to maintain and develop the entire water infrastructure. Competitiveness

was supported on the customer side who could choose any enterprise with a licence, even if it was not based in the customer's location (Cave, Wright, 2010; Abbott, Cohen, 2009).

The American model is mostly featured in the USA and some Central and South American countries. In the USA, primarily smaller enterprises were active in the water industry since large water infrastructures remained in the ownership of cities until the 1990s. However, due to the increasing costs, the cooperation with the private sector was started. Based on the so-called operation & management contracts, many American cities have intensified the cooperation with private enterprises. Unlike in the above described British model, the level of participation oft he private sector is not only much lower but the main difference ist hat the regulation is based on price creation – the main criteria is set as the so-called adequate capital profitability. The price is determined by the regulator and covers overall expenses and allows for adequate profit which is based on the rate of investments into water infrastructure. In this case, we can call it an ex-ante regulation since the price is determined beforehand according tot he costs in the last accounting period. A certain problem of this model is the so-called goldplating – enterprises often make investments that do not increase effectivity or productivity but only make sure that the investments will return with a certain profit as well (Abbott, Cohen, 2009).

The French modelt hat is very common in Europe is a somewhat different form of administration and regulation of water infrastructure. The difference is that all water and sewage systems are and remain in public ownership but the majority of them is run by private enterprises. It this case, we can also call it state-managed regulation based on granting licences for a limited time. In the case of France, the state transferred the competences in the water industry to municipalities and cities that were supposed to manage local water infrastructure and take of financing the entire system. However, public funds do not have enough own capital which is why municipalities and cities depend on state or EU subsidy programs. In addition, municipalities and cities lack human capital for conducting effective control and negotiations with private subjects about extending licences. This results in situations in which lincences are granted for 25 years, there are enterprises that are active in the water industry for longer than sixty or seventy years because they were able to seize control of the decision-making process in municipalities or cities and basically receive indefinite lincences (Lipka, 2003).

The transformation and privatization of the water industry is also the focus of a number of foreign studies whose conclusions vary significantly. In several cases, the participation of the private sector in the water industry is seen as only "picking out" the rentable elements of the market which in the end leads only to a price increase which does not correspond with the appropriate level of effectiveness and productivity (Memon & Butler, 2003). Partial privatization and participation of the private sector in developing countries can on the other hand lead to the branch receiving large capital investments that later raise the overall level of services and enable significant revitalization of infrastructure and improve the purity of water itself (Pangare a kol., 2004). In most cases, the participation of the private sector is only partial – the ownership of the infrastructure remains in the hands of the public sector and the management of it is provided by the private partner via temporary lease. One of the few exceptions is the privatization of the water industry in the United Kingdom where the water infrastructure was sold to private operators. The entire branch is thereby solely private, of course under strict observation by the regulator. In this case the opinions differ about the development of effectiveness and productivity that the privatization brought. One side of the opinion spectrum states that the privatization significantly strengthened the technological facilities of the water industry but did not deliver the promised growth of productivity, thereby causing significant losses of overall effectiveness (Saal, Parker & Weyman-Jones, 2007). Another study however shows that the UK water industry experiences (thanks to the privatiza-

tion) very quick technological development which leads to the constant decrease in operational costs (Bottasso & Conti, 2003).

The Czech Republic, similarly to e.g. Poland (Lis, 2015) or Slovakia (Havlicek, 2005), and Hungary (Péter, 2007; World Bank, 2015) chose a specific route for the transformation of the water industry. At first, it was not a typical privatization process – transfer of ownership of enterprises and their assets directly to private hands – but rather at first the so-called deetatization – one of the steps in the decentralization process connected to political and economic changes at the turn of the 1980s and 1990s and the transition from centrally planned communist economy to a certain version of market economy. It meant that the water infrastructure and its operational assets were at first transferred into the property of cities and municipalities.

The first goal of this article is to introduce the transformation and privatization process in the Czech water industry, its main pillars, and fundamental mechanisms. The second goal is then to evaluate the effectiveness of these processes – based on key market indicators, such as access of the public to water and sewage infrastructures, the extent of water infrastructure, including number and capacity of waste water platns, water consumption, prices of water and sewage, government investments into the water industry, and also profits of water industry enteprises.

MATERIALS AND METHODS

Information about the transformation process were gathered from publically accessible articles, studies, and legislative documents from the Office of the Government of the Czech Republic. For an objective evaluation of the development of the water market, tools of comparative data analysis were used that compare the development of key indicators of the water industry between 1992-1998 when the process of transformation was finished. The data for the comparative analysis was gathered from the publically accessible database of the Czech Statistical Office, statistical yearly reports of the Ministry of Agriculture of the Czech Republic, and yearly reports of the branches of water systems and sewage systems published by the Ministry of Agriculture of the Czech Republic.

CZECH WATER INDUSTRY IN TRANSITION

Not only in the Czech Republic but also in almost all countries of the former Eastern Bloc, the water industry was highly underfunded before 1990. The pressure for a quick and extensive industrialization during the communist regime lead to corresponding building of water infrastructure, it was however not accompanied by securing enough conducting away or waste-water treatments which lead to a significant deterioroation of the quality of natural water resources. The ownership of the infrastructure and the providing of water services was in the hands of the government that primarily focused on price availability of services for the entire society and not on economic effectiveness (World Bank, 2015).

The transformation of Czech water industry started in 1992. The entire preparation process for this extensive transformation was initiated primarily by the Resolution of the Government of the Czech Republic NO 222 adopted on 3 July 1991, on the principles of the reforms and transformation processes of the systems of providing drinking water, sewage systems, and waste-water treatment. This resolution included a summary of the status quo, the agreement to the reform proposition, and individual gradual

steps of the reform and of the transformation process, for which the former minister of agriculture was responsible for. In the same year, the Act No 92/1991 Coll. was established, on the transfer of property of the state to different persons which defined the course and form of privatization projects, thereby preparing all necessary institutional documents for the extensive transformation and restructuralization not only of the water industry. The so-called water act (Act No 138/1973), adopted in 1975, defined the fundamental areas of water management, such as water protection, underground water, and supplying the inhabitants, watercourses and their management, water buildings, and other important segments, remained valid until 2002.

Besides the mentioned acts, the Ministry of Agriculture also worked on a study called "Zásady pro privatizaci státních podniků oboru veřejných vodovodů a kanalizací" (Rules for Privatizing State-Owned Enterprises in the Area of Public Waterworks and Sewage Plants). The objective of the study was i.a. to introduce foreign experiences to the issue and their recommendations for a healthy development of the branch, as well as appropriate setting of regular mantinels for the functioning of the market environment. The study also stressed the advantages of bigger organizational structures that function more effectively and provide the users with high-quality services with appropriate tempo of price growth (Transparency International, 2009).

The actual process of transformation of the branch started in 1993, initiated by a gratuitous transfer of state-owned property of the water industry's infrastructure and operational property to the self-government of cities and municipalities. In principle, every city or municipality became a sole owner of its water industry infrastructure and its operational property. All responsibility from these remained with the management of the municipalities. The second important aspect of the transformational process was the inception of the so-called water industrial business enterprises, whose goal was to connect the infrastructural property of municipalities and provide their management. The management of cities and municipalities had two options how to manage their water industry property:

1. To keep the property ownership and supply of drinking water and sewage-water drainage of their citizens with their own powers;
2. Or to transfer the property to a water industrial business enterprise that would provide the running, revitalization, and the connected services.

The privatization projects were at the same time constructed so that they secured the decisive influence of the cities and municipalities over the newly established water industry enterprise via having the majority of the shares in them. The beneficial interest of these enterprises (that the municipalities also received for free) was established by the value of their infrastructural property. Naturally, larger cities with a dense infrastructural network had a larger property share in the regional water industry enterprises than smaller municipalities with only several connections. Already at this stage, between 1992-1993, the state calculated the option of creating two different models of management:

1. **Mixed Model:** Water industry enterprise owns and at the same manages the water infrastructure based on agreed upon norms and proper administration of the enterprise;
2. **Separated Model**: Water industry enterprise only owns the water infrastructure and the management and connected services are provided by other natural or legal persons based on a contract (separation of ownership and management). Municipalities do not lose the oversight over the water and sewage prices.

Until 1993, there existed overall 11 state-owned water industry enterprises (9 regional and 2 in Prague that provided the management, renewal, and development of water industry infrastructure). The implementation of privatization projects and the transformation lead to the fragmentization of these large wholes, in 1994 there were around 40 regional water industry enterprises and more than 1,200 additional small-scale operators.

To call the process until this point as a privatization process is completely false. It only came to the so-called deetatization – a transfer of the previously state-owned property (water industry and sewage infrastructure and connected operational property) to cities and municipalities. The original 11 water industry enterprises were by privatization projects fragmented into about 40 regional water industry enterprises whose new majority shareholders were the self-governments of cities and municipalities. The state also within this process created certain safeguards that were supposed to even prevent a complete privatization of this industry as a monopole. Such a safeguard was e.g. an option of using the state administration's influence in water industry enterprises in the form of a "golden share". In such a case, the state could block any fundamental planned changes in the water industry enterprises for which a certain number of shares would be needed at the general meeting. The state also as a part of the privatization projects worked in limiting rules regarding the transfer and selling of shares. The intent of this was to keep the planned owner structure and prevent the selling of shares to the hands of private enterprises. Privatization (selling of share into private hands) would be a serious breach of not only the rules of the water industry enterprises but also of the rules of the Commercial Code. The established water industry enterprises provided the supply of drinking water and drainage of waste-water for 90% of the inhabitants of the Czech Republic. The remaining 10% of the market was provided by small operators created by cities and municipalities that decided to not invest their gained infrastructure and operational property into the ownership of regional water industry enterprises in which the municipality could have their representative (Transparency International, 2009).

As the time progressed, it became obvious that the created regional water industry enterprises were not able to provide enough capital for the needed revitalization and development of water industry infrastructures that were in some areas almost in a desolate state and needed significant investments. Since the state refused to take responsibility for financing of these investment-heavy projects and cities/municipalities were not sufficiently capital-equipped, the entry of private investors needed to happen.

From Transformation to Privatization

At the end of the 1990s, the tendencies towards gradual actual privatization of the water industry enteprises commenced via a direct purchase of shares. In many divisions of owners of water industry infrastructure, it came to the transfer of ownership of separable (operational) property. E.g. in the South Bohemian Region in its water industry, already in 1998 the relation to the property changed this way in more than 90 cities and municipalities. The consequent privatization was joined by more than 45 regional water industry enterprises (MZe, 1999). The overall state of the privatization process of the Czech water industry in 1990 is shown in the following Table 1. Already at the end of 1998, 99.98% of property submitted into a privatization project was already privatized, the overall value of the properties was more than 48 billion CZK.

The biggest interest of investors (mostly foreign companies) was in the shares of large cities that provided water to densely populated areas or in enterprises that provided the management of large areas. For example the enterprise Pražské vodovody a kanalizace a.s. was privatized this way which provided

Table 1. Procedure of privatization of the water supply and sewerage sector as of 31 December 1998

Number of entreprises included in privazation projects	**45**
Number of presented projects	162
Number of approved projects	84
Amount of assets included in privatization projects (millions CZK)	48 720
Privatized property	99,98%

Source: (Ministry of Agriculture, 1999)

the provision, draining, and cleaning of water for the entirety of Prague and parts of the Central Bohemian Region. Ownership of the Prague water industry infrastructure remained (and remains until today) in the hands of the enterprise Pražská vodohospodářská společnost that is 100% owned by the Prague City. Similarly, privatization took place in other water industry enterprises that decided to separate their operational part from their ownership structure. They signed a contract between the operational enterprise and the city (or the alliance of cities and municipalities) lasting longer than 20 years. The sale of the operational parts of the enterprises meant that cities received sufficient amount of finances and the transfer of responsibility of the operations of infrastructure. Small towns and municipalities ran the risk of landing in a very disadvantageous situation, in which municipal partnerships (in which mostly large cities had the main role) did not want to accept them since they were not interested in small partners who would rather cause large investment costs and generate only small profits. Such municipalities were then forced to privatize their water industry or to struggle with high investment costs of revitalizing old infrastructure property with their own funds.

Regulatory Framework of Water Industry

Already in 1991, the state applied a regulatory tool in the form of determining the maximum price of water, which differed for households and other customers. The year 1992 brought only small changes in the form of the deregulation of the prices of water for other customers, the limits of the maximum price of water for households, which was valorized yearly.

The change in the approach to regulation came in 1993, when the price of water for households was regulated via a factual price regulation. This approach to regulation is based in the COS method (cost of service regulation) – regulation of prices based in the amount of costs of production of services or products. This most common method is based in the sum of relevant expenses in connection with the production of products or services and on calculating the desired rates of return of the capital invested. Such an approach has several disadvantages, e.g. the information asymmetry between the regulator and the regulated enterprise. The regulator from its position is not able to understand all conditions and connections of the runnings of the given branch. The enterprise that functions within this branch has a higher level of information and can misuse its position. In the interest of increasing the regulated prices it can e.g. superfluously and inefficiently increase its capital investments (Stigler, 1971). Such an approach to price regulation can also cause a significant deviation from the average price of water – water from large companies costs anything from 14 CZK/m3 do 22 CZK/m3. Small enterprises were not able to compete with such low prices and their prices were higher by even 35% (MFČR, 2019).

Key Regulatory Institutions

The regulation of the water industry and sewage systems is regulated by:

- **The Ministry of Agriculture of the Czech Republic,** which is the central office for state administration of the water industry, i.a. it manages the public water systems and public sewage systems;
- **The Ministry of Finance, key regulatory institution for end-customers,** whose functions in the area of water industry are the financial regulation and the overlooking of the rules of public regulations of prices of drinking water.
- **The Ministry of Environment,** is the central office of state administration for protection of natural accumulation of water or the protection of water sources, and the quality of surface water and groundwater;
- **The Ministry of Health,** takes care of the health of the population and the quality of drinking water via the main hygienist and district hygiene stations, and provides hygiene control, materials, and measures of the organs of hygiene services;
- **The Ministry of Regional Development,** manages regional policies, urban planning, and building regulations;
- **The Office for the Protection of Competition;**

as well as the municipalities as owners of the water industry infrastructure (Hospodářská komora, 2015). The other institutions (e.g. Minsitry of Industry and Trade, Ministry of the Interior, or the Ministry of Transport) manage the issues of spatial planning of water industry objects, creating legislation in the area of water protection or water quality.

Development of Key Industry Indicators

The form of the transformation process in the 1999s lead to the original market structure to crumble, overall 11 state-owned enterprises became around 45 regional water management enterprises and more than 1,200 small operators. Within Europe, the Czech Republic is nowadays – thanks to this transformation of the water industry – absolutely unique for its number of owners and operators of the water infrastructure (in 2017, the number of owners was 6,795 and the number of operators was 2,878). The next part of the article illustrates how the key market indicators developed during the process of transformation which ended in 1998.

Drinking water has become somewhat more accessible for Czech consumers. While in 1993, 8.75 million citizens (figure 1) were connected to water infrastructure, which was 84.7% of population, until 1998 the number grew to 8.88 million citizens (86.2% of population). The number of people connected to the sewage system also slightly increased. In 1993, approximately 7.52 million citizens were connected to the sewage system. This number grew to about 7.66 million in 1998, which means that in 1998 74.4% of Czech population were connected to the public sewage system.

Although the number of inhabitants connected to the water system grew by 128 thousand between 1993 and 1998, the overall yearly volume of invoiced water decreased by 163.1 mil. m3 of water. The explanation for this decreasing trend of invoiced water can be found primarily in the always decreasing average consumption of water. In 1993, the average water consumption was 223 l per inhabitant per day, this value decreased to about 179 l daily in 1998 (figure 2). The decreasing trend is of course also caused

Figure 1.

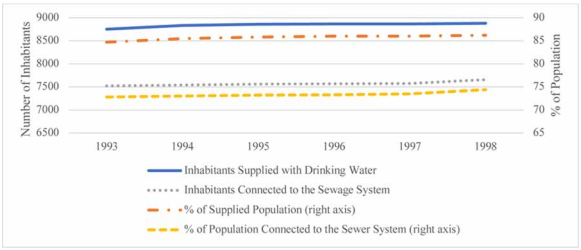
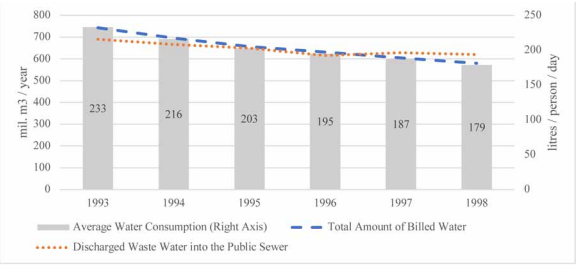


Figure 2.



by the development of technologies that brought more economical appliances to Czech households. With the decreasing water usage, the volume of water released into the sewage system also decreases. In 1993, the overall volume of water released into the sewage system was 666.2 mil. m3 per year, by 1998 the overall yearly volume decreased to about 620 mil. m3.

To connect more inhabitants to water infrastructure, it was necessary to revitalize and expand it properly. The overall length of the water infrastrure network grew from 1993 to 1998 by 4,054 km (see table 2). The length of the sewage system infrastructure was lengthened by 2,329 km since 1993. A crucial indicator are the losses of water in the pipe network. Between 1993 and 1998, these losses were able to be lowered to an average amount of 71 litres per person and day, which meant a decrease by 29.7%.

A crucial part of water infrastructure are also city waste water treatment plants that process water flowing through sewage pipes. This way, uncontrolled discharges of waste water do not happen that generate a number of negative externalities. Although their number increased between 1993 and 1998

Table 2. Water Infrastructure Development

	1993	1998	Change (%)
Length of drinking water infrastructure (km)	45 579	49 633	+ 4 054 (+ 8,89%)
Length of waste water infrastructure (km)	17 493	19 822	+ 2 329 (+ 13,31%)
Water loss (litres/person/day)	101	71	- 30 (- 29,7%)

Source: (Ministry of Agriculture, Czech Statistical Office, 1999)

Figure 3.

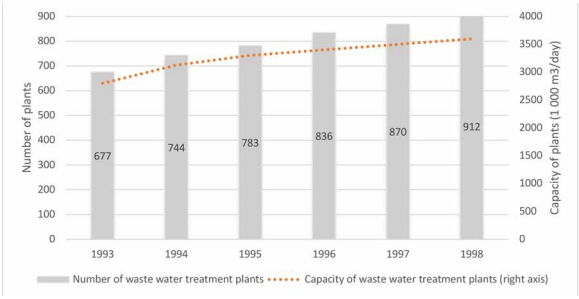
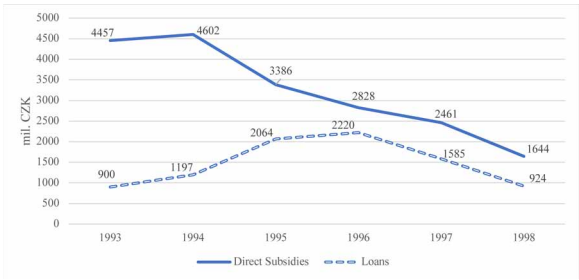


Figure 4.



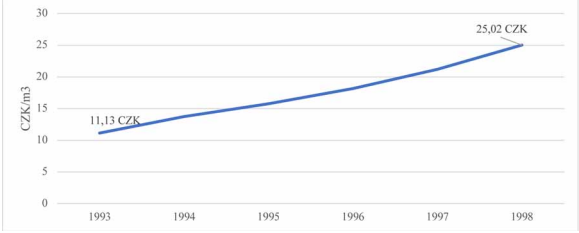
from 677 to 912 (increase of 35%), their capacity only increased from 2.8 mil./m^3 per day to 3.6 mil. m^3 per day (increase of around 29%).

Figure 4 illustrates the development of state investments into the water industry. Already in 1994, the volume of direct investments was constantly decreasing. In 1994, the state directly invested financial sources in the amount of 4,602 mil. CZK. Until 1998, the volume of these investments decreased to 1,644 mil. CZK. The decrease of these investments was partially compensated by a higher volume of loans, although even this indicator significantly decreased until 1998.

Next figure 5 illustrates the development of the average price of water and sewage per household. Still in 1993, the average price per water and sewage was 11.13 CZK. Until 1998, this price grew to 25.02 CZK which means an increase of 125%.

Although the average consumption of drinking water rapidly decreased between 1993 and 1998 (see Figure 5), the risk of decreasing profits of enterprises was significantly compensated by increasing prices

Figure 5.



of water and waste. These trends are shown in Table 3 that describes the development of sales of water industry enterprises for distributing drinking water and sewage water collection, as well as the overall volume of drinking water orders and collected waste water. The overall drinking water volume decreased in the observed period of time from 678,321,000 m^3 to 561,655,000 m^3 (decrease of 17%); the volume of collected waste water decreased from 628,689,000 m^3 to 583,301,000 m^3 (7% decrease). Despite these decreasing values, the overall sales of water industry enterprises (prices for water and waste) increased from 10.47 bill. CZK to 14.51 bill. CZK – an increase of 39%.

As shown in Table 4, overhead costs (18.67%) are one of the largest cost items for distributing drinking water and collecting waste water enterprises, followed by material costs (14.75%), direct wages (9.54%), and rent for tangible assets of water infrastructure from municipalities and cities (9.44%).

The development of the indicators (primarily water and waste costs) must be compared with the development of selected macroeconomic indicators that are partially determined by the development of prices on markets – primarily the inflation rate and average wage, from which the price of labor is derived. As shown in Figure 6, the rate of inflation was around 5% lower during the whole observed period. Average wage, however, in the Czech Republic increased during the post-revolutionary era on average quickly and its year-to-year growth speed surpasses the price growth of water and waste – only in the years 1995-1997. The prices for water and waste, therefore, grew quicker than macroeconomic determinants.

An interesting comparison is included in Table 5. It illustrates how the purchasing power of the average wage changed over time. Meaning, what amount of the stated goods we could buy for the average wage in 1993 and 1998. In 1998, the Czech consumer could with an average wage purchase 429.75 kWh of electrity and 515.97 litres of petrol more than in 1993. The increase in price for water and sewage did

Table 3. Development of revenues from water distribution and sewerage with development of water and waste water supplies in 1994 - 1998

	Revenues (mil. CZK)			**Supplies (thousands m^3)**	
	Water	*Waste water*	*Total*	*Water (drinking and utility)*	*Waste water*
1994	6 063,1	4 409,0	10 472,1	678 321	628 689
1995	6 406,7	4 702,4	11 109,1	628 891	612 125
1996	6 997,3	5 345,1	12 342,4	608 200	582 692
1997	7 695,4	5 831,5	13 526,9	592 413	603 560
1998	8 159,4	6 350,6	14 510,0	561 655	583 301

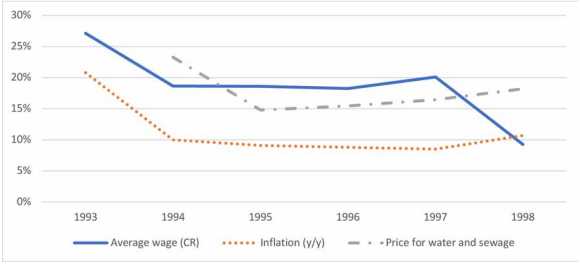
Source: (Ministry of Agriculture, 1999)

Table 4. Structure of drinking water distribution costs (including wastewater treatment) in 1998

Rent for tangible assets	*Electricity*	*Depreciation of tangible assets*	*Direct wages*	*Repairs of tangible assets*	*Overhead costs*	*Material*	*Others (insurence etc.)*
9,44%	*9,44%*	9,15%	9,54%	7,36%	18,67%	14,75%	21,68%

Source: (Ministry of Agriculture, 1999)

Figure 6.



not correspond with the increase in the average wage, which meant that water became more expensive. The average Czech consumer could therefore purchase 63.57 m3 fewer of drinking water than in 1993. Such a quickly increasing price of water could be one of the reasons for more economic behavior of Czech households whose average water usage significantly decreased.

SOLUTIONS AND RECOMMENDATIONS

The question now is if the entire transformation process was correctly set from the start. Thanks to the transfer of previous state owned water infrastructure to municipalities and cities, more than 6,000 owners arose until today (number of owners is almost identitical with the number of municipalities and cities in the Czech Republic). If infrastructure property was transferred to e.g. the property of higher-level self-governing units (14 in the Czech Republic), the entire water industry might not have become so fractured as it is now – not only when it comes to ownership but also when it comes to management. The Czech system of separated management does not differ much from other European countries, where the market functions very similarly and the only difference is the number of individual management models. The Czech Republic is however unique in the aspect of the number of enterprises active on the market. Interconnecting water systems is therefore currently very complicated. As an example, there is the British system, specific due to its completely private nature of the market and the limited number of enterprises that are active on the market. This limited number of enterprises enables the regulator to overall efficiently collect all data and regularly compare the effectiveness of enterprises. The results of this benchmark are used for a more effective adjustment of regulatory rules and limits, they are also published online (discoverwater.co.uk) and thereby provide all customers the option of comparing the

Table 5. Purchasing power of average wage

	1993	1998	Change (%)
Average wage	CZK 5,904	CZK 11,801	+ 5,897 (+99.98%)
Water (m3)	553.85	490.28	-63.57 (-11.48%)
Fuel (l)	338.53	584.50	+515.97 (+ 72.66%)
Electricity (kWh)	6,945.88	7,375.63	+429.75 (+ 6.19%)

Source: (Czech Statistical Office, 2019)

efficiency of their provider with other subjects on the market. Based on the published information, they can then better and more constructively talk with their providers if they are not satisfied.

Correnctly set and legislatively anchored rules for entry of private enterprises and investors on the water industry at the beginning of the transformation process could have also secured enough capital investments and therefore faster and more dynamic development of the entire branch.

FUTURE RESEARCH DIRECTION

The continuously increasing prices of water and waste-water collection currently cause the escalation of the discussions and disputes concerning effectivity and transparency of management models that were introduced during the privatization process. Private management enterprises are very often harshly criticized and labeled as resellers of water. Some interest groups also believe that the inception of these management models (and the entry of private enterprises and investors on the market) caused the nationalization of costs and privatization of profits since the responsibility for revitalizing water and sewage infrastructures remained at the hands of the owners of the infrastructure – cities and municipalities – who cover these investment costs mostly from the profits of renting out the infrastructural property. The discussion is currently very relevant because the validity of long-term contracts from the end of the 1990s is coming to an end and the state will be confronted with identical decisions as during the after-revolution period. There is however a new important factor – if the municipality manages and runs its infrastructural property without a majority share of a private partner, it will be eligible for grants from EU funds – thereby giving the issue a political dimension as well. Research should therefore focus on thorough analysis and benchmark of enterprises active on the water market and on objective evaluation of the effectiveness of private and public (city) management enterprises.

The development of key indicators of the water industry before the start of the privatization process (time period between 1993-1998) should be also compared to the development of these indicators after 1998 when private subjects entered the market. Only this way, it will be possible to objectively evaluate possible benefits or negative impacts of allowing private management enterprises onto the market, as well as allowing the privatization of the water industry's infrastructure property.

CONCLUSION

The Czech water industry has come a long way since the 1990s. The deciding factor for the future of this branch was the transformation process, during which the infrastructural property was transferred to cities and municipalities that were supposed to then decide how to manage the newly gained property. The implementation of privatization projects lead to the fragmentation of the original 11 water industry enteprises into more than 40 regional water industry enteprises to which the municipalities were able to voluntarily invest their infrastructural property and still decide on the questions of manangement together with other representatives of cities that decided on the same approach. As a part of the privatization projects, newly established regional water works were constructed so that they could secure the deciding influence of cities and municipalities via major share ownership. The beneficial interest of municipalities of these newly established water enterprises (that municipalities received free of charge) was determined by their infrastructural property that they invested in the enterprise. Although the statutes of these regional

waterworks allowed direct sale of shares only between the current owners (primarily cities) – which was supposed to prevent privatization of enterprise – the extensive process of privatization started in 1998 when the market was opened to domestic and foreign investors.

As seen by the development of key indicators of the branch, the water industry developed only slowly in the period of transformation. The number of inhabitants connected to the water and sewage infrastructure increased only slowly, as did the length of infrastructure. The decreasing average use of drinking water and the connected decreasing volume of invoiced water would additionally mean a significant loss of revenue for the water industry enterprises, which were therefore compensated by a relatively high increase in prices of water and sewage. Between 1993 and 1998, the average price of water and sewage increased by 125%. Due to the insufficient state financial support of capital investments into water industry infrastructure, the later privatization process and entry of private investors onto the market was absolutely the rational conclusion of the unsustainable market development. The questionable development of the transformation process of the water industry also fragmented the entire market into the current state of more than 6,700 owners of water infrastructure.

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KEY TERMS AND DEFINITIONS

Deetatization: Process with the goal of transforming state-owned enterprises into private or mixed enterprises with partial ownership by the public sector. The objective usually is to set market conditions and increasing the effectivenss of economy of previously state-owned enterprises.

Eastern Bloc: The term for the Soviet Union (USSR) and its political satelites. Although the countries that were part of the Bloc were officialy independent, there were actually significantly dependent on the Soviet Union's politics. These countries were Albania, Bulgaria, Czechslovakia, Hungary, Poland, Romania, Soviet Union, and East Germany.

Golden Share: A share that grants its owner the veto right when shareholders vote at the general meeting. It enables its owner to rule a limited liability company even with a minority property share.

Industry Fragmentation: A high-level of industry fragmentation and distribution of market share among many market players.

Privatization: Change of public (state) ownership into private; usually, this term is used for the transfer of state-owned property to private property. The opposite process is the purchase of private property by the state or its nationalization.

Transformation: Fundamental change of functioning of basic market mechanisms in society. Most commonly, this term is used in connection with the transition from a centrally-planned economy to market economy.

Water and Sewage Infrastructure: Water and sewage pipes that provide drinking water and collect waste water. This infrastructure also includes waste-water treatment plants.

Chapter 22
Linking Stakeholder Engagement to Multiple Future Policies in the European Energy Sector: An Impact Analysis

Charikleia Karakosta
https://orcid.org/0000-0002-2500-8880
National Technical University of Athens, Greece

Aikaterini Papapostolou
https://orcid.org/0000-0002-2950-1699
National Technical University of Athens, Greece

ABSTRACT

European energy, innovation, and climate challenges define the direction of a future European energy system; however, the specific technology pathways are policy sensitive and need careful comparative evaluation. Stakeholder dialogue or exchange is a very enriching experience, as it promotes the communication of different and sometimes controversial ideas, approaches, and expectations. The chapter introduces stakeholder consultation process, so as to analyse the impact of multiple future pathways and policies in the European energy sector. This will be done through a concrete methodological approach based on an institutionalised consultation process of the relevant stakeholders at policy, industry, and research/academic level. Key findings as regards the critical uncertainties affecting the future energy sector reveal that the level of cooperation and the level of decentralisation may play a crucial role in the design of alternative pathways towards a clean energy system.

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INTRODUCTION

Stakeholder engagement is becoming an important component of all policy- and decision- support processes (Welp et al., 2006; Phillipson et al., 2012). Dialogue or exchange with stakeholders is a very enriching experience, as it allows scientists or researchers to get exposed to different views, approaches, and expectations on project results (Beringer et al., 2013; Kelley et al., 2016; Yang et al.,2009).

The involvement of key stakeholders is very useful to get an alternative perspective, which stimulates the scientists or researchers to shift the focus from project activities to intended outcomes in the early stage and to clearly communicate main ideas about the project in terms of objectives, milestones and outputs.

As noted by Yang et al. (Yang et al., 2009a, 2009b) stakeholders should be engaged as early as possible and this engagement is essential for stakeholder analysis and decision-making. However, the involvement of stakeholders with different (and sometimes opposite) views, backgrounds and expectations might increase confusion (Pacheco & Garcia, 2012; Pollack et al., 2017; Karakosta & Fujiwara, 2018).

Another important aspect is to define the boundaries of the engagement and the expected positive impacts on the project results (Fujiwara, et al. 2015a, 2015b; Karakosta & Dede, 2015). A series of questions should therefore be answered by the consortium members before approaching the stakeholders, like:

- What is the added value of the stakeholder participation?
- How much is its participation contributing to a change?
- Is this participation appropriate (in terms of investigated topic, point of time for the consultation, willingness of the stakeholder to get involved, etc.)?
- What level of engagement is being sought?
- What are the risks, both for the consortium members and the stakeholders, of such participatory process (in terms of image, reputation, relationships, resources, etc.)?

The present paper addresses these issues so as to share good practices with interested stakeholders and help the policy-makers to achieve concrete and action-oriented results in a more effective way. In this context, the specific paper introduces stakeholder consultation process, so as to analyse the impact of multiple future pathways and policies in the European energy sector.

The remaining paper is structured as follows: Section 2 presents the basic elements of stakeholder engagement process, Section 3 analyses the main methodological steps that were developed and Section 4 presents the impact analysis of multiple clean energy pathways. Finally, Section 5 summarizes the main points and provides some concluding remarks.

STAKEHOLDER ENGAGMENT

A science- based stakeholder dialogue is defined as a structured communicative process of linking scientists with selected actors who have specialised knowledge and insights that are particularly relevant for the scientific process. In this respect stakeholders are identified based on the relevance of knowledge or certain competencies rather than on the representation of the full spectrum of interests (Welp et al., 2006). The involvement of stakeholders is key to ensure that the outcomes are immediately exploitable by a large number of interested institutions (Doukas et al., 2016; Fujiwara et al., 2015b; Karakosta & Dede, 2015).

There are different levels of participation of stakeholders, depending on the purpose that is to be reached. Dialogue with stakeholders can be purely informative, therefore not requiring a very active involvement of external participants in the research process, or on the contrary seek to develop a full participatory process (Karakosta et al. 2010, 2011, 2018). In this case, stakeholders collaborate with project members in every aspect of the decision-making process and jointly participate in the finalisation of outcomes. An overview of the different levels of public participation is given in Table 1.

METHODOLOGICAL FRAMEWORK

The particular paper proposes a methodological framework, which could act as a concrete stakeholder engagement plan and consists of a series of concurrent and consecutive steps to involve stakeholders throughout the process.

Step 1: Identification and categorisation of the most relevant stakeholders

A list of the relevant groups, organisations, experts, and everyone that has an interest in the specific objectives is compiled, as well as of activities of relevant initiatives and projects. This list is developed in view of a balanced professional, institutional and geographic representation of stakeholders (Karakosta et al. 2007, 2015).

Ranking stakeholders' relevance, according to their expertise, interest, power, influence, commitment, and interest levels, will help to target and engage each stakeholder and each stakeholder segment properly and efficiently.

Step 2: Listing the key objectives and benefits of the stakeholder dialogue

Once the overall aims of the engagement process are identified and described, it is important to define the specific purpose of the consultation in terms of expected output. This is important to get a common understanding and make sure that the stakeholders being mobilized are those who are the most directly interested and affected by the project activity. In this respect, building on the desired outcomes, a list of tangible products/results that can originate from the stakeholder consultation will be specified.

Step 3: Stakeholders selection

If the previous steps have been carefully analysed and the right questions have been raised, then it should become relatively easy to identify the type of stakeholder categories and profiles to be solicited,

Table 1. Levels of public participation (from low to high)

Levels of public participation	
Inform	To provide stakeholders with balanced and objective information to assist them in understanding the problem, alternatives, opportunities and/or solutions
Consult	To obtain public feedback for decision-makers on analysis, alternatives and/or decisions
Involve	To work directly with the public throughout the process to ensure that public concerns and aspirations are consistently understood and considered in decision making process
Collaborate	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution
Empower	To place final decision-making in the hands of the public

Source: REVIT, 2016

because of their influential role, background experience, specific expertise, degree of involvement in the particular subject/area that is meant to be discussed.

Step 4: Means of stakeholder consultation

The means of stakeholder engagement result from a specific strategy according to each group and to stakeholder mapping (Karakosta & Flamos, 2016). In other words, this step is referred to the communication strategy/plan. The plan defines where public consultations are planned and the communication methods, the audience for each engagement, the frequency, and the tools are identified that will be used to efficiently implement the strategy. To this end, a number of techniques to approach stakeholders are enlisted, including emailing, phone interviews, face-to-face meetings, questionnaires, distribution of dissemination material, focus groups, workshops, thematic discussions, in order to attract stakeholders' interest and input, as well as seminars and training sessions.

Step 5: Preliminary stakeholder engagement

This preliminary stakeholder engagement will include also a time schedule, a communication strategy, and the selection of methods and techniques to be used. Another important aspect to be considered is that the consultation process needs to take into account the more general context, including previous experience, lessons learnt, links to other projects/initiatives, the current decision-making context. Cultural diversity (including language and gender issues, etc.) is also an important aspect to be considered at this stage.

Step 6: Topical workshops

Topical workshops are organised to promote the work done within different project actions or case studies and ensure a continuous flow of dissemination activities. There is an initial pre-selection of the topics of each workshop and can be adapted based on the preference of stakeholders. The discussions in the topical workshops are based on a respective "issues paper" that are circulated to all speakers, commentators and other workshop participants before each meeting, providing background information on the topic of the workshop and the corresponding work within the project and raising specific questions to be discussed during the workshop.

Step 7: Analysis of stakeholders' feedback

At this stage the methodology keeps track of the feedbacks received by stakeholders, learn from experience and implement any needed corrective action. Finally, an evaluation of the stakeholder engagement process should take place in order to assess whether: the involvement of stakeholders was satisfactory and appropriate to the goals that were looked for; the methods and techniques for dealing with stakeholders were appropriate; the overall process was time and cost-effective.

Step 8: Impact Assessment of alternative pathways

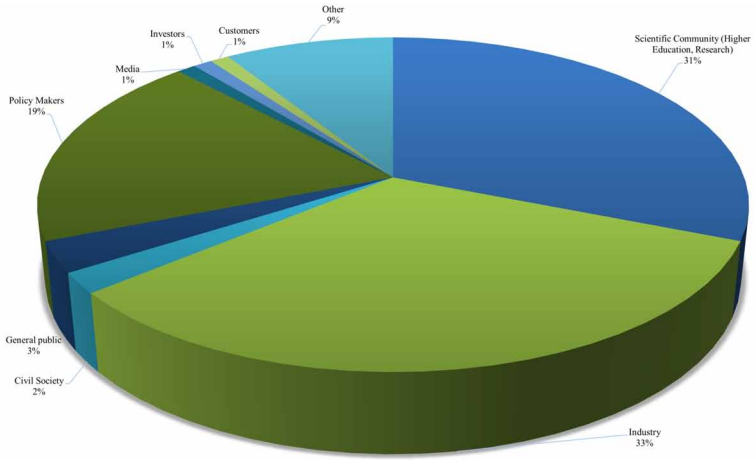
From the stakeholders' feedback gathered in Step 7 the evaluation of the impact, risks and opportunities associated with the project activities takes place.

Step 9: Dissemination of results

Dissemination protocols have been designed and special emphasis is also laid on features of modern e-presence and e-communication tools to disseminate relevant project findings to and exchange with the target audiences. A series of e-newsletters describing with a non-technical language particularly apt to interface with the general public, and the media, current relevant issues, the contribution made by the project towards these issues and practical applications / success stories on the ground.

Policy recommendations as well as project's policy conclusions are published in a series of policy briefs dedicated to policy stakeholders.

Figure 1. Stakeholders categories reached, in the context of all dissemination and communication activities



Summarising the whole project, a Final Conference presents the acquired knowledge, policy implications and recommendations and discuss them with top-level keynote speakers and other experts. Final Conference serves as the ultimate dissemination of the project and its main goal is to present the final outcomes of project and appropriately promote the strategic policy analysis.

IMPACT ANALYSIS OF MULTIPLE CLEAN ENERGY PATHWAYS

Within the European Horizon 2020 SET-Nav project[1] an independent analysis of pathways for a deep decarbonisation for Europe until 2050, assessing a broad portfolio of options under distinct framework conditions was conducted. Through a large-scale modelling effort, SET-Nav offers a bandwidth of solutions derived by modelling and provides key insights based on the SET-Nav main modelling perspectives: demand side, energy supply and infrastructure, and the macroeconomic effects.

Based on the proposed methodology, an intense dialogue and institutionalised consultation process took place in order to analyse the impact of the multiple future pathways and policies towards a decarbonised European energy sector. To this end, different types of events were organised, were more than 600 stakeholders participated from different fields (academia, industry, policy makers, etc.):

- **3 Topical workshops** to promote the work done within the case studies
- **5 Modelling workshops** related to specific challenges with regard to modelling of the energy system.
- **2 Regional workshops** to disseminate and discuss the results of the project on a regional level.
- **1 Policy workshop** to put to the test the results and policy recommendations developed.
- **1 Final Conference** to present the final outcomes of SET-Nav and appropriately promote the strategic policy analysis of transformation pathways.

The figure 1 displays the estimated proportions of persons engaged, in the context of all stakeholder engagement activities with the framework, in each of the following categories.

An overview of the outcome of the dialogue conducted across the different case study energy sectors is summarised below:

Buildings

- EU stakeholders support that the phasing-out of natural gas is one of the main challenges for the decarbonisation of the building sector.
- Only in scenarios with a high amount of green gas generation would the gas grid structure and business models be sustained.
- District heating could take over the role of natural gas in densely populated areas.

Industry

- Deep emission cuts require substantial changes in the iron and steel, cement and chemicals industries (e.g. use of hydrogen).
- Biomass is the most important RES in industry, particularly in the medium term.
- Electricity is not yet competitive with biomass, meaning that replacing biomass with electricity would require targeted policies.

Transport

- The diffusion of zero-emission vehicles, such as battery electric cars, fuel cell electric trucks and hybrid trolley trucks generates increasing electricity demand from the transport sector.
- Europe's production of vehicles contributes to GDP growth and employment.

CONCLUSION

The study and the methodology followed indicated several general benefits of an active participatory process including:

- Clearer identification of problems;
- Improving the quality of the resulting plans;
- Developing a common basis for action programmes;
- Raising awareness and encouraging changes in behaviour;
- Overcoming conflicts and streamlining implementation;
- Initiating social empowerment of participants.

First, the proposed methodological framework provides stakeholders, such as policy makers, business, NGOs and citizens with a novel and effective opportunity to identify the information needs on the future courses of strategic energy policy making and their impacts on stakeholders' decisions. It ensures that at different policy- and decision-making levels within the EU, decisions are taken on the basis of the best available knowledge including an increased understanding of opportunities for business and society.

The methodology is a first step assisting in reducing the uncertainty of policy makers and sector– and company-level decision makers and help them better understand the consequences of alternative policy scenarios towards a decarbonized energy system. Moreover, it provides stakeholders with plenty opportunities to share their experiences and lessons learned with a view to providing targeted input to policy implications and recommendations for the EU and delivering these outputs to a wider range of stakeholders.

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KEY TERMS AND DEFINITIONS

Decision Maker: A person who is responsible to decide, selecting a logical choice from the available options, especially at a high level in an organization.

Dissemination: The public disclosure of the results of a project by any appropriate means (other than resulting from protecting or exploiting the results), including by scientific publications in any medium.

Exploitation: The use of results in research activities other than those covered by the action of a specific project concerned, or in developing, creating and marketing a product or process, or in creating and providing a service, or in standardisation activities.

Impact Assessment: Impact Assessment is a means of measuring the effectiveness of organizational activities and assess the significance of changes brought about by those activities.

Knowledge Transfer: The process of sharing or distributing complex information, knowledge, skills and behaviors among organizations/ stakeholders to support mutually beneficial collaborations.

Participatory Approach: An approach that includes numerous methods that involve research participants and key stakeholders collaboratively in a research/ project and are likely to improve the use of evidence, objectivity, and integration of project planning efforts.

Pathway: It is the process (a set of actions) required in order to achieve the desired outcome.

Policy Recommendation: A simply written policy advice/ suggestion prepared for some group that has the authority to make decisions.

Stakeholder Engagement: The process by which a project involves people who may be influenced by the decisions and results it produces or can influence the decision-making process.

ENDNOTE

[1] http://set-nav.eu/

Chapter 23
ISO 14001 Environmental Management Systems Assessment From the Insurers' Point of View: Methodical Approach

Malwina Lemkowska
https://orcid.org/0000-0001-9951-9977
Poznań Univeristy of Economics and Business, Poland

ABSTRACT

Standardized Environmental Management Systems (EMSs) appeared in the 1990s. They are voluntary tools for managing the relation between the organization and its environment. Multiple analyses indicated the strong external context of EMS. More often than not, the importance of ISO 14001 EMS for the relation between the organization and its insurer has been indicated. The goal of this research is to answer the question how to assess the usefulness of ISO 14001 EMSs adopted by the insured or insurance seeker for the process of environmental insurance products' provision. The structure of the specific measure (checklist) is the result of the analysis. The research is conducted in four steps: (1) analysis of environmental insurance proposal forms for stand-alone products on the Polish market, (2) analysis of the general terms and conditions of the above, (3) review of ISO 14001 requirements, and finally, (4) template analysis of the interview transcript, supported by narrative approach.

INTRODUCTION

Standardisation became one of the tool-related responses to a growing awareness of environmental issues in the second half of the twentieth century. It was perceived as alternative to hard-law regulations which often proved ineffective in providing solutions to global environmental problems (Prajogo, Castka, Yiu, Yeung, & Lai, 2016). The barriers of legislation have motivated the society to look for

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the way to broader the members of the entrepreneurship' contribution into the global discussion about sustainable development. ISO 14001 is the result of the above and provides the tool to self-regulate the environmental aspects by organizations.

As a result of the efforts of the general secretary of the United Nations Conference on Environment and Development (UNCED), Business Council for Sustainable Development (BCSD)[1] was established in 1991. The organisation promoted activities aimed at initiating evolution of entrepreneurs' attitudes to environmental issues. Thanks to this, a group was established within the ISO framework, whose focus was set on the methods of measuring environmental effectiveness, which further led to development of the 14000[2]-series standards.

In the past fifty years, the EMSs have contributed greatly to the instrumental inventory of the activities undertaken for protection of the environment. Multiple analyses, which have been performed since 1996[3] in the area of motives, effects and barriers to EMSs' implementation, indicated their strong external context. Introduction of ISO 14001 EMS influences strongly the formal and informal relations between an organization and its surroundings. More often than not, the importance of ISO 14001 EMS for the relation between the organization and its insurer has been indicated.

The relationship between the organization managed according to ISO 14001 and the insurance companies could be analyzed in multiple ways: (1) from the point of view of the specific insurer (the provider of an insurance product); (2) from a standpoint of the organization, which implemented the ISO 14001 EMS; (3) by taking into account the market perspective, this means: the role of the massive EMSs implementation for the insurance market development. All the above contexts are strongly linked to each other. However, the decisive factor for the perception of the (2) and (3) perspective is the result of research in the (1) area.

Taking into account the above the purpose of this research was established. The purpose of the following work is to answer the question how to evaluate usefulness of the ISO 14001 EMSs adopted by the insured or insurance seeker for the process of providing environmental insurance products. As a result of the research, a scheme has been developed for construction of assessment indicator regarding environmental management in an organisation. The structure of the indicator was suggested following the analysis of insurance proposal forms for stand-alone environmental insurance offered in Poland, the analysis of general terms and conditions thereof, analysis of the ISO 14001:2015 requirements and narrative analysis of the transcript of the focus group interview conducted between 19 – 28 March 2018 among experts in environmental risk insurance in Poland (underwriters, risk analysts, insurance brokers).

BACKGROUND

Announcement of ISO 14001 standard was connected with numerous social and individual expectations regarding systems implementation. In the late nineteen nineties a plethora of research appeared concerning the motives for systems implementation, the outcomes and barriers to fulfilment of the expectations.

The groups of motives for systems implementation are strongly intertwined with relations binding organisations and their stakeholders. Stakeholder identification is considered to be the focal point of systems management in companies (Matuszak-Flejszman, 2018), although it was formally mentioned no sooner than in the newest ISO 14001 of 2015 (ISO 14001:2015). Regardless of the requirement for normative stakeholders' identification process, organisations, from the very start, justified system implementation with the expectations of various interested parties, such as owners, employees, custom-

ers, suppliers, neighbours, local authorities, environmental organisations and the society as a whole. The stakeholders, on the one hand, define the expectations as for the operations of an organisation, and on the other, by setting satisfaction levels, evaluate the way in which these operations are performed (Matuszak-Flejszman, 2018). The scope of recognition and consideration given to stakeholders' expectations affects definitions of the goals of EMSs implementation.

Research shows a wide range of motives for implementation of EMSs, beginning with the most general ones like environmental protection, preventing pollution, conformity with legal regulations, to an organisation's practical access to certain markets (suppliers, customers – often international ones), to achieving financial benefits (such as lower costs or increased access to capital, etc.), or improvement of the corporate image (Matuszak-Flejszman, 2018; Prajogo, tang, & Lai, 2012; Sorooshian, Qi, & Fei, 2018).

Generally, classification of motives is limited to either two (internal (technical) and external (institutional) ones) (Hillary, 2004; Prajogo, Castka, Yiu, Yeung, & Lai, 2016; Prajogo, Tang, & Lai, 2012; Psomas, Fotopoulos, & Kafetzopoulos, 2011; Santos, Rebelo, Lopes, Alves, & Silvka, 2016) or four categories (related to markets, society, finance and regulations) (Sorooshian, Qi, & Fei, 2018; Zutshi & Sohal, 2004). The former division is embedded in the organisation's decision-makers' consciousness: internal motives come to the fore when they understand the potential strategic benefits that could be derived from implementation of processes proposed by ISO 14001 (Prajogo, Tang, & Lai, 2012). External motives, in turn, reflect the urge to respond to pressures from the surrounding world. There are three mechanisms of such pressure: coercive – ISO 14001 as the response to the clear demands of third parties; mimetic – ISO 14001 as the result of observation of benefits from implementation by the competitors; normative – ISO 14001 as the "must be" business practice to enhance the corporate reputation in the market (Jovanovic & Janjic, 2018; Prajogo, Tang, & Lai, 2012).

Categorisation of the motives as relating to market, society, finance and regulations stems from the sources of pressure exerted on an organisation. However, the pressure may vary depending on the country, type of operations, social experiences etc.; also, it may be perceived differently by the organisation itself.

More than twenty years' experience with ISO 14001 EMSs has made it possible to juxtapose the aforementioned reasons for systems implementation and their real outcomes. Research overview does not, however, constitute an unambiguous image of the consequences of management in conformity with ISO 14001 (Lemkowska, 2015). Researchers propose various categories of environmental management impact, thereby dividing them into i.al. environmental (e.g. emissions reduction) and economic (e.g. cost-cutting) (Jovanovic & Janjic, 2018), internal (organisational, financial, human) and external (commercial, environmental, communicative) (Hillary, 2004; Psomas, Fotopoulos, & Kafetzopoulos, 2011), tangible (quantifiable, e.g. reduction in wastage volume) and intangible (difficult to quantify, such as enhancement of the company image or better working environment) (Sorooshian, Qi, & Fei, 2018; Zutshi & Sohal, 2004).

Most researchers point to improvement in relations with stakeholders and betterment of organisational conditions (Poksinska, Dahlgaard, & Eklund, 2003). Reports on augmentation in some environmental outcomes are also abundant (Goh Eng, Suhaiza, & Nabsiah, 2006; Jovanovic & Janjic, 2018; Melnyk, Sroufe, & Calantone, 2003; Potoski & Prakash, 2014; Pun & Hui, 2001; Standards Council of Canada, 2000). Nevertheless, there are also studies which contradict the positive relation between implementation of a management system compliant with ISO 14001 and beneficial environmental impacts (Barla, 2007; Fryxell & Szeto, 2002; Gomez & Rodriguez, 2011; Yüksel, 2008). What is important, lack of positive environmental impacts does not necessarily lead to a negative evaluation of system implementation by the organisation's decision-makers, because of the external motives. At the same time, research shows that

emphasising the internal reasons for implementation frequently leads to achieving benefits of systemic management (Prajogo, Castka, Yiu, Yeung, & Lai, 2016), including particularly positive environmental impacts (Prajogo, Tang, & Lai, 2012).

INSURERS AND ORGANISATIONS MANAGED IN CONFORMITY WITH ISO 14001

The overview of the studies presented above also pertains to the relation between insurers and organisations managed in conformity with ISO 14001. Lowering insurance costs as well as ensuring accessibility of insurance cover are amongst organisations' numerous probable expectations (Jovanovic & Janjic, 2018; Massoud, Fayad, El-Fadel, & Kamleh, 2010; Zutshi & Sohal, 2004). However, it is barely possible to find proof of insurance companies exerting any pressure whatsoever on organisations concerning system implementation. Despite numerous institutional and scientific recommendations concerning potential usefulness of systemic environmental management for offering and providing insurance cover (Environmental Protection Agency [EPA], 2006; European Commission, 2016; European Commission, 2017; Federation of European Risk Management Association [FERMA], 2017; Lemkowska, 2018; Minoli & Bell, 2002a, 2002b, 2003; Swiss Re, 1998), there are no studies which would suggest that insurers insist on the system implementation or make the scope of insurance cover conditional upon system implementation. On the contrary, analyses point to a limited interest of insurers in ISO 14001 management and its meagre importance for underwriting (Lemkowska, 2019; Minoli & Bell, 2002a, 2002b, 2003). There is no proof, either, of relevant perceptible financial benefits resulting from lower insurance premiums. If the category of benefits is mentioned in empirical studies at all, it is only declared by few respondents (Hajduk – Stelmachowicz, 2013; Matuszak-Flejszman, 2009; Matuszak-Flejszman, 2010; Santos, Rebelo, Lopes, Alves, & Silva, 2016; Zutshi & Sohal, 2004).

As early as in 2000 a phenomenon called *hitting the green wall* attracted researchers' attention, as it reflected difficulties connected with gaining returns on investments in environmental management systems (Shin & Chen, 2000). Pecuniary benefits (e.g. lower premiums) offered by financial institutions to organisations managed in conformity with ISO 14001 is limited primarily due to a lack of documented information about the impacts of environmental activities. While ISO 14001 standard is management-related, it does not precisely state what the expected impact of the operations should be (ISO 14001 doesn't specify performance level) (Psomas, Fotopoulos, & Kafetzopoulos, 2011; Shin & Chen, 2000). The above uncertainty is additionally worsened by the major trait of the certification market, which is the conflict between providing broad accessibility to certification services and the quality of these services (Shin & Chen, 2000). The market offers solutions to needs expressed by organisations managed in conformity with ISO 14001 (their internal and external motives) and consequently moulds two approaches to auditing (auditing orientation): improvement-oriented auditing and compliance-oriented auditing (Prajogo, Castka, Yiu, Yeung, & Lai, 2016). Research has shown that the internal motives for systems implementation lead to expectations concerning improvement-oriented auditing and generate real benefits which arise thereof. In the remaining cases certification does not guarantee any particular management impacts (Shin & Chen, 2000), which justifies the reluctance of financial institutions to reward organisations for implementing systems with a whole array of financial bonuses.

The process of certification auditing is mainly qualitative (Prajogo, Castka, Yiu, Yeung, & Lai, 2016) and is not conducted according to the checklist of expected impacts. However, check-listing can be used

in the context of EMSs for purposes other than obtaining a certificate. In the hands of the organisation's stakeholders, it is a tool which enables them to evaluate systemic solutions and system management impacts which are relevant from their point of view. Usefulness of this instrument has been recognised in the public sector of economy where check-listing makes it possible to determine if an organisation managed in conformity with ISO 14001 standard fulfills the conformity requirements which remain under control of public administration units (European Union Network for the Implementation and Enforcement of Environmental Law [Impel], 2012).

TOOL FOR ASSESSMENT OF EMS ISO 14001 USEFULNESS FOR INSURANCE PURPOSES

Developing a parallel checklist for insurance sector may serve at least two purposes. Firstly, it may be used as a complementary section to an insurance proposal form which will extend the question about implementation of a management system in conformity with ISO 14001 to detailed elements of the system. Secondly, the checklist may constitute a collection of guidelines to system implementation which would take into account the interests of an insurance company being the interested party to the implementer. In the first case, importance of the checklist is derived from integration between systemic solutions and terminology used in ISO 14001 EMSs as well as the scope of indispensable information which the insurer needs in order to conduct the process of underwriting[4]. Making use of standard terminology in the process of signing an insurance contract may enhance the quality of responses offered by the organisation members. The other goal pointed above – developing the guidelines for system implementation – is congruent with the gap which appeared between the theoretical justification of EMS ISO 14001 significance for insurance purposes and its practical application in the process of insurance cover provision. Although ISO 14001 has been in use for over two decades, insurance sector has not, as yet, recognised its significance. It can be concluded that either the standard itself or its implementation or certification process in its current form are not up to the insurance companies' expectations. At the same time, however, flexibility of the standard makes it possible to embed elements in it which are relevant to insurers. The guideline checklist may even strengthen the practical dimension of the above relation.

Checklist development required an integration of insurance technology assumptions with the structure of ISO 14001 standard. Insurance technology assumptions were assessed through theoretical and practical analysis of the underwriting process (evaluation of the insurance proposal form questionnaire) (Colonnade, 2019) as well as analysis of general terms and conditions of environmental insurance offered by a domestic insurer and Polish branches of the EU insurers (Ergo Hestia, 2018; Colonnade, 2018; Chubb, 2019). Template analysis backed by a narrative approach to the transcript of focus group interviews conducted via the Bulletin Board platform from 19 to 28 March 2018 based on asynchronic written communication (Lemkowska, 2019) led to identification of potential benefit areas resulting from integration between systems in conformity with ISO 14001 and the process of insurance provision. The respondents to the interview were insurance experts in the field of environmental risk, actively operating in the Polish market. Finally, the analysis of ISO 14001 standard enabled identification of EMS areas where it is indispensable to take insurers' interests into consideration, if the system implementation is to generate positive impacts within environmental insurance.

Based on the analysis of insurance proposal forms, Aon (2011) identified nine groups of information items which insurance companies obtain before completion of insurance contract: information on loca-

tion, size and financial results of the organisation, type of activity, available reports on fixed property studies, description of operations within the certified environmental management system, description of operations and equipment covered by the integrated environmental permit, all the available reports on conformity, environmental reports, on sustainable development, information on underground bodies of water, information on relations with public administration units with regard to ensuring conformity with environmental regulations. In markets where insurers present a limited range of universal environmental insurance products (e.g. in Poland), questionnaires are usually extended to include queries about planned modernisation and restructuring of the premises, haulage range, types of substances and materials transported; when there are no environmental reports, questions about the past cases of environmental risk occurrences are also asked (Colonnade, 2019). In numerous cases of environmental insurance contracts underwriting is based on insurance proposal form questionnaire. However, many other contracts are preceded by a thorough risk assessment (Jastrzębski, 2018). A properly designed ISO 14001 EMS may theoretically become the source of input data both in a simplified (based on the questionnaire) and extended risk assessment process (Zutshi & Sohal, 2004).

Importance of the ISO 14001 system as a source of information was also emphasised by the respondents to the focus group interview; they asserted that risk analysts frequently use system documentation, albeit not always consciously i.e. by recognising the relation between documentation and ISO 14001 standard. Environmental insurance market experts were not aware of the effect which management in conformity with ISO 14001 has on the scope of environmental risk. Without a statistical backup and referring to a limited credibility of certification as well as too much voluntariness in implementation of the systems, the experts could not positively evaluate the influence of ISO 14001 EMSs on the scope of risk covered by insurance.

The expert group did not respond very actively to particular attributes of EMS. The experts' little familiarity with the standard made it impossible for them to point at the guidelines referring to ISO 14001 implementation which would be suitable for insurers.

From insurers' point of view, the structure of the assessment tool for measuring the ISO 14001 EMSs must refer to the scope of the proposed insurance cover. All stand-alone environmental insurance products in Poland (three products) are focussed on protection against immediate threat and damage included in the 2004/35/EC directive (ELD) i.e. damage to the land, waters and to protected species as well as protected natural habitats towards which particular remedying measures are enforced by the Polish legal system. In the case of two of these products the general insurance terms and conditions in the aforementioned area are based on the "all risks" formula. When it comes to civil liability for damage done to property and individual or for any other material losses (e.g. pure financial losses), the occurrence whose effects are covered by insurance is defined as emission, i.e. occurrence causing contamination or pollution of the environment elements. The third product on the Polish market offers a slightly different construction of insurance cover. The insurer - regardless of the type of damage consequences (remedy costs in accordance with legal requirements, claims due to civil liability for damage done to property, individual or loss of profit) – is held responsible only for the occurrence of environmental pollution and its prospective further implications. Hence, the above regulations do not consider insurer's liability for disturbing elements of the environment which do not constitute a form of pollution (e.g. disturbing a bird habitat due to construction activities). The above laws are also questionable when it comes to phenomena such as light or noise emissions (light or noise pollution).

The assessment indicator of ISO 14001 EMS must be flexible, so that it may encompass the diverse scope of cover offered by insurers. However, considering the core of insurance cover linked to primary

damage requiring rectification in accordance with implementation of the ELD, essential elements of the indicator should refer to the impact of ISO 14001 EMS on the scope of risk and information potential with regard to damage done to waters (surface and groundwater), land, damage to protected species and protected natural habitats. Due to particular social disruptions and the civil-law claims potential, there is a need to consider one more emission type, namely emissions of substances into the air, despite their exclusion from the ELD (except for the situations when the air serves as an agent in occurrence of damage to elements of the environment specified in the directive). The above scope of risk considered in the assessment indicator constitutes the category of environmental insurance risk, which, for organisations, means the kinds of environmental risk occurrences the financial implications of which may be transferred onto an insurance company.

The indicator regarding usefulness of management in accordance with ISO 14001 for the process of insurance provision should refer the aspects of the risk scope and information about risk to particular stages of implementation and ISO 14001 system elements. Implementation process of ISO 14001 starts from evaluation of the organisation's context and primarily, from a study of its stakeholders' needs and expectations. This stage determines the kind of environmental policy and affects the process of identifying environmental aspects: such elements of operations, products or services provided by the organization, which may or will interact with the environment. Out of these, in line with the criteria individually set by the organisation, significant environmental aspects, i.e. ones which have a significant impact on the environment, are selected. The last stage of the organisation 'diagnosis' in the process of system implementation involves identification of risks and opportunities (adverse and beneficial effects connected with the company's operations) and potential emergency situations which may occur in connection with its activities.

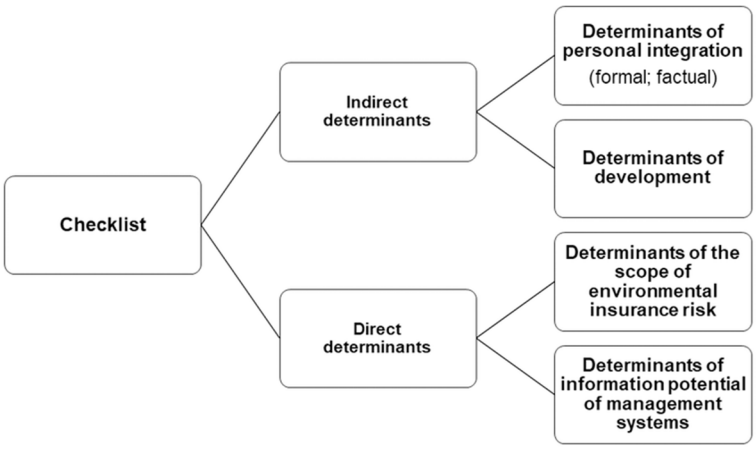
Describing an organisation according to the above structure constitute a basis for setting individual objectives and action planning. The objectives should be measureable and their accomplishment should be monitored. Special attention should be paid to action planning in case of potential emergencies, in order to prevent or mitigate adverse effect on the environment.

Environmental management system should be documented. Obligatory record keeping with regard to identified environmental aspects, the criteria for identification of significant aspects, environmental objectives and processes of responding to potential emergencies enables insurance companies to relatively determine the extent to which a system is useful for the insurer. The organisation must monitor and maintain records of results with respect to the parameters of environmental operations connected with significant environmental aspects and the parameters referring to legal requirements. Also, the progress in environmental objectives accomplishment should be monitored and properly recorded. Systemically managed entities must evaluate environmental impact of their operations through application of environmental effectiveness indicators. The impact of environmental operations should be communicated in and outside of the organisation.

SOLUTIONS AND RECOMMENDATIONS

Taking all the above remarks into consideration, an indicator has been designed in the form of a checklist[5], which contains system elements determining its usefulness for the process of insurance cover provision. The elements have been catalogued in two groups: indirect and direct determinants of usefulness of environmental management systems for developing environmental insurance. (cf. Figure 1, Table 1).

Figure 1. Checklist – system elements determining its usefulness for the process of insurance provision
Source: Author's Own Compilation



The fact that indirect determinants are taken into account means that the organisation provides conditions for management of the risks which are at the core of the insurance cover. The determinants can be divided into two groups of factors: firstly, those which are connected with personal integration between the area of ISO 14001 EMS and the area of environmental insurance; secondly, the factors describing the extent to which determinants of environmental risk insurance should be considered during the system development.

Personal integration in the area of the two analysed instruments for environmental risk management may exist formally (joint functions of the person responsible for the standardised management system and the scope of insurance cover in the organisation) and actually (in which case the person responsible for the environmental management system knows about the signed insurance contracts which cover environmental risk and is aware of their essential terms and conditions).

Usefulness of certified environmental management systems in conformity with ISO 14001 standard indirectly depends on attention paid to the insurers' interest i.e. determinants of environmental insurance risk (the risk which may be covered by insurance) when developing the system. It is only possible when the organisation analyses insurers' interests in the process of the organisation's context or takes them into consideration during system implementation.

System elements which directly determine its usefulness are the areas of systemic management which the insurer may directly apply in the process of insurance cover provision. They can be divided into two groups i.e. the ones which affect the scope of the environmental insurance risk and those which mould the information potential of management systems. The relation between direct and indirect determinants is ambiguous. On the one hand, the existence of indirect determinants should have a positive impact on shaping the direct ones. There may, however, appear situations, when within a particular company only one catalogue of factors (direct or indirect) will be identified. In such a case direct factors should be treated as prevalent. A detailed list of indirect and direct factors is presented in Table 1.

Table 1. Checklist – system elements determining its usefulness for the process of insurance provision

Category Level I	Category Level II	Category Level III	Description of determinants
Indirect determinants	**Personal integration determinants**	**Formal**	Joint functions of the person responsible for the standardised management system and the scope of insurance cover in the organisation
		Actual	The person responsible for ISO 14001 knows about the current completed environmental risk insurance contracts
			The person responsible for ISO 14001 knows about the past environmental risk insurance contracts
			The person responsible for ISO 14001 knows the possible reasons for lack of insurance
			The person responsible for ISO 14001 is able to indicate insurance products in the area of insurance risk which have been purchased by the organisation
			The person responsible for ISO 14001 knows whether the insurance company enquired about system implementation at the stage of contract completion.
			The person responsible for ISO 14001 knows the impact of systemic management on premium level.
			The person responsible for ISO 14001 knows the impact of systemic management on the scope of insurance.
	Development determinants (taking into consideration the factors of environmental insurance risk in the process of system development)		Organisation analyses insurers' interests in the process of organisation's context assessment.
			Organisation takes into account the likelihood of compensation payments to the parties interested in the process of identification thereof.
			Organisation takes into account the estimated, probable amount of compensation payments in the process of identification of the parties interested.
			In the process of environmental aspects identification, organisation considers the regulations referring to liability toward third parties for environmental damage or other adverse environmental effects resulting from their operations.
			In the process of environmental aspects identification, organisation considers the regulations enforcing remedy of environmental damage or other adverse effects on the environment.
			In the process of environmental aspects identification, organisation considers – if it has any damage-related experience – the scope of damage done to the environment and other adverse effects on the environment in the past.
			In the process of environmental aspects identification, organisation considers the value of compensations payments to third parties and other claims in the past.
			In the process of environmental aspects identification, organisation considers the costs of remedying action with regard to environment elements in the past.

continued on following page

Table 1. Continued

Category Level I	Category Level II	Category Level III	Description of determinants
Direct determinants	**Determinants of the scope of environmental insurance risk**		Organisation establishes the process(es) for responding to emergency in areas which are relevant to environmental insurance risk.
			In the processes for responding to emergency organisation considers actions indispensable for restoration of the environment to its baseline condition and cleansing the environment afterwards.
			Organisation monitors the condition of technical means of prevention.
			Organisation monitors the condition of technical means of reducing adverse effects on the environment.
			Organisation monitors installation parameters.
			Organisation sets environmental goals in areas which are relevant to environmental insurance risk.
			Organisation accomplishes the environmental goals mentioned above.
			Organisation takes preventive and repressive action.
			Subjective assessment of the person responsible for ISO 14001 referring to the impact of the implemented management system on the scope of environmental risk for the organisation.
	Determinants of information potential of EMSs		Organisation estimates the likelihood of damage occurrence or another adverse effect on the environment.
			Organisation estimates the probable maximum cost to be incurred as a result of potential damage done to the environment.
			Organisation monitors environmental aspects.
			Organisation holds a ledger of environmental damage within a particular scope.

Source: Author's Own Compilation

FUTURE RESEARCH DIRECTIONS

Complementary to the presented research process, the proposed indicator should be used in the future for assessment of already implemented ISO 14001 environmental management systems from the point of view of their significance (referring to information and the scope of risk) for insurers. Thus prepared quantitative research will make it possible to verify the hypothesis regarding small impact of systemic management on the significance of environmental risk and systems' information potential. The source of this hypothesis is the result of the Bulletin Board Interview: the skeptical attitude of the insurance sector to management systems in conformity with ISO 14001.

Another research area is to identify ways in which the insurance sector could support the development of ISO 14001 environmental management systems to make them more useful for insurance purposes.

Usefulness of systemic environmental management for the insurance sector is contingent upon reaching a situation in which the system would guarantee correctness and reliability of processes implemented according to the insurers' guidelines. This would require close cooperation between insurance companies and certification bodies, which would, in turn, result in quality improvement with regard to certification audits. Such cooperation should diminish pressure from certification bodies' clients to reduce auditors' requirements and to lower certification prices; at the same time, the clients would be shown the added

value of more beneficial insurance terms and conditions. A problem remains, however, of a low demand for insurance cover and lack of interest in the above solution on the insurers' part.

Consequently, replying the question how to increase the demand for environmental risk insurance cover should be the goal of the future research projects. There are no studies, which would corroborate a positive effect of ISO 14001 system implementation on the decision to sign an insurance contract. On the contrary, systemic management may be treated as a substitute of cover or a reason for limiting its scope.

A practical strengthening of the synergy between environmental insurance and ISO 14001 EMS does not require the standard to be changed; what is needed, though, is the alteration of other determinant factors affecting the way in which a standardised system is implemented. Engagement of insurance sector, including development of guidelines for system implementation for insurance purposes backed by cooperation between certification institutions is seemingly a sine qua non condition for commonplace control of environmental insurance risk through implementation of ISO14001 systems. In the future research, the above engagement of insurance sector should be considered in a broad context of the role of insurance sector in the sustainable development. According to Insurance Europe (2018) sustainability is already a key factor for insurers. Numerous insurance companies decide voluntarily to commit to sustainability objectives by their investment decisions, insurance cover supply etc. The above is recently supported by the legal and technical initiatives of European Union, e.g. proposal for a regulation on the establishment of a framework to facilitate sustainable investment (European Commission, 2018a), proposal for regulation on disclosures relating to sustainable investments and sustainability risks (European Commission, 2018b) and guidelines on non-financial climate-related information reporting (European Commission, 2019).

CONCLUSION

The research is conducted in the area of concepts which endeavour to strengthen the importance of environmental management systems in organisations. At the same time, it is focussed on the synergy potential which can be generated by the relation between environmental insurance and environmental management systems and which was already identified in various studies in the late 1990's. Numerous references to the above issue in the following years, however, never reached beyond the process of identification and explanation of potential advantages and barriers to the aforementioned relation. Researchers' conclusions were supported by the bulk of general analyses of motives, advantages and barriers connected with implementation of environmental management systems in conformity with ISO 14001. The studies so far have not proposed an instrument for measuring of usefulness of systemic management for insurance purposes. As a result of the present publication this cognitive gap has been filled in. On the basis of the analysis of the structure of ISO 14001 environmental management system, insurance sector documentation and the opinions of environmental risk experts a usefulness indicator has been developed in the form of a checklist. It constitutes the outcome of an attempt to relate the construction of ISO 14001 management systems to environmental insurance products offered on the Polish market. Thus designed indicator performs three functions: firstly, it may provide support in the process of underwriting in a relation with an individual customer; secondly, it suggests a data catalogue which can be used for an *en masse* analysis of usefulness of systemic management in conformity with ISO 14001; thirdly, it may become the groundwork for EMS implementation guidelines in accordance with ISO 14001 for insurance purposes.

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KEY TERMS AND DEFINITIONS

Environmental Insurance: A modest fraction of the product range within the area of environmental risk cover (considering the number of products) by transacting of which the environmental underwriting is conducted.

Environmental Insurance Risk: Possible component of organization's environmental risk; the types of a subject's environmental risk the financial implications of which – considering the present insurance product range – may be transferred onto the insurance company by entering into an environmental insurance contract.

Environmental Underwriting: Assessment, selection and classification of environmental risk.

Environmental Risk: The risk which is determined by the impact that the subject exerts upon the surrounding environment.

ENDNOTES

1 Since 1995 it has operated as World Business Council for Sustainable Development (WBCSD), after merging with World Industry Council for the Environment (WICE). Cf.: https://www.wbcsd.org/Overview/Our-history

2 On the history of ISO 14000 standards (Coglianese & Nash, 2001).

3 Publishing year of the first international ISO standard on environmental management (ISO 14001:1996).

4 Understood as assessment, selection and classification of risk.

5 The checklist can be treated as a catalogue of indicators, measured according to a nominal binary scale.

Chapter 24
Poverty in Bulgaria and Other EU Countries: A Comparative Study

Marta Zdravkova Sugareva
Faculty of Economics and Social Studies, University of Plovdiv, Bulgaria

Mariana Koleva Mourgova
Faculty of Applied Informatics and Statistics, University of National and World Economy, Bulgaria

ABSTRACT

According to Eurostat data, in 2016, one quarter of the population in the European Union is at risk of poverty or social exclusion. Hardest hit are the Balkan countries – Bulgaria, Romania, and Greece. The aim of the chapter is to compare the level of poverty in Bulgaria with that of the other Member States of the European Union. Different indicators of poverty are presented and discussed. A critical analysis is provided for some of the indicators used by the Eurostat and more specifically for their opportunities in comparative analyses.

INTRODUCTION

Poverty is an important social and economic phenomenon, because it impedes the well-being of the populations. The United Nation (UN) agenda is focussing on eradicating of poverty. In December 1996, the General Assembly declared the theme of the First Decade for eradication of poverty (1997-2006) to be: "*Eradicating poverty is an ethical, social, political and economic imperative of humankind*" (United Nations, 2007). The second decade (2008 - 2017) was on the theme *"Full Employment and Decent Work for All*" (United Nations, 2016). The documents for these decades focus on the multidimensional and complex nature of poverty and the need to develop *framework conditions and policies for its eradication at national and international levels*.

Poverty exists not only in developing countries, but also in industrialized ones, including the European countries. According to latest Eurostat data in 2017, 22.4% of the population of European Union

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(EU) - 28 countries - lived at risk of poverty or social exclusion. The countries with the highest share of poor people are Bulgaria, Romania and Greece (Eurostat, 2019). In these countries, the share of people at risk of poverty or social exclusion in 2017 was above 30% (28.9% in Bulgaria, 36.7% in Romania, 34.8% in Greece). On the other extreme, Czechia and Iceland have the least percentage of people at risk of poverty and social exclusion in Europe (12.2% in each one of these countries for 2017).

The aim of the chapter is to compare the levels of poverty in Bulgaria with that of the other Member States of the European Union. The authors were interested to investigate how important are the differences between Bulgaria and the other countries of the EU.

The complex indicator most commonly cited in Eurostat publications on the theme of poverty is "*people at risk of poverty and social exclusion*"(AROPE). The authors argue that this indicator turns out to be inappropriate for international comparisons. The reason for this lies in the fact that it is calculated as a percentage of people living below the poverty line; at the same time, it fails to provide information about the differences between countries in terms of the respective poverty lines in each country. In reality, the poverty line is very much different across countries, and therefore the percentage of people living below the poverty line conceals a significant part of the information about poverty. While analysing the sub-indicators of this complex indicator, the researchers have come to the conclusion that some of them are much more appropriate for the aims of the study. Based on several poverty indicators of a lower level of complexity, they come to conclusions about the levels of poverty in Bulgaria and the other countries of the EU.

Some data and some analyses are presented about the poverty in several groups of the population. A typical feature of poverty in Bulgaria and Romania, for instance, is that it is largely located among the old people – something that is much less common in the other EU countreis. Moreover social differences and inequality in Bulgaria are greater than in the other countries.

CONCEPTS AND INDICATORS OF POVERTY

The concept of poverty can be interpreted in many different ways, according to different approaches, ideologies, and even according to different political interests. The approach of the authors is based on the idea that social sciences have to elucidate both the real situation of poverty in the countries under investigation, but also the quality of the indicators used for such investigation. In the first place a distinction has to be made between the notions of **absolute poverty** and **relative poverty**. This is the most widespread distinction of the existing types of poverty, and each one of them involves a series of indicators. Creating aggregate indicators of poverty (either by deduction or by induction) should be based on solid assumptions about the respective notions, and phenomena that they have to represent. Therefore some basics are presented below about the notions "absolute" and "relative" poverty.

Absolute Poverty

Absolute poverty is a condition where people can not meet their most basic needs, therefore this type of poverty is the lack of basic items necessary for the mantainance of human physical surviving (such as: food, clean water, clothing, shelter, sanitation, education and information). The definition of absolute poverty relies on defining the human basic needs, which if not met would endanger the person's health and life.

According to Renata Lok-Dessallien "absolute poverty refers to subsistence below minimum, socially acceptable living conditions, usually established as based on nutritional requirements and other essential human necesseties. Relative poverty compares the lowest segments of a population with upper segments, usually measured in income quintiles or deciles" (Renata Lok-Dessallien, 2000).

In this interpretation, not only the satisfaction of basic biological human needs, but also the social aspects of life are considered for defining absolute poverty. (Absolute poverty is seen as a lack of "socially acceptable living conditions"). In other interpretations (by the UN and the World Bank), various other aspects of absolute poverty are introduced, such as: access to education, to heath care, the health status of people, some elements of the physical environment, etc.

There is an International poverty line, measuring approximately the income under which people live in extreme poverty. Since 2015 the World Bank updated this poverty line (poverty threshold) to 1.90 US dollars a day. In 2015, 10 percent of the world's population lived on less than US$1.90 a day. (World Bank, 2018 and 2019).

The most recent research on extreme poverty definitions includes more social dimensions of life, as well as two higher poverty lines, designed to complement the international poverty line of 1.90 dollars per day, namely: 3.20, and 5.50 dollars per day. These new poverty lines are supposed to measure extreme poverty in lower- and upper-middle-income countries. In 2015, according the World Bank data, a quarter of the world population was living on less than $3.20 and close to half of the world population was living on less than $5.50 per person per day. (World Bank, 2018 -2)

The UN Developmet Programme (UNDP) has elaborated a Multidimensional Poverty Index (MPI), which includes health, education, and living standards (Bourguignon & Chakravarty, 2000).

Relative Poverty

Relative poverty is a condition where people live below the minimum standard of living developed in their social environment (country, social group, age group, etc.) More precisely, if it has to be expressed in terms of people's income, these minimum standarts are defined by the governments (official "*poverty line*"). People in a situation of relative poverty are usually entitled to social benefits.

The idea of using relative poverty instead of absolute poverty has arisen from the fact that economic development varies largely across countries; in most countries the economy is growing with time, technologies are improving, and therefore the (absolute) critera for being poor are changing. Another reason behind the introdunction of indicators for relative poverty is the fact that people are social creatures, and their postion in a society is highly dependent on the social norms for wealth, consumption, and well-being in that precise society. It is obvious that the subjective perception of well-being (respectively of being poor) can not be neglected when defining the level of poevrty, and that this perception is largely determined by the relative position of each individual in its community ("society"). At the same time there are huge differences between the different countries, and even inside of each country (between regions, social groups, age groups, etc.) not only in economic development, but also in climate, traditions, family life style, etc.

In this respect one crucial question arrises touching the utility of the indicators of relative poverty: what are the boundaries of that "society" of the individuals and their families, according to which the relative poverty has to be measured? The fall of the Berlin wall has created new horizons both for people in the East and in the West of Europe. The process of the enlargement of the EU[1] has created more changes in these boundaries. Today people living in Bulgaria for example, feel themselves more European, than in

the previous years and decades. Many Bulgarians travel abroad – for tourism, or for work, for visiting family members, etc. Many foreigners travel to Bulgaria, some of them create businesses, some buy houses in Bulgaria for temporary or permanent residences, etc. The process of intensified migration obviously push Bulgarians to compare their own standard of life to that of people in the other European countries, and even outside of Europe. Therefore the ”society” of Bulgarians is now surpassing the national boundaries, as people tend more and more to live by the standards of the other EU and oversees countries. In this situation the “relative” indicators of poverty, based on national “norms” (such as the “at risk of poverty treshold”) are getting more and more irrelevant.

Other Classifications of Poverty, and Specific Issues

Other classifications of the types of poverty distinguish between **objective and subjective poverty**. Subjective poverty is a category reflecting the subjective perception of poverty. It may obviously differ from the objective situation of a person or of a household, especially in comparison with other people, other countries, etc. The authors will not address here the subjective aspects of poverty.

One important issue that has to be addressed when studying various types of poverty, is the specific economic and social situation in the Europan countries. After World War II, Europe was divided (roughly) into two blocks: Eastern and Western, differing by the political orientation of each country and also by some basic principles of the economic and the social systems.

Communication between the two blocks was impeded in the post-war period, and even now, 30 years after the fall of the Iron curtain, people in the countries of Eastern and Westen Europe live in quite different economic and social conditions. Important economic migration flows took place over the years from the countries of Easten Europe towards the West, provoked by the differences in the living standards. Both the salaries and the prices remained lower in the East, while relative differences in the living conditions, including the differences and the trends of poverty, remained insufficiently clear. All these motivate the crucial role of the poverty indicators in the process of assessing poverty rates, especially in inter-country comparisons and rankings. These issues will be further discussed in the following sections.

The authors concentrate specifically on the indicators of the so-called “relative poverty”, claiming that they create a distorted image of the real distances between countries.

Eurostat is using a complex indicator for the rate of poverty in a country: “*People at risk of poverty and social exclusion*” (Eurostat, 2019). This complex indicator is composed of three sets of sub-indicators of absolute and relative poverty:

1. Access to certain monetary resources (monetary poverty);
2. Access to certain material living conditions such as: regular complete foods, residential and living conditions, opportunities for holiday trips, possibilities to meet unexpected needs, etc., and
3. Opportunities for employment.

People at risk of poverty and social exclusion, according to this concept, are those who do not have access to either one or more of these three sets of items (sub-indicators).

According to the complex indicator, *people at risk of poverty or social exclusion* are those people who live in households with either:

- **Monetary Poverty** (below the poverty line, which is normally set at 60% from the national median income). In 2017, 17.3% of the population in the EU was below this line.
- **Severe Material Deprivation** (lack of access to at least 4 of 9 defined items, linked to everyday needs). In 2017, 7.5% of the population in the EU suffer from severe material deprivation.
- Or **Low Work Intensity**. In 2017, these are 10.5% of the population aged 0-59 years in the EU (Eurostat, 2019).

Thus the most commonly cited complex poverty indicator *At risk of poverty or social exclusion* is not sufficiently correct in representing the real distances in the incidence of poverty between countries. Its main component (sub-indicator) "*At risk of poverty*" measures the share of people living below the poverty line in the respective country, but this poverty line differs quite a lot in the different countries. Therefore the relative nature of this sub-indicator impedes the correct comparison between the various countries, and influences the comlex indicator by introducing to it an obscuring element resulting from this relativity.

This complex indicator has three components (sub-indicatots), among which the so-called "at risk of poverty" has the highest weight. This component is calculated as the share of the total population whose income is lower than the poverty threshold. The threshold is calculated in relation to the national median income.

At the same time the national median income (and therefore the poverty line, set at 60% of this median) differs substantially across the EU countries. This fact compromises the relevance of the indicator "at risk of poverty" for comparing poverty in different countries. The differences in the magnitude (value) of the respective line on the graph, is not displaying correctly the differences in poverty between the different countries. Being an indicator of "relative poverty", this line may easily mislead the interpretators interested to learn about the real differences in poverty between the EU countries. In the next sections, this issue will be further discussed.

Lack of Access to Health and Education as Indicators of Poverty

Access to education is aquiring more and more importance in the modern world, and therefore its lack has been introduced in many classifications as one of the indicators of poverty. Another dimention of poverty is linked to health. People living in poor housing conditions and/or in unhealthy environment more often suffer from diseases, and live a shorter life. The lack of access to proper health care and short life expectancy at birth, can also be used as indicators of poverty, though they reflect only its consequences.

The global indicator of human development, *Human Development Index" (HDI),* is providing insights for the level of poverty, though it is not directly measuring poverty. The HDI is calculated based on the following indicators: 1) life expectancy at birth; 2) level of education and 3) income per capita (United Nations Development Programme, 1990).

EU COUNTRIES RANKING ACCORDING TO VARIOUS POVERTY INDICATORS

Ranking According to the Complex Indicator "People at Risk of Poverty or Social Exclusion"

The values of the complex indicator "*people at risk of poverty or social exclusion*" (calculated as the share of people living in households touched by one or more of the three up-cited main dimensions of poverty) in the EU countries, are displayed in Figure 1 (Eurostat, 2019). In this classification, Bulgaria ranks first among all EU countries, with the highest share of people being "at risk" (38.9%). Next are: Romania (35.7%) and Greece (34.8%). This first approach to the comparative analysis, by using the complex indicator "at risk of poverty and social exclusion", proves to be quite problematic, as further research based upon other (less complex) criteria, lead sometimes to completely different rankings.

Some notes have to be addressed to this indicator and its sub-indicators.

First, the name of the indicators, "*people at risk of poverty or social exclusion*", does not imply that these are poor people. Being "at risk" of poverty is not the same as being poor. Second, as monetary poverty is fixed to the people below the official poverty line (below the threshold which is about 60% of the median income), in some countries this poverty line is so low that people having such income can hardly meet their most basic needs (absolute poverty).

Another problem arises when the poverty line is fixed above the normal income of large fractions of the population. Thus in Bulgaria the poverty line is fixed at 348 leva per month, which is well above the minimum retirement pension for work experience and old age (220 leva). In this situation, people with the lowest pensions (who have a long work experience and who meet the requirement for seniority) should apply for government social support, in order to get to the poverty line. Also, if a working person receiving the minimum salary (560 leva), has at least one person to support (a minor child, a sick parent, spouse, etc.), he (she) also has to apply for state social support in order to attain the poverty line per person.

The low salaries and the low retirement pensions put a great part of the population in a situation of need for social support. This can be called a ***general poverty***, as it is touching too many people from different social strata. In this situation some urgent policy measures are needed to be introduced in order to overcome severe poverty.

As mentioned above this indicator bears the relativity of one of its components – *at risk of poverty rate* - share of population in each of the countries, living below the poverty line.

Monetary Poverty and the Poverty Line (Threshold)

The rate of **monetary poverty** (in a given country) is defined by the share of population whose income is **below the poverty line**. In general, the poverty line is defined as 60% below the national median income per household member[2].

Obviously, this indicator (rate of monetary poverty, displayed in the figure 2 is heavily influenced by the variations of the median income across countries (table 1). At the same time the variations of the median income across countries are very important, ranging for a single person household (in PPS) from 3143 in Romania to 17292 in Luxemburg.

Consecutively the variations of the poverty line across countries are also as great. The poverty thresholds for a single person (povery line) in each one of the EU countries (Eurostat, 2019). The variations

of the threshold across countries compromise the utility of the indicator "*At risk of poverty rate*" for inter-countriy comparisons.

The poverty line varies also inside of each country by the type of household and is approximately 60% of the national median income (calculated per person living in the respective household type). In table 2, the poverty line refers to a single person living in a one person household.

Analyzing the data in tables 1 and 2, the authors have come to the following conclusions:

1. Bulgaria and Romania are characterized by a combination of low poverty thresholds and a high poverty risk (as percentage of people living below the threshold). The threshold in Romania is set lower than that of Bulgaria, which explain a relatively higher poverty risk compared to Bulgaria.
2. The lower thresholds in Romania and Bulgaria, compared with that in the other countries, explain to a great extent why the differences in poverty risk between these countries and the other EU countries are not considerable.

(The respective differences displayed by the indicators of material poverty in the Appendix, are much more pronounced.) A low threshold in combination with a high percentage of population being below it is an alarming signals for very high poverty rates in these countries. At the same time the indicator "***At risk of Poverty Rate***" obviously underestimates the real poverty rates in the cited countries.

It has to be noted once again that the figures (percentages) displayed in Figure 1 (calculated as the share of people living below the poverty threshold) are largely dependent on the absolute level of the threshold in each country, and therefore they can hardly be used to compare the poverty rate between the countries.

If one analyzes the relative differences in poverty across the EU countries upon this indicator, the conclusion may be that the poverty rate in Bulgaria and Romania is not very different from the rate in Greece, Spain, and even in Italy, which would be an incorrect conclusion. The relative differences in poverty between the EU countries are not well presented by this indicator of monetary poverty. Moreover, this same indicator is also used for the calculation of the complex indicator "*Risk of poverty and social exclusion*", and therefore the last one also bears the same limitations.

Other unexpected results may be cited when analysing this indicator (*At-risk-of-poverty rate by poverty threshold*) by household type. For ***One adult 65 and over*** – in Latvia the rate is 74% (people living below the poverty treshold), in Estonia the rate is 81%, and in Bulgaria - only 49. For a ***Single person*** (living in one person household) – irrespectively of the age – the rate for Bulgaria is 40%, close to that in Slovenia. The rates in Poland and Romania are close to that in Sweden where it is around 31%). (eurostat, 2019). All these results are heavily influenced by the differences in the respective thresholds, and therefore the international comparisons based on the indicator *At-risk-of-poverty rate* are problematic.

Material Deprivation

This is the second sub-indicator, which is used for the calculation of the complex indicator "*At risk of poverty or social exclusion*" by Eurostat. Material deprivation is also a complex indicator, composed of the following elements (each one of the latter refers to the inability of people to have access to the respective material goods or services: to pay unexpected expenses; to afford a one-week annual holiday away from home; a meal involving meat, chicken or fish every second day; the adequate heating of a dwelling; durable goods like a washing machine, colour television, telephone or car, computer and

Table 1. Median equivalised net income in the EU countries for 2017 (in Euro, PPS)

Country	Euro
Belgium	22 784
Bulgaria	3 590
Czechia	8 282
Denmark	29 383
Germany	21 920
Estonia	9 384
Ireland	22 879
Greece	7 600
Spain	14 203
France	22 077
Croatia	6 210
Italy	16 542
Cyprus	14 497
Latvia	6 607
Lithuania	6 134
Luxembourg	36 076
Hungary	4 988
Malta	14 522
Netherlands	23 561
Austria	24 752
Poland	5 945
Portugal	9 071
Romania	2 742
Slovenia	12 713
Slovakia	7 183
Finland	23 987
Sweden	25 376
United Kingdom	20 995

Source: Eurostat, 2019. Latest data available on:
http://appsso.eurostat.ec.europa.eu/nui/
show.do?dataset=ilc_di04&lang=en

internet connection; being able to buy new clothes; or being able to regularly payments of mortgage or rent, utility bills, etc.

More precisely the indicator for *material deprivation rate*, currently in use by Eurostat, measures the percentage of the population that cannot afford at least three of the following nine items:

1. To pay their rent, mortgage or utility bills;
2. To keep their home adequately warm;

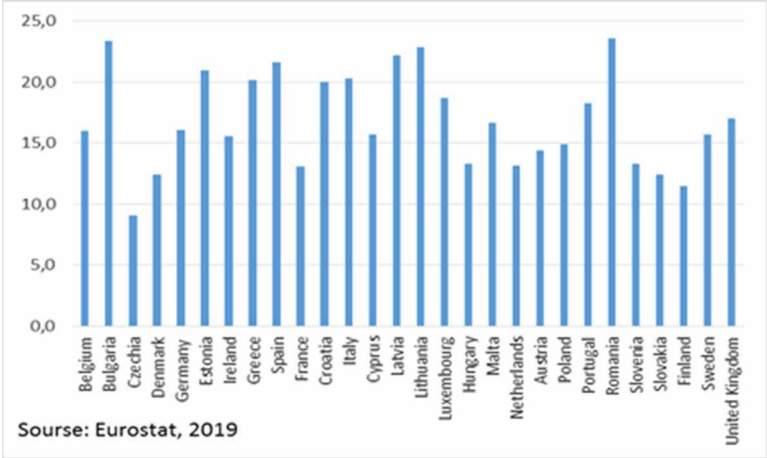
Table 2. At risk of poverty threshold in the EU contries in 2017 per a single person (60% of median equivalised income) in Euro, PPS

Countries	Euro
Belgium	13 670
Bulgaria	2 154
Czechia	4 969
Denmark	17 630
Germany	13 152
Estonia	5 631
Ireland	13 727
Greece	4 560
Spain	8 522
France	13 246
Croatia	3 726
Italy	9 925
Cyprus	8 698
Latvia	3 964
Lithuania	3 681
Luxembourg	21 645
Hungary	2 993
Malta	8 713
Netherlands	14 137
Austria	14 851
Poland	3 567
Portugal	5 443
Romania	1 645
Slovenia	7 628
Slovakia	4 310
Finland	14 392
Sweden	15 225
United Kingdom	12 597

Source: Eurostat, 2019 Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:People_AROPE_2019_6.png

3. To face unexpected expenses;
4. To eat meat or proteins regularly;
5. To go on holiday;
6. A television set;
7. A washing machine;
8. A car;
9. A telephone.

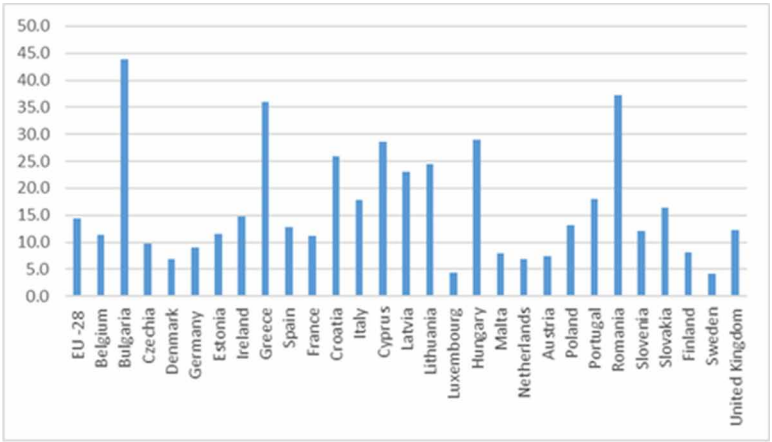
Figure 1. At-risk-of-poverty rate by poverty threshold in the EU countries in 2017



According to this indicator of material deprivation, Bulgaria occupies the highest position among the EU countries, with highest percentage of people lacking three or more of the enumerated 9 items (see Figure 2).

We shall further cite some of the data for the simple indicators of material deprivation in order to verify our initial hypothesis that the complex indicator "*At risk of poverty or social exclusion*" underestimates the poverty rate in Bulgaria, and in some other EU countries, mainly some of the countries of the former Eastern block. The Balkan countries Bulgaria, Romania and Greece, which appear to be most touched by poverty according to that complex indicators, occupy quite different positions, when poverty indica-

Figure 2. Material deprivation rate in the EU countries in 2017 (by lack of three or more items), in %
Source: Eurostat, 2019



tors of the second group (material deprivation) are used. Especially Bulgaria occupies a quite distinct position, compared to the rest of EU countries, according to most indicators of material deprivation.

Here are some examples:

In the table in Appendix the percentage of people in each country who can not afford meat, fish or vegetarian equivalent every second day is displayed. In Bulgaria more than 60% of the total population is unable to afford meat, fish or another vegetarian equivalent every second day. The respective percentage for the EU as a whole is around 17%.

In the same table the percentage of people in the respective countries are presented who can not afford a washing mashine. Among the EU countries, this percentage is highest in Bulgaria (8,4% of the total population) and in Romania (8,8%). In Greece, the respective percentage is as low as 1,1%, as low as in Portugal and lower than in Denmark (1,6%).

Another indicator of poverty (as material deprivation), is the percentage of people in each country, who are unable to keep their home adequately warm. The data about this indicator are displaied in the same table. The percentage of people in each country, who have no bath and no shower in their dwelling.is also displayed.

The highest percentages of people who can't afford a bath or shower in their homes, are in Romania (27,8%), in Latvia (12,2%), Lithuania (11,%), and Bulgaria (10,4%).

Another indicator of material deprivation is represented: the percentage of people in each country, who can not afford to replace worn-out clothes by new (not second hand) ones. The highest percentage is registered in Bulgaria (70,9%), followed by Hungary (57,9%), Latvia (52,1%), Romania (50,6), and Lithuania (49,9).

Severe Material Deprivation

Another complex indicator of deprivation is in use, called "*severe material deprivation rate*" (percentage of people who lack 4 or more of the 9 items, chosen to indicate deprivation. **Severe material deprivation rate** is defined as the enforced inability to pay for at least four of the above-mentioned items, characterizing material deprivation .

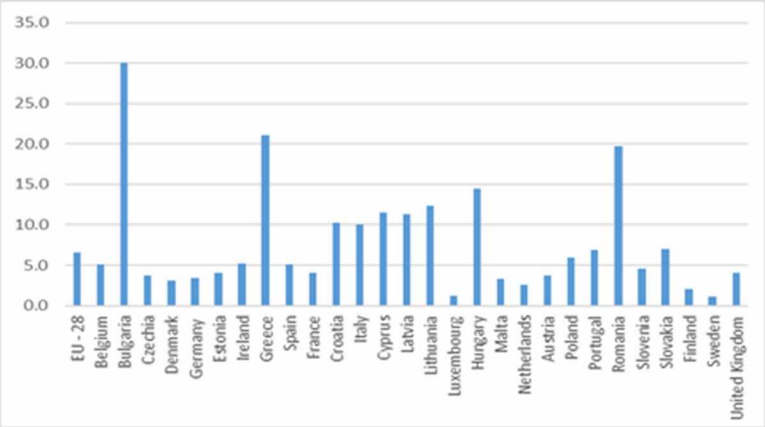
According to this indicator of severe material deprivation (the percentage of people

who have no access to 4 or more of the enumerated items), Bulgaria ranks much higher that the other EU countries (Figure 3). The respective percentage in Bulgaria is 30%, while for the EU as a whole it is around 7%. Other countries with high levels of severe material deprivation are Greece and Romania.

Low Work Intensity

This is the third set of indicators used for the calculation of the complex indicator "*At risk of poverty and social exclusion*". Ireland is the country with highest proportion of people living in a household with very low work intensity (above 20%). Next are Greece, Spain, and Belgium (see table 3). The conclusion that can be drown from these data is that work intensity, as indicator of social exclusion, is not closely correlated with the other indicators of poverty, such as the indicators of monetary poverty and those of material deprivation.

Figure 3. Severe material deprivation rate in the EU countries in 2017 (by lack of four or more items), in %
Source: Eurostat, 2019



POVERTY IN BULGARIA

Obviously, the palette of possible indicators of poverty is extremely varied, while the selection of indicators provides great differences in the resulting ranking of countries comparative classifications by their level of poverty. Nevertheless is becomes clear from the previous analyses that Bulgaria and Romania rank in the first place – with the highest levels of poverty among the EU countries according to most of the indicators. This motivates the authors to explain in more depth some specific elements of the situation in Bulgaria.

The issue of poverty definition and assessment has been addressed in many surveys and publications during the last decades. One of the recent ones is a large-scale survey: "*Bulgaria - The Poverty Challenges*", conducted by the National Statistical Institute in 2003 based on Multi-Purpose Household Surveys data (National Statistical Institute, 2003). The authors of this study concluded: "*the most appropriate indicator for measuring the living standard of the population in current conditions is the level of consumption*". Based on five criteria, they had set a poverty line for Bulgaria in 2003 at BGN 102.

At present, Bulgaria follows the Eurostat guidelines for measuring poverty. The poverty line is yearly defined in the national currency (leva, BGN) by a Decree of the Government[3] and is published in the official newspaper "Darjaven vestnik". For 2019 the poverty line in Bulgaria for a single person is 348 leva. (This is equivalent approximately to 124 Euro.)

The minimum salary is 560 leva, and the minimum retirement pension for work experience and old age is 220 leva. The social pension for old age is 133 leva.

The number of pensioniers (including the retired due to illness) is 2 130 000. (The population is estimated as 7.1 million for 2017. A population census will be conducted in 2011, while the last one was in 2011.)

Another problem is the ratio between salaries and retirement pensions. At present this ratio in Bulgaria is relatively low, around ¼. (In 2014 the average salary was 865 leva while the average pension was 236 leva. For 2019 the average salary is 1253 leva, and the average pension is 386 leva.) The target is that this ratio increases up to 80% in the future.

Table 3. In-work at-risk-of-poverty rate by work intensity of the household (population aged 18 to 59 years) in the EU countries in 2017

Country	Percentage
European Union - 28 countries	37,3
Belgium	29,5
Bulgaria	58,4
Czechia	28,9
Denmark	31,9
Germany	34,4
Estonia	39,6
Ireland	16,1
Greece	42,0
Spain	37,1
France	36,0
Croatia	34,4
Italy	38,8
Cyprus	30,6
Latvia	44,1
Lithuania	43,7
Luxembourg	31,3
Hungary	31,3
Malta	36,5
Netherlands	25,4
Austria	31,4
Poland	33,6
Portugal	50,2
Romania	62,1
Slovenia	28,3
Slovakia	48,1
Finland	15,1
Sweden	35,8
United Kingdom	41,1

Source: Eurostat, 2019

All data cited show that poverty in Bulgaria is characterized by the following specific features:

1. It is spread not only among the unemployed people and the pensionniers, but also among many of the working people. The minimum salary (560 leva) is so low that it can hardly cover the basic needs of a single person; for a working person living in household with dependant children and/or dependent old people or disabled ones) this salary brings them below the subsistence level.

2. The minimum retirement pension (220 leva) is well below the poverty line (348 leva).
3. Many families with minor children live in inappropriate dwellings - overcrowded, unhealthy, without modern sanitary equipment, and also with low income (mainly from social assistance). These situations are most often located in the Gypsy areas of cities and towns, but they can be observed among other social groups as well. In the villages, one of the huge problems is to encourage all children to go to school. As a matter of fact, many children drop out of school before the age of 14 (especially girls), which is the legal age when all children have to go to school. Illiteracy is one of the main problems linked to low income, unemployment, and low work intensity in some areas.
4. A large part of poverty is located also among lonely old people living in one or two-person households. The middle generation is often absent – out of the country – in the search for better paid jobs. The old people who live alone are vulnerable, though in many cases they help each other, especially in remote rural areas.
5. It is very common that the older people have to take care of the children, while their parents work abroad. This may last for years, while the mother and the father of the children contact only (or mainly) by electronic communication. The absence of the middle generation creates many problems for the childrens' education and emotional stability, as some of them may feel lonely and abandonned. This situation creates also problems for the old people, as they have to perform tasks unsuitable to their age and strength. The normal transfer of values between generations is somewhat embarrassed.
6. In order to allocate important financial resources the system of social security is tasked with a work load that sometimes surpasses its capacitise.

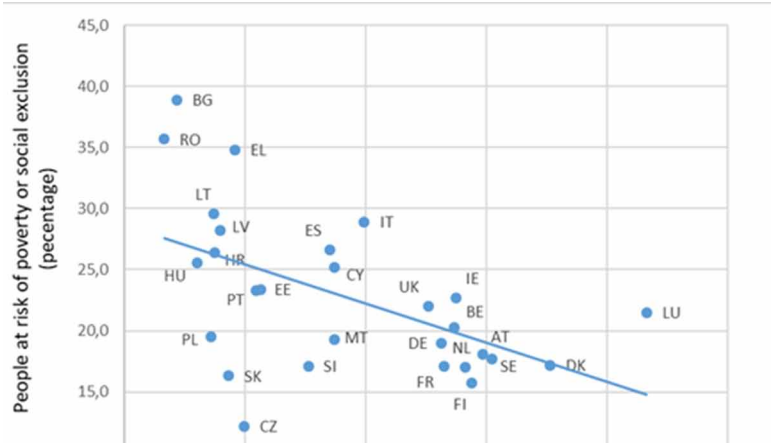
CORRELATIONS

In order to analyse the relevance of some of the sub-indicators of poverty for the purposes of inter-country international comparisons, the authors present some correlations. The first one (figure 4) is between the "*At risk of poverty threshold*", and the complex indicator "*People at risk of poverty or social exclusion*". From the graph is becomes clear that the correlation is negative, but not strong.

Bulgaria, Romania and Greece are the three countries with highest percentage of **people at risk of poverty and social exclusion,** and at the same time they have some of the lowest (at risk of poverty) **thresholds**. This is clear indication that these three countries share common features as outliers in the distribution of the EU countries by these two variables. On the opposite side Czechia and Slovakia (and less so Poland) are outliwer as countries with low levels of both of the indicators (**at risk of poverty threshold** and **people at risk of poverty and social exclusion).** This means that a low level of the threshold can be associated either with the highest, or with the lowest levels of the complex indicator **people at risk of poverty and social exclusion.** If the two group of three countries each, namely – Bulgaria, Romania and Greece in one group, Czechia, Slovakia and Poland in the other – are eliminated from the graph, the correlation between the two indicators would become much stronger. Further research is needed in order to explain the specific features of these two groups of countries in terms of their level of poverty, and the respective indicators.

On figure 5 the correlation between the "**at risk of poverty threshold"** and the "**material deprivation rate"** in the EU countries is diplayed. Here again, Bulgaria and Romania (and less so Greece) are outliers with **lowest levels of the threshold**, and highest levels of the "**material deprivation rate".** With the exception of these countries, the correlation beween the two indicators is medium. The negative

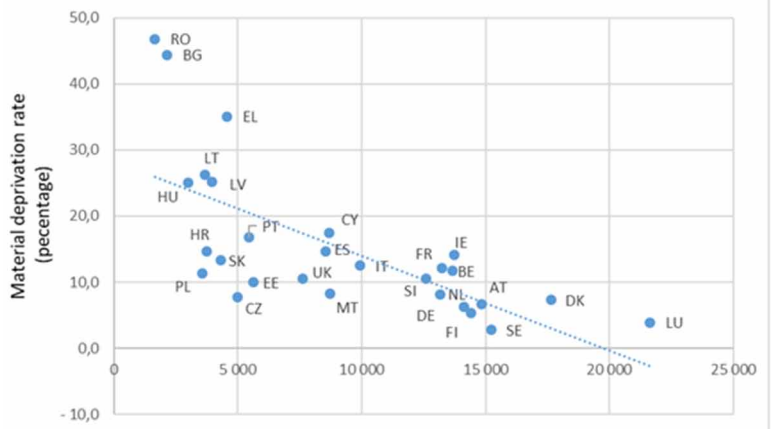
Figure 4. Correlation between "At risk of poverty threshold" and the complex indicator "People at risk of poverty or social exclusion"



correlation is expected; in the countries where the threshold is low (and therefore the median income is also low), one can expect the material deprivation to be higher, than in countries, wher e people have higher incomes. An open

question remains for the situation in Bulgaria and Romania, both with low incomes, and too high a percentage of people in material deprivation. As there are many other countries belonging to the same group of countries with similar (low) levels of the threshold (Poland, Slovakia, Criatia, Hungary, Lithania, Latvia and Greece), the question comes down as to explain the specific features of Bulgaria and Romania in terms of their too high material deprivation rate. The authors consider that this topic dererves a deeper analysis in the future. As for the weak correlation between these two variables, it can be explained by the fact that the monetary poverty (expressed here by the level of the threshold) is not sufficient to explain the distribution of countries by the complex indicator of poverty (people at risk of poverty or social exclusion). The later is much more influenced (especially when discussing Bulgaria and Romania) by the material side of poverty (material deprivation). The material deprivation rate is

Figure 5. Correlation between At risk of poverty threshold and Material deprivation rate



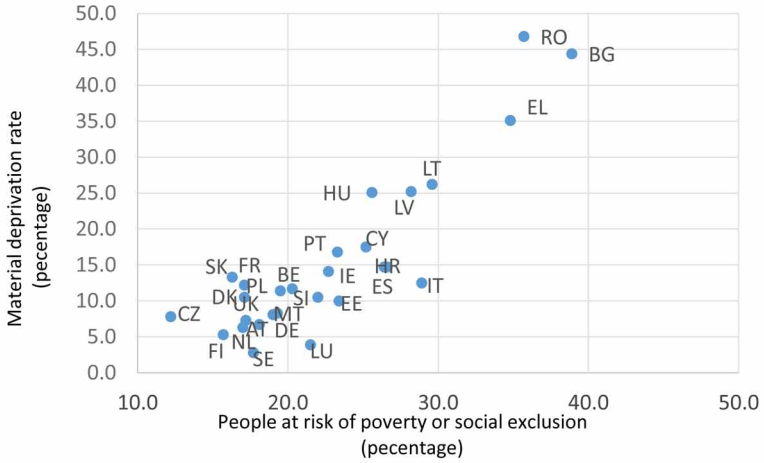
too high in these two countries, while the monetary indicator simply does not reproduce correctly the level of poverty because of its relative nature. Therefore the authors claim that the complex indicator itself produces a quite blurred image of poverty, because it hides some crucial aspect, mixing together material deprivation with the relative indicator of monetary poverty.

On the next graph (figure 6) the correlation between *At risk of poverty threshold* and *Material deprivation rate* is diplaied.

Material deprivation is closely correlated with the ***At risk of poverty threshold***. The correlation is negative. The higher material deprivation rates across countries tend to be combined with lower *at risk of poverty tresholds* in the respective countries. In this graph, Bulgaria and Romania (and also Greece to some extend) are outliers with extremely high levels of material deprivation rate, compared to the rates in the other countries of the same group with low ***At risk of poverty threshold.*** This graph explains that the rich countries (with higher poverty thresholds) have a greater share of the population living in material deprivation. This is another proof that the indicators of material poverty are the best suited ones when comparing countries by the poverty rate. They are tangible, clear and straightforward, and their interpretation is unambiguous. That is why they should be preferred for international comparisons, possibly coupled together with indicators for the social differentiation.

The correlation between the complex indicator *At risk of poverty or social exclusion* and *Material deprivation rate* is presented on figure 5. This figure confirms the inference that the indicators for material deprivation are most closely related to the general rate of poverty and that they reproduce in a sufficuently adequate way the incidence of poverty in a comparative perspective.

Figure 6. Correlation between the complex indicator At risk of poverty or social exclusion and Material deprivation rate



SOCIAL INEQUALITY

High poverty rates are often accompanied by a high level of social inequality. The poorest countries, usually display also relatively high levels of inequality.

Social differentiation can be expressed roughly by the ratio (or the difference) between the fifth and the first quantile according to some indicators of poverty or well-being.

According to Eurostat data about the share of ***net disposable income*** in the EU countries, social differentiation (the difference between first and fifth quntiles) in 2017 was greater in Bulgaria and Romania than that in the other countries of the EU. The respective percentages are shown in Table 4.

In Bulgaria the share of net disposable income received by people in the first quantile (the poor) is going down between 2011 and 2017, while the respective share of the rich (fifth quantile) is going up. This means that the differenciation is not only great but is also increasing. The share of net disposable income received by people in the first quantile (poor), 5.6%, is the lowest among all the countries in the EU.

The issue of inequality will not be examined here in detail; the authors only mention it in the context of the complexity of poverty indicators.

CONCLUSION

The existing indicators and data of poverty in Europe are produced mainly by Eurostat and the national statistical offices. This research has proved that the data are abundant, and that they provide ground for the study of various sides of the problem of poverty.

The inter-country comparative studies seem to be dominated at present by the aggregated indicator "*at risk of poverty and social exclusion*", which is not sufficienly elucidating the inter-country differences in poverty. Other indicators, such as the indicators of material deprivation, display results that are more comprehensive, and closer to the real ranking of countries by the poverty rate in them.

Bulgaria and Romania display very high levels of poverty (compared to the rest of the EU countries), according to many indicators. Greece holds a position somewhat apart from the other Balkan countries (with less poverty). While outside of the Balkan area, Hungary, Litva and Lithuania also have high levels of poverty according to most of the indicators of material deprivation.

One important point: the so-called "relative poverty" (with the indicator "at risk of poverty"), calculated as the percentage of people below 60% of the median income of their country, when used for comparative purposes between countries, can lead to some incorrect or dubious interpretations. As far as this indicator is used as the main component of the complex indicator "at risk of poverty and social exclusion", the latter also suffers from insufficient capacity to represent the levels of poverty in each country and the inter-country differences.

Countries	First quantile	Fifth quantile
Bulgaria	5.6%	46.0%
Romania	6.0%	33.5%
Greece	6.6%	40.1%
EU – 28 countries	7.8%	38.6%

Source: Eurostat, 2019

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ENDNOTES

1 Bulgaria and Romania joined the EU on January 1, 2007.

2 In each country, the povery line is defined yearly, in the respective currency, by an official state document. It varies for people living in different household types – by the number of household members, and by the number of adults, and children. People who are below the poverty line are entitled to social benefits.

3 https://www.mlsp.government.bg/index.php?section=CONTENT&I=400

APPENDIX

Country	Inability to afford a meal with meat, chicken, fish (or vegetarian equivalent) every second day	People inable to keep afford washing mashine home adequately warm		People having neither a bath, nor a shower in their dwelling	Pesons who cannot afford to replace worn-out clothes by new (not second hand) ones
Belgium	5.60	1.20	5.70	0.40	26
Bulgaria	31.70	8.40	36.50	10.40	70.9
Czechia	7.10	0.20	3.10	0.30	29
Denmark	2.10	1.60	2.70	2.00	17.1
Germany	7.00	0.50	3.30	0.00	17.6
Estonia	5.30	0.90	2.90	7.00	20.4
Ireland	1.70	0.30	4.40	0.20	21.3
Greece	13.20	1.10	25.70	0.50	8.8
Spain	3.70	0.20	8.00	0.10	13.4
France	7.10	0.50	4.90	0.60	27.2
Croatia	10.50	0.80	7.40	1.40	37.7
Italy	13.40	0.20	15.20	0.60	33.2
Cyprus	3.80	0.30	22.90	0.60	36.2
Latvia	13.00	3.30	9.70	12.20	52.1
Lithuania	16.50	:	28.90	11.50	49.9
Luxembourg	2.20	0.30	1.90	0.50	18.4
Hungary	16.40	0.70	6.80	3.50	57.9
Malta	5.60	0.30	6.30	0.10	19.5
Netherlands	1.90	:	2.40	0.10	13.4
Austria	5.50	0.30	2.40	0.30	13.6
Poland	6.30	0.50	6.00	2.90	26.7
Portugal	3.00	1.10	20.40	1.20	40.3
Romania	19.20	8.00	11.30	27.80	50.6
Slovenia	6.50	0.20	3.90	0.30	15.8
Slovakia	14.80	0.70	4.30	0.90	34.2
Finland	2.60	:	2.00	0.50	8.5
Sweden	1.80	0.00	2.10	0.00	4
United Kingdom	5.10	:	5.90	0.30	17.4

Chapter 25
Quality of Life in the Republic of North Macedonia Seen Through the Human Development Indicators

Elizabeta Djambaska
https://orcid.org/0000-0002-4812-5166
Institute of Economics, University Ss. Cyril und Methodius in Skopje, Macedonia

Aleksandra Lozanoska
https://orcid.org/0000-0003-2496-8553
Institute of Economics, University Ss. Cyril und Methodius in Skopje, Macedonia

Vladimir Petkovski
Institute of Economics, University Ss. Cyril und Methodius in Skopje, Macedonia

ABSTRACT

This chapter considers the trend of human development in the RNM, presented through the HDI. The special focus would be the links with the problem of poverty and inequality in the economy, regarding the data for the GINI, IHDI, GDI, poverty line, MPI, vulnerable employment, and youth unemployment. The research subject is the period from 2010 to 2017, using the secondary statistical data. Comparative analysis, with the countries from the CESEE countries, further improve the quality of the chapter. The RNM is a country with a high level of human development, and it is relatively equally distributed among the population. There is a difference in the distribution of the achievements of HD and an intermediate level of equality in the distribution between the genders. Income inequality expressed with the GINI index shows increase. The results confirm that there is no automatic link between the economic growth and human development. Income and gender inequality regress the quality of life in Macedonia. Growth in RNM in the past period has failed to produce the expected positive effects.

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INTRODUCTION

Stable and increasing income, poverty, inequality and vulnerability are all monetary dimensions of development. Human development concept emphasized that people are the development objective and "people are the real wealth of a nation", not accumulated capital. The human development concept stressed the role of non-monetary aspects of wellbeing and significantly broadening the dimension of development. This paper analyzes the quality of life seen through the human development indicators.

There are several indices and indicators that relate different aspects of the quality of life, such as demographics, health, education, the environment, income and expenditures of states, democratic rights and freedom of speech and many others. Grouping and analysis of the socio-economic indicators for the Republic of North Macedonia was made according to the general division of the United Nations. Selection of the analyzed indicators was made considering their importance and methodology and their interpretation in terms of the current socio-economic situation in the Republic of North Macedonia. Also, the same indicators were used for the comparative analysis with the countries of the Central East-Southeast Europe.

First, the analysis refers to the Human Development Index (HDI). The data for the HDI for the Republic of North Macedonia has been presented, the trend has been determined and an overview of the position of the Republic of North Macedonia in relation to human development on a global level was made and compared with the human development in the CESEE countries.

The special focus of the analysis is the links with the problem of inequality in the economy, regarding the data for the GINI index, inequality adjusted human development index (IHDI) and gender development index (GDI). The poverty situation in the Republic of North Macedonia is seen through the Poverty Line and Multidimensional Poverty Index (MPI). Also, special contribution of the analysis is the aspect of the vulnerable employment and youth unemployment.

The research subject is the period from 2010 to 2017, using the secondary statistical data.

Comparative analysis, for the mentioned indicators, with the countries from the Central, Eastern and South-eastern Europe, further improve the quality of the paper.

According to the data for the Human Development Index, the Republic of North Macedonia is a country with a high level of human development and in the 2017, in the United Nation Human Development Report, ranks at the position of 80 (out of 189 countries). The data on the Inequality Adjusted Human Development Index (IHDI), present that the achieved level of human development is relatively equally distributed among the population. The result generally indicates that there is a difference in the distribution of the achievements of human development, but the difference is not significant. The distribution of human development by gender (GDI) in the period 2011-2017 determine the country in the category with an intermediate level of equality in the distribution between the genders (in 2011- 5.7, in 2015- 5.2 and in 2017, 5.4). Income inequality expressed with the GINI index shows increase. The highest average increase in the GINI index, in the Republic of North Macedonia is evident in the period from 1998 to 2000, when the index increased by 18%, i.e. from 28.1 to 34.4. The GINI index indicates further increase in income inequality. Hence, in 2015 it is 35.6.

The poverty in the Republic of North Macedonia seen through the poverty line and MPI shows discouraging situation. Republic of North Macedonia and Albania are the countries which have the largest percentage of their population living in poverty. In 2012 it is 29.2% and 39.1% respectively.

Due to the inaccessibility of data for all components for calculating the MPI index, it is calculated for only about 100 countries. Therefore, the comparison is among data of the Balkan Countries. The

highest index for multidimensional poverty belongs to Republic of North Macedonia, therefore meaning that people in this country are living on the verge of poverty conditions described with the MPI index, more specifically 2.53% of the population.

The data for the vulnerable employment of the Republic of North Macedonia rates around and higher than 20%. Although the values of the vulnerable employment indicator of the RNM are not the highest among the considered CESEE countries, in comparison to developed countries are high. Hence, vulnerable employment continues to be an issue for the Republic of North Macedonia.

Another aspect that country must hang out is the youth unemployment. The evidence shows that the highest youth unemployment rates are characteristic for Bosnia and Herzegovina and Republic of North Macedonia. In 2017 it was 45.8% in the first, and 46.7% in the later country.

The results confirm the hypothesis that there is now automatic link between the economic growth and human development, which is mainly result from the inequality in the distributions of the benefits among the population. Inequality, especially income inequality is weakening the efficiency of the economic system. Also, the gender inequality of the distributions of the achieved human development, regress the quality of life in Macedonia. The general conclusion is that economic growth in the Republic of North Macedonia in the past period has failed to produce the expected positive effects.

BACKGROUND

The imperative of the economic research, for a long time has been the production growth. The effects of increased production and quality of life have been marginalized. Over the years, the focus on research changes, so human needs and the way they satisfy them receive priority in research. The result of these tendencies is the emergence of the concept of human development, which stressed that economic development ultimately should result in growth of quality of life of individuals, while the goal of development process was to expand the capabilities of individuals by placing them in the focus of the efforts of development.

The concept of Human Development has been promoted in the 80s and 90s. The focus is not only on achieving positive economic growth and development, but also improving the well-being. Increased GDP as well as GDP per capita, are not sufficient to determine the quality of life. Therefore, in the early 1990s, the United Nations introduced new standards for economic well-being. The Human Development Index is an indicator that represents a composite of three indicators that show the achievements in terms of human development (life expectancy, education and GDP per capita). Later, other aspects that are important for human development and economic well-being are also introduced. In this way, the statistical database of indices and indicators that calculate the quality of human development provides an overview of the achievements, as well as a comparison between economies.

Human capital development and the quality of life are closely linked concept. Quality of life is the category that characterizes the essential circumstances for decent life of individual, also the opportunity for each individual to have choices about education, work, social and cultural aspect of the living. Therefore, this chapter highlights the quality of life seen through the concept of the human development.

There are many general definitions of the quality of life. “Quality of life, the degree to which an individual is healthy, comfortable and able to participate in or enjoy life events. The term quality of life is inherently ambiguous, as it can refer both to the experience an individual has of his or her own life and to the living conditions in which individuals find themselves. Hence, quality of life is highly

subjective. Whereas one person may define quality of life according to wealth or satisfaction with life, another person may define it in terms of capabilities (e.g., having the ability to live a good life in terms of emotional and physical well-being). A disabled person may report a high quality of life, whereas a healthy person who recently lost a job may report a low quality of life. Within the arena of health care, quality of life is viewed as multidimensional, encompassing emotional, physical, material, and social well-being."(Jenkinson, 2019)

Defining the quality of life, as a social and economic category, it is necessary to highlight that it cannot be separated from other socio-economic categories. It combines them and includes them in a qualitative aspect. The most famous are the Sen's (1985) capabilities approach and Easterly's (1999) classification of the dimension of the quality of life beyond income growth, escape from poverty, equality and equity, security, basic needs in education and health and environmental sustainability.

According to Sen (1985) development is a process of expanding freedoms. Greater freedoms derive from enhancement of "capabilities", defined as the choices that a person makes among "functioning" that could be achieved, and the freedom he or she has in making such choices. This "functioning" people can do only if: they are well nourished, healthy, educated and self-confident. Also, "functioning" is determined by "entitlements" i.e. the set of alternative commodities and services that a person can command in a society using the totality of rights and opportunities that they are facing. Furthermore, Sen (1985) define that entitlements depends of several factors such as availability of public goods, personal; characteristic, assets endowments, social norms, climate and environmental conditions and individual differences in relative deprivation. According to this it can be summarized that the understanding of development based on the concepts of entitlements, functioning, capabilities and freedoms broadens the definition of development beyond simple measures of income, consumption and wealth with the inclusion of the issues of freedom and choice.

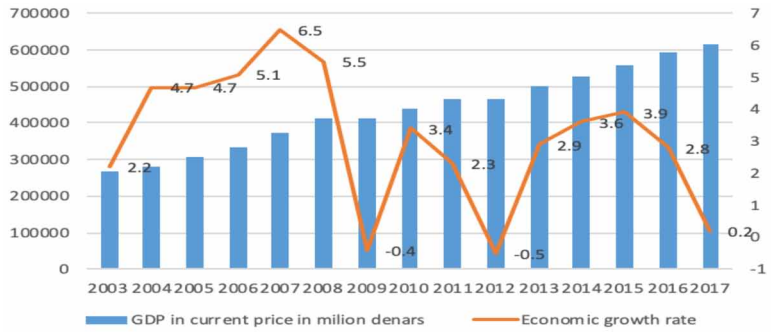
William Easterly (1999) using the 81 indicators beyond income, define and determine the quality of life at the country level. His research includes the categories such as education, health and inequality, as well as other important categories for achieving a higher quality of life: individual rights and democracy, political stability and peace and absence of "bads". The conclusion that he highlights is that if development is about wellbeing, and the wellbeing is a multidimensional concept, there is always ongoing process of making priorities and trade-offs in development achievements.

Authors choose different aspect for researching and analyzing the concept of quality of life. Some focus on human capital and its importance on quality of life (Tsaurkubulle, 2014). Eurostat publish the studies about the quality of life indicators considering economic security and physical safety, education, governance and basic rights, health, leisure and social interactions, material living conditions, natural and living environment and others (Eurostat, 2018).

It is interesting that many researchers consider the quality of life during the economic crises. Notably, the researcher from Russia, study not only the economic aspect of quality of life, but also philosophy and sociology aspect and problems that are reflected. (Kilimanova, 2016).

The Human Development Reports (United Nations Development Programme, 2019) that are prepared annually and HDI are computed for each country has been subject of researcher critics. Mostly they focus on the methodological omission and mistakes. HDI has become an important alternative to the unidimensional measure of development i.e. GDP. Although the index still fails to include ecological consideration, it has broadened the discussion surrounding the evaluation of development. Essential remark is that HDI focuses almost exclusively on national performance and ranking, but does not pay much

Figure 1. Real GDP and economic growth rate in the Republic of North Macedonia



attention to development from a global perspective. (Sagar&Najam, 1998) Hence, Human Development Index is widely accepted indicator that represent the concept of human development.

In this paper quality of life in the Republic of North Macedonia are seen through the human development indicators.

HUMAN DEVELOPMENT INDEX: HDI

The economic situation in the Republic of North Macedonia is perceived through real GDP and the economic growth rate. The analysis of the rate of GDP growth in the period from 2003 to 2017 shows cyclical oscillations. (State Statistical office, 2019) Thus, the highest level of 6.5% was realized in 2007 and in the next two years it declined. In 2008, the economic growth rate was 5.5%, while the biggest drop was recorded in 2009, leading to a negative economic growth rate of -0.4%. The decline was a consequence of the global financial and economic crisis that began in 2008 in the USA and soon spread to the EU, with repercussions affecting almost all economies in the world.

The stabilization of the crisis in the following years is evident and the economy registered positive changes in the economic growth rate, which in 2010 amounted to 3.4% and in 2011 it was reduced to 2.3%. Negative economic growth of -0.5% was realized in 2012. The recovery of the economy, which is followed by positive changes in the rate of economic growth, is present in 2013 (2.9%), 2014 (3.6%) and 2015 (3.9%). In 2016, a 2.9% reduction is evident and in 2017 it was 0.2%. The period of growth in the years after the global financial crisis from 2009 to 2016 is primarily the result of the increase in gross investment in construction and final consumption of households.

The stock of labour is determined by the expected duration of life, health status and knowledge and acquired skills during education. The index of life expectancy at birth in the Republic of North Macedonia is increasing and in value from 71.15 years in 1990, in 2015 it is 75.52 years. In addition, the indicator life expectancy at birth is the basis for calculating the life expectancy index.

Life expectancy index, with the assumption of minimum of 20 years and a maximum age of the population of 85 years, in the Republic of North Macedonia shows higher values with the probability of achieving the highest age. Thus, in 1990, the index was 0.787, in 2000 - 0.820, 2010 - 0.841 and in 2017 0.859. This is the result of achievements in research for medical treatment, but also of the changes

in lifestyle and habits of the population. The data of the life expectancy index for the analyzed countries is presented in Figure 2 (United Nation [UN], 2019a).

Since LEI estimates only describe averages, like the probability of the people to live and reach the maximum estimated 85 years of life, these indicators are complementary and help us to understand how health is distributed across time and space. According to the data it is obvious that country with high HDI have high Life Expectancy Index. Therefore, Germany has LEI 0.925 in 2010 and 0,941 in 2017. This shows that the health and life condition are improved, so it is expected 94.1% from the population to live 85 years. Similar index above 0.900 has Slovenia at its value is in rank of 0.916 in 2010 and 0.940 in 2017.The main deficiency in interpretation of this index is that it's not taking into consideration the mortality rate.

Another important aspect of the HDI and the quality of life is the expenditure for health goods and services. It is the indicator that shows how much of the real GDP in the country is targeted to achieving better health and long life. The indicator represents the percentage of the real GDP that is spent for the health goods and services.

Expenditures for health goods and services expressed as % of GDP in the RNM are significantly low. According to the available data, (UN, 2019b) for the period from 2000 to 2015, the lowest value was recorded in 2000 of 3.9%, in 2005 it was the highest percentage of 8.4% and from then to 2015 it is steadily decreasing and in 2015 it is 6.1% of the GDP of Macedonia. These data are lower compared to the countries of the former Yugoslavia, and, of course, in comparison with the group of countries with a high level of human development.

Germany, Switzerland and Ireland are the countries that have the highest percentage of GDP towards expenditures for health goods and services. The data for the Macedonia evident that these expenditures in some years are only half of the percentage that are spent in Germany and Switzerland. The data are presented in the figure 3 (UN, 2019b), and it is easy to compare. RNM has the lowest health expenditures.

Education is another aspect of HDI and quality of life. Here, we present the data for the education index and the indicator for the years of schooling.

Countries that have a minimum score of 0.8 and above are considered to have developed education capabilities. The data for the countries from CESEE, presented in figure 5, (UN, 2019c) shows that the most of them have education index above this rang. Therefore, Germany has the highest education index, above 0.9, but the most of the countries have index around 0.8 (Slovenia, Czechia, Estonia, Lithuania, Latvia, Austria, Slovenia, Slovakia, Poland and Hungary), that is characteristic of the developed coun-

Figure 2. LEI in the CESEE

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	0.872	0.877	0.883	0.888	0.892	0.895	0.898	0.900
20	Austria	0.932	0.935	0.937	0.940	0.942	0.945	0.948	0.950
53	Belarus	0.781	0.789	0.796	0.803	0.808	0.812	0.814	0.816
77	Bosnia and Herzegovina	0.860	0.862	0.865	0.868	0.870	0.873	0.876	0.878
51	Bulgaria	0.826	0.830	0.833	0.836	0.838	0.840	0.842	0.844
46	Croatia	0.871	0.874	0.876	0.879	0.882	0.884	0.887	0.889
27	Czechia	0.887	0.890	0.893	0.896	0.899	0.901	0.904	0.906
30	Estonia	0.852	0.860	0.868	0.874	0.879	0.883	0.886	0.888
5	Germany	0.925	0.927	0.929	0.931	0.934	0.936	0.939	0.941
45	Hungary	0.840	0.845	0.849	0.853	0.856	0.859	0.861	0.863
41	Latvia	0.811	0.818	0.824	0.830	0.834	0.837	0.840	0.842
35	Lithuania	0.814	0.820	0.826	0.831	0.835	0.838	0.841	0.843
112	Moldova (Republic of)	0.763	0.771	0.778	0.784	0.789	0.792	0.794	0.796
50	Montenegro	0.850	0.857	0.863	0.868	0.873	0.876	0.879	0.881
33	Poland	0.866	0.870	0.874	0.878	0.881	0.884	0.886	0.889
52	Romania	0.831	0.836	0.841	0.845	0.848	0.851	0.853	0.855
49	Russian Federation	0.751	0.760	0.768	0.775	0.780	0.783	0.786	0.788
67	Serbia	0.831	0.835	0.838	0.842	0.845	0.847	0.849	0.851
38	Slovakia	0.855	0.859	0.863	0.867	0.870	0.873	0.875	0.877
25	Slovenia	0.916	0.921	0.925	0.929	0.932	0.935	0.938	0.940
80	**Republic of North Macedonia**	**0.841**	**0.843**	**0.846**	**0.849**	**0.852**	**0.855**	**0.857**	**0.859**
64	Turkey	0.833	0.838	0.842	0.846	0.850	0.854	0.858	0.862
88	Ukraine	0.761	0.770	0.779	0.786	0.792	0.796	0.799	0.802

Figure 3. Expenditures for health goods and services expressed as% of GDP in the Republic of North Macedonia and the selected country with high HDI

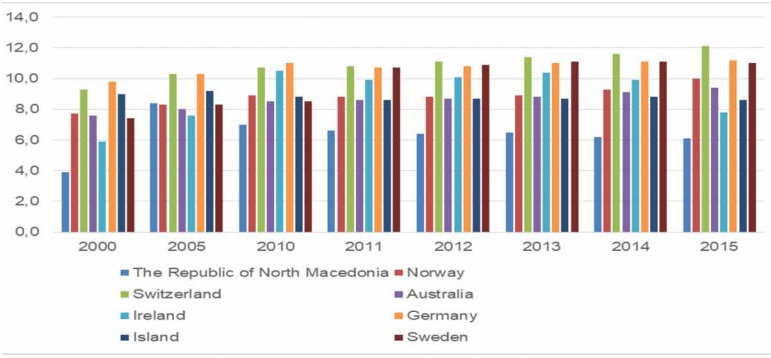


Figure 4. Expenditures for health goods and services expressed as% of GDP in the RNM and the country from the former Yugoslav Republic

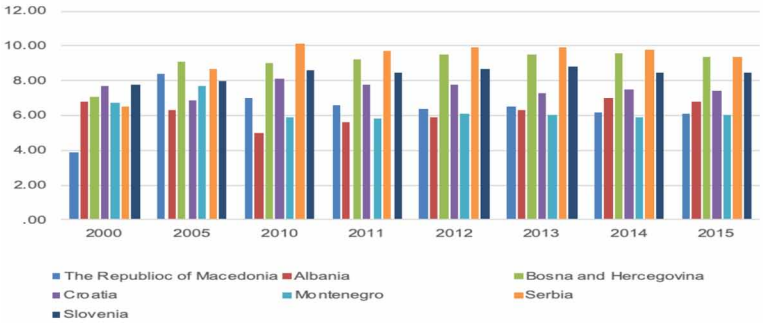


Figure 5. Education Index in the CESEE

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	0.673	0.693	0.730	0.732	0.733	0.733	0.742	0.745
20	Austria	0.837	0.838	0.841	0.833	0.844	0.847	0.852	0.852
53	Belarus	0.829	0.833	0.836	0.835	0.835	0.836	0.838	0.838
77	Bosnia and Herzegovina	0.608	0.626	0.672	0.686	0.699	0.695	0.718	0.718
51	Bulgaria	0.756	0.760	0.764	0.779	0.786	0.811	0.805	0.805
46	Croatia	0.760	0.772	0.778	0.787	0.793	0.793	0.791	0.791
27	Czechia	0.858	0.863	0.859	0.882	0.893	0.891	0.893	0.893
30	Estonia	0.872	0.876	0.877	0.875	0.870	0.869	0.868	0.869
5	Germany	0.928	0.932	0.935	0.933	0.936	0.940	0.940	0.940
45	Hungary	0.819	0.823	0.831	0.834	0.821	0.818	0.815	0.815
41	Latvia	0.850	0.848	0.843	0.859	0.865	0.866	0.866	0.866
35	Lithuania	0.854	0.850	0.844	0.848	0.880	0.880	0.879	0.879
112	Moldova (Republic of)	0.696	0.699	0.709	0.716	0.714	0.709	0.710	0.710
50	Montenegro	0.787	0.787	0.791	0.791	0.791	0.790	0.790	0.790
33	Poland	0.832	0.833	0.817	0.853	0.822	0.853	0.862	0.866
52	Romania	0.783	0.777	0.763	0.767	0.765	0.767	0.762	0.762
49	Russian Federation	0.772	0.784	0.796	0.806	0.812	0.828	0.832	0.832
67	Serbia	0.722	0.744	0.741	0.744	0.756	0.766	0.778	0.778
38	Slovakia	0.802	0.818	0.824	0.823	0.821	0.831	0.831	0.831
25	Slovenia	0.878	0.878	0.859	0.881	0.876	0.879	0.887	0.886
80	**Republic of North Macedonia**	**0.662**	**0.667**	**0.670**	**0.673**	**0.676**	**0.689**	**0.691**	**0.691**
64	Turkey	0.608	0.639	0.651	0.667	0.678	0.683	0.689	0.689
88	Ukraine	0.788	0.787	0.791	0.791	0.794	0.794	0.794	0.794

tries. RNM in the period 2010-2017 has education index from 0.662 till 0.691. RNM and Turkey, has the smallest education index.

Another indicator for the education is the expected years of schooling. The data is presented in figure 6. (UN, 2019d)

Slovenia is the country with the highest average 17 years of schooling. Germany has similar average years of schooling 16.8 (2010) and 17 years (2017). Republic of North Macedonia has the average 13 years of schooling. According to the statistics of the UN the country with the very high human development index in 2013 has the average of 16.3 years of schooling. The progress is evident and this index in 1980 was 13.0, in 2000 15.2, 2005 15.7 and in 2010 16.2. The country with the high human development increases the average years of schooling starting from 9.1 in 1980, then 10.7 in 2000, 2005 11.7, 2010 13.1 and in 2013 13.4. The greatest progress is evident in the group with the low human development, and the average years of schooling in 1980 from 5.1 increase and in the 2013 is 9 years of schooling.

According to the statistics of the UN the country with the very high HDI in 2013 has the average of 16.3 years of schooling. The greatest progress is evident in the group with the low human development, and the average years of schooling in 1980 from 5.1 increase and in the 2013 is 9 years of schooling.

HDI data in the Central, East and Southeast Europe - CESEE, of the period 2010-2017 are presented in figure 7. (UN, 2019e). The high level of HDI in 2017, which rang country in the 5 place has Germany. Its HDI is in the range from 0.921 till 0.936. The data for the countries: Slovenia, Croatia, Montenegro, Bosna and Hercegovina, Serbia and Republic of North Macedonia, is with the accordance to their economic development. Therefore, the best rang in 2017 has Slovenia and it's on the 25 places, right after it is Croatia with rang 46. They are also member countries of the EU. The other economies, Bosnia and Hercegovina has the 77, Serbia 67, Montenegro 50 rank. The highest HDI rank from this group of countries except, Germany, have Slovenia (25 rank) and Czechia (27). These countries have the high HDI in the all years of the analyzed period. Moldova is the country with the lowest HDI rank among the considered countries, and it has 112 rank.

Figure 6. Expected years of schooling in the CESEE Country in the period 2010-2017

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	13,1	13,8	14,7	14,8	14,8	14,8	14,8	14,8
20	Austria	16	16	16,1	15,8	15,8	15,9	16,1	16,1
53	Belarus	15,5	15,6	15,7	15,6	15,5	15,5	15,5	15,5
77	Bosnia and Herzegovina	13,4	13,9	14,2	14,2	14,2	14,2	14,2	14,2
51	Bulgaria	14,4	14,5	14,5	14,9	15,2	15,1	14,8	14,8
46	Croatia	14,4	14,5	14,8	15,1	15,2	15,1	15	15
27	Czechia	16	16,1	16,1	16,6	16,7	16,9	16,9	16,9
30	Estonia	16,4	16,5	16,5	16,4	16,2	16,1	16,1	16,1
5	Germany	16,8	16,9	16,9	16,8	16,9	17	17	17
45	Hungary	15,3	15,2	15,2	15,6	15,4	15,2	15,1	15,1
41	Latvia	15,6	15,4	15,2	15,7	15,6	15,8	15,8	15,8
35	Lithuania	16,8	16,5	16,3	16,3	16,1	16,1	16,1	16,1
112	Moldova (Republic of)	11,8	11,8	11,8	11,8	11,8	11,6	11,6	11,6
50	Montenegro	15,1	15	15	15	15	14,9	14,9	14,9
33	Poland	15,3	15,2	15,3	16,3	16	16,1	16,4	16,4
52	Romania	15,4	15	14,4	14,5	14,5	14,5	14,3	14,3
49	Russian Federation	14	14,3	14,6	14,9	15	15,4	15,5	15,5
67	Serbia	13,5	14	14,1	14,3	14,4	14,4	14,6	14,6
38	Slovakia	15	14,9	14,9	14,9	14,8	15	15	15
25	Slovenia	17,1	16,9	16,9	17,6	17,3	17,2	17,2	17,2
80	The Republic of North Macedonia	12,9	12,9	12,9	12,9	13	13,3	13,3	13,3
64	Turkey	13,8	14,3	14,4	14,8	15,2	15,2	15,2	15,2
88	Ukraine	14,8	14,8	14,9	14,9	15	15	15	15

Figure 7. HDI in the CESEE

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	0.741	0.752	0.767	0.771	0.773	0.776	0.782	0.785
20	Austria	0.740	0.741	0.745	0.752	0.758	0.758	0.757	0.757
53	Belarus	0.792	0.798	0.803	0.804	0.807	0.805	0.805	0.808
77	Bosnia and Herzegovina	0.713	0.721	0.739	0.747	0.754	0.755	0.766	0.768
51	Bulgaria	0.779	0.782	0.786	0.792	0.797	0.807	0.810	0.813
46	Croatia	0.808	0.815	0.816	0.821	0.824	0.827	0.828	0.831
27	Czechia	0.862	0.865	0.865	0.874	0.879	0.882	0.885	0.888
30	Estonia	0.845	0.853	0.859	0.862	0.864	0.866	0.868	0.871
5	Germany	0.921	0.926	0.928	0.928	0.930	0.933	0.934	0.936
45	Hungary	0.823	0.827	0.830	0.835	0.833	0.834	0.835	0.838
41	Latvia	0.816	0.821	0.824	0.833	0.838	0.841	0.844	0.847
35	Lithuania	0.824	0.828	0.831	0.836	0.851	0.852	0.855	0.858
112	Moldova (Republic of)	0.670	0.677	0.684	0.693	0.696	0.693	0.697	0.700
50	Montenegro	0.793	0.798	0.800	0.803	0.805	0.809	0.810	0.814
33	Poland	0.835	0.839	0.836	0.850	0.842	0.855	0.860	0.865
52	Romania	0.797	0.798	0.795	0.800	0.802	0.805	0.807	0.811
49	Russian Federation	0.780	0.789	0.798	0.804	0.807	0.813	0.815	0.816
67	Serbia	0.759	0.769	0.768	0.771	0.775	0.780	0.785	0.787
38	Slovakia	0.829	0.837	0.842	0.844	0.845	0.851	0.853	0.855
25	Slovenia	0.882	0.884	0.877	0.885	0.887	0.889	0.894	0.896
80	**Republic of North Macedonia**	**0.735**	**0.738**	**0.740**	**0.743**	**0.747**	**0.754**	**0.756**	**0.757**
64	Turkey	0.734	0.753	0.760	0.771	0.778	0.783	0.787	0.791
88	Ukraine	0.733	0.738	0.743	0.745	0.748	0.743	0.746	0.751

The Republic of North Macedonia is a country with a high level of human development and ranks at the position of 80 (out of 189 countries), according to the UN Human Development Report.

GINI AND INEQUALITY HUMAN DEVELOPMENT INDEX: IHDI

The HDI represents a national average of human development achievements in the three basic dimensions making up the HDI: health, education and income. Like all averages, it conceals disparities in human development across the population within the same country. Therefore, two countries with different distributions of achievements can still have the same average HDI value. Inequality human development index - IHDI takes into account not only the average achievements of a country in health, education and income, but also how those achievements are distributed among its population.

GINI coefficient (UN, 2019f) is the most common coefficient for measuring inequality in income.

Even that, the IHDI use Atkinson inequality measures in its calculation.[1]

While the HDI can be viewed as an index of average achievements in human development dimensions, the IHDI is the level of human development when the distribution of achievements across people in the society is accounted for. (Figure 9). (UN, 2019g). The IHDI will be equal to the HDI when there is no inequality. Every value of the IHDI below the HDI shows that inequality rises. The difference between the HDI and IHDI, expressed as a percentage of the HDI, indicates the loss in human development due to inequality.

Figure 10 presents the IHDI trend in the RNM. It is noticeable that starting from year 2013, the IHDI increase, and in the 2017 is 0.661. This means that there is improvement in the distribution of the achievements of the HDI and lowering the inequality that arise from it.

According to the data, the IHDI and the HDI generally indicate that there is a difference in the distribution of human development achievements, but the difference is not great. Hence, human development achievements are almost equally distributed in the RNM.

Figure 8. GINI Index in the CESEE, average

HDI Rank (2107)	Country	2010-2017
68	Albania	29.0
53	Belarus	27.0
77	Bosnia and Herzegovina	32.7
51	Bulgaria	37.4
46	Croatia	30.8
27	Czechia	25.9
30	Estonia	32.7
5	Germany	31.7
45	Hungary	30.4
41	Latvia	34.2
112	Moldova (Republic of)	26.3
50	Montenegro	31.9
33	Poland	31.8
52	Romania	28.3
49	Russian Federation	37.7
67	Serbia	28.5
38	Slovakia	26.5
25	Slovenia	25.4
80	**Republic of North Macedonia**	**35.6**
64	Turkey	41.9

GENDER DEVELOPMENT INDEX: GDI

GDI, Figure 12, (UN, 2019h) shows how the human development achievements between men and women are distributed.

Data on the indicator for the distribution of human development by sex (GDI) in the RNM in the period 2011-2017 determine the country in the category with an intermediate level of equality in the distribution between the sexes (in 2011- 5,7, in 2015- 5,2 and in 2017, 5,4).

Figure 9. IHDI in the CESEE

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	0.647	0.648	0.661	0.667	0.669	0.671	0.685	0.707
20	Austria	0.828	0.831	0.840	0.832	0.832	0.824	0.837	0.835
53	Belarus	0.718	0.732	0.736	0.743	0.749	0.753	0.753	0.755
77	Bosnia and Herzegovina	0.568	0.638	0.654	0.668	0.654	0.655	0.666	0.649
51	Bulgaria	0.691	0.693	0.708	0.705	0.713	0.721	0.712	0.710
46	Croatia	0.685	0.691	0.693	0.729	0.749	0.751	0.752	0.756
27	Czechia	0.810	0.822	0.819	0.825	0.831	0.834	0.836	0.840
30	Estonia	0.782	0.786	0.781	0.787	0.785	0.788	0.783	0.794
5	Germany	0.847	0.862	0.863	0.862	0.866	0.866	0.854	0.861
45	Hungary	0.752	0.769	0.769	0.773	0.773	0.769	0.769	0.772
41	Latvia	0.726	0.731	0.735	0.745	0.747	0.752	0.756	0.759
35	Lithuania	0.729	0.747	0.739	0.748	0.765	0.763	0.764	0.757
112	Moldova (Republic of)	0.580	0.594	0.605	0.608	0.621	0.623	0.625	0.627
50	Montenegro	0.715	0.743	0.741	0.746	0.731	0.738	0.741	0.741
33	Poland	0.745	0.758	0.753	0.766	0.760	0.774	0.779	0.787
52	Romania	0.701	0.698	0.695	0.715	0.719	0.716	0.712	0.717
49	Russian Federation	0.690	0.700		0.707	0.722	0.733	0.737	0.739
67	Serbia	0.677	0.696	0.695	0.687	0.697	0.692	0.668	0.667
38	Slovakia	0.773	0.789	0.789	0.791	0.792	0.799	0.794	0.797
25	Slovenia	0.821	0.837	0.826	0.834	0.835	0.836	0.843	0.846
80	**Republic of North Macedonia**	**0.612**	**0.617**	**0.631**	**0.642**	**0.622**	**0.628**	**0.632**	**0.661**
64	Turkey	0.561	0.583	0.589	0.649	0.655	0.658	0.666	0.669
88	Ukraine	0.673	0.670	0.675	0.677	0.690	0.690	0.696	0.701

Poverty Line

World Bank estimates that 10.7% of the world's population or about 760 million people live with only 1.90 dollars a day. These people live in what the World Bank calls "extreme poverty," which is measured by the international poverty line or the so-called poverty threshold that was introduced in 1990. The poverty threshold is an estimate of the absolute minimum of resources needed to make a living. For a more precise definition and determination of the poverty threshold, the World Bank has set three basic principles for setting a new poverty line (Foster, Seth, Lokshin, & Sajaia, 2013):

1. Use the most accurate and up-to-date data sets available to compare the real living standards across countries.

Figure 10. IHDI in the Republic of North Macedonia

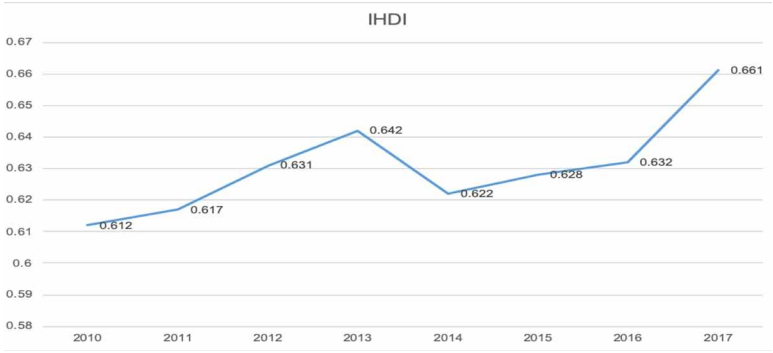


Figure 11. HDI and IHDI in the Republic of North Macedonia

	2010	2011	2012	2013	2014	2015	2016	2017
HDI	0.735	0.738	0.740	0.743	0.747	0.754	0.756	0.757
IHDI	0,612	0,617	0,631	0,642	0,622	0,628	0,632	0,661

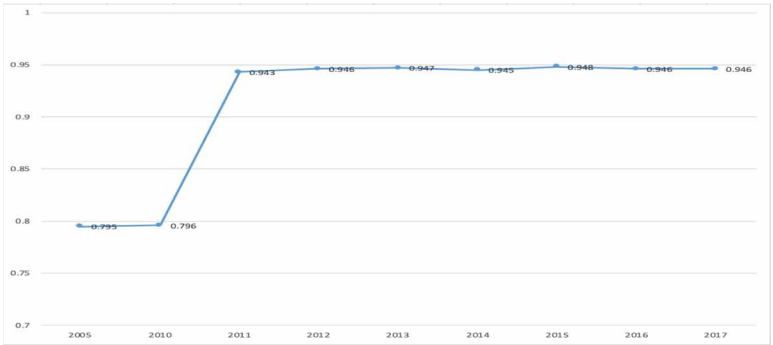
Figure 12. GDI in the CESEE

HDI Rank (2017)	Country	2010	2011	2012	2013	2014	2015	2016	2017
68	Albania	0.958	0.955	0.964	0.961	0.960	0.968	0.969	0.970
20	Austria	0.969	0.960	0.961	0.962	0.971	0.972	0.971	0.971
53	Belarus	1.028	1.027	1.026	1.025	1.025	1.024	1.020	1.020
77	Bosnia and Herzegovina	0.928	0.930	0.916	0.914	0.912	0.913	0.923	0.924
51	Bulgaria	0.991	0.991	0.991	0.991	0.991	0.991	0.990	0.990
46	Croatia	0.988	0.986	0.988	0.993	0.996	0.990	0.990	0.991
27	Czechia	0.974	0.978	0.980	0.985	0.983	0.985	0.986	0.986
30	Estonia	1.028	1.025	1.023	1.021	1.019	1.020	1.019	1.019
5	Germany	0.964	0.964	0.963	0.965	0.966	0.967	0.967	0.967
45	Hungary	0.993	0.992	0.990	0.991	0.988	0.986	0.985	0.985
41	Latvia	1.038	1.030	1.026	1.022	1.011	1.029	1.030	1.030
35	Lithuania	1.039	1.034	1.033	1.028	1.028	1.027	1.026	1.026
112	Moldova (Republic of)	1.008	1.010	1.012	1.008	1.006	1.006	1.006	1.005
50	Montenegro	0.954	0.956	0.955	0.956	0.955	0.956	0.955	0.956
33	Poland	1.009	1.010	1.008	1.008	1.007	1.006	1.006	1.006
52	Romania	0.986	0.985	0.983	0.985	0.987	0.986	0.985	0.985
49	Russian Federation	1.032	1.024	1.021	1.020	1.019	1.020	1.019	1.019
67	Serbia	0.970	0.970	0.969	0.974	0.972	0.974	0.976	0.976
38	Slovakia	0.991	0.988	0.989	0.989	0.989	0.990	0.991	0.991
25	Slovenia	1.006	1.011	1.005	0.996	1.000	1.001	1.003	1.003
80	**Republic of North Macedonia**	**0.796**	**0.943**	**0.946**	**0.947**	**0.945**	**0.948**	**0.946**	**0.946**
64	Turkey	0.903	0.909	0.914	0.917	0.918	0.920	0.922	0.922
88	Ukraine	1.008	1.001	0.999	0.999	0.996	0.993	0.993	0.993

2. Minimizing changes in attitudes, i.e. more precise definition and retention of the poverty threshold unchanged over a longer period of time unchanged.
3. In defining the "real conditions", the price levels that should be taken into account as the most important for measuring world poverty are those faced by the poorest people in the world.

These principles have led to a very simple solution to updating the poverty threshold, i.e. calculating the average of national poverty lines for the fifteen poorest countries using the country's price index. Updating the line to keep its true value constant, in terms of the purchasing power of the poorest countries, does not change much in real terms, as the index treats the poorest countries, the poverty line will still be below the required World Bank standards. Also, the poorest countries are those who always have insufficient data due to lack of household surveys or censuses annually. This additionally complicates the methodology and monitoring of the world poverty index, especially in countries where poverty line monitoring is of the utmost importance. According to the latest estimates, the international poverty line for extreme poverty is $ 1.90 per day. The poverty line, the poverty threshold for middle-developed countries, was set in 2011 at $ 3.10 a day. This means that real incomes relative to the nominal exchange rate of these extremely poor people were actually much lower than $ 1.90 a day, because the US dollar's purchasing power is much higher in developing countries than in the US. That would mean that one in

Figure 13. GDI in the RNM



every eight people live below this poverty line, or rather about 30% of the world, living with less than $ 3.10 per day.

In a bid to more precise classifications of the poverty threshold, the World Bank recently added new poverty standards to people living in middle- and high-income countries. They are the first additions since the poverty line was originally set up in 1990. The new standards are set at $ 3.20 a day for people in middle income countries, such as Egypt or India, and $ 5.50 a day for higher middle-income countries, such as Jamaica or South Africa. The World Bank also announced a third standard for high-income countries, such as the United States, at $ 21.70 per day. Under the new standards, the 15 poorest countries in their classification (low, low medium, medium high and high) determine the poverty threshold for that group of countries. This is a more accessible approach mainly due to serious development between countries. However, the threshold for extreme poverty is still set at $ 1.90 per day.

According to the World Bank, (World Bank,2019) the countries taken into consideration in this research belong to the group of high middle-income countries except for Slovenia. This can also be seen in Figure 14, which presents data from the World Bank, and shows the state of the CESEE countries in relation to the poverty line of $ 5.50 per day as a percentage of the total population.

According to the figure 14, in 2012, Republic of North Macedonia and Albania are the countries which have the largest percentage of their population living in poverty. It is 29.2% and 39.1% respectively. The lowest percentage of population living in poverty can be noticed in Slovenia with 0.2, although Montenegro and Croatia are not far behind from this condition, given the consideration that their percentage is steadily declining. The situation is the same with the number of poor people living with 5.50$ per day in millions. Obviously, poverty indicators are mostly dependent on the economic and social policies of the state, but the tax system of the state should not be neglected. Taxes and the taxation system in an economy can contribute to increasing or decreasing inequality in income and income distribution in one country, which definitely have an impact on poverty reduction. For example, a progressive tax system can mean that a more mature workforce will pay a higher percentage of their income in taxes. On the other hand, people who earn lower incomes will pay a lower percentage of their share in the generated income. In addition to the progressive taxation system, the flat tax system implies that any income-generating person should pay the same percentage in the form of taxes. This also means that people who earn higher income also pay a higher amount of tax, although the percentage is the same for everyone. But the social impact of this tax is relatively on the side of people who achieve a higher

Figure 14. Poverty headcount ratio at $5.50 a day as a percentage of the total population and number of poor in millions (2011 PPP)

Country	Indicator/Year	2009	2010	2011	2012	2013	2014	2015	2016
Albania	Poverty headcount ratio at $5.50 a day	35,8	NA	NA	39,1	NA	NA	NA	NA
	Number of poor at $5.50 a day	1,1	NA	NA	1,1	NA	NA	NA	NA
Austria	Poverty headcount ratio at $5.50 a day	1	1	0,7	1	1	0,8	0,7	0,9
	Number of poor at $5.50 a day	NA	NA	NA	NA	NA	NA	NA	NA
Belarus	Poverty headcount ratio at $5.50 a day	5	3,4	2,5	1,1	0,7	0,4	0,9	0,7
	Number of poor at $5.50 a day	0,5	0,3	0,2	0,1	0,1	0	0,1	0,1
Bosnia and Herzegovina	Poverty headcount ratio at $5.50 a day	2,9	NA	NA	3,9	NA	NA	NA	NA
	Number of poor at $5.50 a day	0,1	NA	NA	0,1	NA	NA	NA	NA
Bulgaria	Poverty headcount ratio at $5.50 a day	11,5	9,5	8,4	11	11,2	11	11,2	9,7
	Number of poor at $5.50 a day	0,9	0,8	0,6	0,8	0,8	0,8	0,8	0,6
Croatia	Poverty headcount ratio at $5.50 a day	4,7	6,2	7	7,2	7,2	6,2	5,5	5,5
	Number of poor at $5.50 a day	0,2	0,3	0,3	0,3	0,3	0,3	0,2	0,2
Czechia	Poverty headcount ratio at $5.50 a day	0,5	0,7	0,7	0,7	0,7	0,4	0,7	0,4
	Number of poor at $5.50 a day	0,1	0,1	0,1	0,1	0,1	0	0,1	0
Estonia	Poverty headcount ratio at $5.50 a day	2,2	3,2	4,2	3,7	3,7	0,7	3,2	2
	Number of poor at $5.50 a day	0	0	0,1	0	0	0	0	0
Germany	Poverty headcount ratio at $5.50 a day	0	0,2	NA	0,2	NA	0,2	NA	0,2
	Number of poor at $5.50 a day	NA	NA	NA	NA	NA	NA	NA	NA
Hungary	Poverty headcount ratio at $5.50 a day	1,5	1,5	2,5	2,7	4,5	4,5	3,2	2,7
	Number of poor at $5.50 a day	0,2	0,1	0,2	0,3	0,4	0,4	0,3	0,3
Latvia	Poverty headcount ratio at $5.50 a day	6,2	9,5	9,5	8,7	7,5	6	5,5	4
	Number of poor at $5.50 a day	0,1	0,2	0,2	0,2	0,1	0,1	0,1	0,1
Lithuania	Poverty headcount ratio at $5.50 a day	4,7	9	8,4	5,5	5,6	5	5	4,2
	Number of poor at $5.50 a day	0,1	0,3	0,3	0,2	0,2	0,1	0,1	0,1
Moldova (Republic of)	Poverty headcount ratio at $5.50 a day	31,5	28,9	25,6	24,6	19,6	18,3	16,1	16,4
	Number of poor at $5.50 a day	1,1	1	0,9	0,9	0,7	0,7	0,6	0,6
Montenegro	Poverty headcount ratio at $5.50 a day	3,3	5,2	4,5	6,6	8,7	10	4,8	4,8
	Number of poor at $5.50 a day	0	0	0	0	0,1	0,1	0	0
Poland	Poverty headcount ratio at $5.50 a day	4,8	4,7	4,9	4,7	4,6	4,2	3,6	2,1
	Number of poor at $5.50 a day	1,8	1,8	1,9	1,8	1,7	1,6	1,4	0,8
Romania	Poverty headcount ratio at $5.50 a day	27	26,7	28	31,6	31,5	31,2	28,6	28,7
	Number of poor at $5.50 a day	5,5	5,2	5,7	6,3	6,3	6,2	5,7	5,1
Russian Federation	Poverty headcount ratio at $5.50 a day	5,2	4,9	4	3,2	2,8	2,6	2,4	2,7
	Number of poor at $5.50 a day	7,5	7	5,6	4,6	4,1	3,8	3,5	3,9
Serbia	Poverty headcount ratio at $5.50 a day	8,5	9,6	12,5	NA	12,4	NA	7,4	NA
	Number of poor at $5.50 a day	0,6	0,7	0,9	NA	0,9	NA	0,5	NA
Slovakia	Poverty headcount ratio at $5.50 a day	2,2	2,5	2,2	2,2	3	3	3,5	3
	Number of poor at $5.50 a day	0,1	0,1	0,1	0,1	0,2	0,2	0,2	0,2
Slovenia	Poverty headcount ratio at $5.50 a day	0	0,2	0	0,2	0,2	0,2	0,2	0,2
	Number of poor at $5.50 a day	0	0	0	0	0	0	0	0
Republic of North Macedonia	Poverty headcount ratio at $5.50 a day	35,1	32,4	31,3	29,2	26,2	24,3	23,1	21,9
	Number of poor at $5.50 a day	0,7	0,7	0,6	0,6	0,5	0,5	0,5	0,4
Turkey	Poverty headcount ratio at $5.50 a day	16,7	15,9	13,8	13	11,4	10,5	11,5	9,5
	Number of poor at $5.50 a day	11,9	11,5	10	9,7	8,6	8,1	9	7,6
Ukraine	Poverty headcount ratio at $5.50 a day	9,8	6,1	5,7	4,1	3,3	3,6	7,8	6,4
	Number of poor at $5.50 a day	4,5	2,8	2,6	1,9	1,5	1,6	3,5	2,9

income level. Namely, they deduct a small portion of their income in the form of taxes, while people who earn less income give more of their income in the form of a tax. The main point and effect of this tax system is to allow people with higher incomes to allocate income to those with lower income by generating greater revenue opportunities in the form of different real capital investments. However, people who realize the higher amount of earnings usually invest their income in the possibility with the highest rate of return on an acceptable amount of risk. This can usually mean that people with higher incomes invest their assets in investment funds, different types of securities, bonds, etc., thus leaving their revenues to generate more income, while at the same time generating a greater gap between those with lower income and thereby increasing poverty.

Multidimensional Poverty Index: MPI

In 1997, as the first indicator related to the problem of poverty based on the concept of human development, the Human Poverty Index - HPI was calculated. Unlike the indexes of income (monetary) poverty that use income / consumption information, i.e. quantitative information, this human poverty index and the human development index use categories of information that are related to human development, that is, qualitative information that goes beyond what information on income / consumption can give. Accordingly, this index covers the basic dimensions of poverty: short life, lack of primary education and lack of access to public and private resources. At that time when this index was created, it was obvious that the human poverty index and the components it contained could not be the same for the poor and rich countries. This is because the nature of poverty in each country depends on the socio-economic conditions in the country. From there, the Human Poverty Index for Underdeveloped Countries (HPI-1) and the Poverty Index for Highly Developed Countries (HPI-2) was calculated. The variables that are used to calculate these two indices are not the same. The Human Poverty Index in underdeveloped countries (HPI-1) is based on three basic elements of human life that are covered in the Human Development Index (HDI): the length of life, knowledge and standard of living. The first component refers to the survival of the individual, i.e. the possible death of the individual in the relatively early years. It is represented by the percentage of people who are not expected to experience 40 years of age (P_1). The second component is measured by the percentage of adults who are illiterate (P_2) and refers to a lack of knowledge. The third component refers to a lack of living standard as a general economic supply (P_3). It is represented by three variables: the percentage of people who do not have access to healthy drinking water (P_{31}), the percentage of people who do not have access to health services (P_{32}) and the percentage of under-nutrition children under five years of age (P_{33}).

The variable (P_3) is calculated as a simple arithmetic mean of the three variables (P_{31}), (P_{32}) и (P_{33}).

The formula for computing the human poverty index in underdeveloped countries (HPI-1) is as follows:

$$HPI-1=\left[\frac{1}{3}\left(P_1^3+P_2^3+P_3^3\right)\right]^{\frac{1}{3}}$$

The index of human poverty, as seen, determines the extent of poverty in an economy, which means that it corresponds to the main aggregate index of the group of measures of income (monetary) poverty. When determining HPI, it is important to overlap the three (four) dimensions that it covers, i.e. whether a certain percentage of poor people are those same persons in the three categories, or in each of the categories that percentage is represented by different people. It is also important whether a certain percentage of poor people refers to all three categories or poverty is expressed in only one or two dimensions.

In addition, consideration should be given to the problem of substitutability between the three components. This problem is solved by using an additional size (α). When the percentage of poor people is obtained through a simple average of the three dimensions, then the largest percentage of shortages is considered relevant.

Finally, it is interesting that the concept of human development is much wider than what the human poverty index can measure, since the concept covers many aspects that cannot be measured or have not been measured so far. Such are for example: lack of political freedom and personal security, inability to actively participate in the life of the community, inability to participate in decision-making and a like.

In 2010, a new composite indicator, the multidimensional poverty index, is introduced as a substitute for these two indicators of human poverty (Multidimensional Poverty Index - MPI). The index aims to show the state of poverty in one country and the aspects it manifests most on the population. Special attention is paid to health, education and living standards, compared to 10 indicators. People who face deprivation of at least one third of these weighted indicators, fall into the category of the multidimensional poor. When compiling the composite of the Multidimensional Poverty Index, it was necessary to ensure that it was harmonized, as far as possible, with the indicators used to monitor the Millennium Development Goals (MDGs). The Global Multidimensional Poverty Index - MPI is published in each HDR sequentially, with the adjustments documented in the methodological reports. Calculations of the global index in 2018 have the same functional form as in the previous years, but some indicators present changes. Ten (10) indicators are used in the three listed aspects - health, education and living standards, based on the same allocations as in the Human Development Index - HDI. When surveying households, each surveyed household needs to evaluate (depending on its position of availability of 10 listed indicators). The maximum value of participation on all 10 indicators is 100 percent, each aspect having equal participation and it cannot exceed more than 33.3 percent or 1/3. In health and education aspects, there are two indicators in each of them and therefore their participation in the composite index is 1/6. In the section on living standards there are 6 indicators present and accordingly each of them has 1/18 participation in the multidimensional poverty index.

The determination of persons who are multidimensional poor is determined by the assessment of each indicator. (Figure 15) (UNDP, 2019) The limit according to which a person is considered poor or not is 1/3. If the result of the responses pertaining to the lack of 10 indicators is 1/3 or more, it determines the household and persons as multidimensional poor. If the result is 1/5 or more but not less than 1/3, it is considered to be households that are vulnerable to multidimensional poverty. Households that are deprived of ½ or more of the indicators are determined as severe multidimensional poor.

The multidimensional poverty index determines the various aspects of the deprivation (deficiency) of certain goods in the households in terms of health, education and living standards. The data used for the calculations of this index are provided by a household survey which must include the responses to all aspects included in this index. Indeed, the index does not represent a composite of data obtained from different sources.

Although the human development index HDI and the multidimensional Poverty Index MPI are based on three components, health, education and a standard of living, there is, however, a fundamental difference to what they represent. Thus, in the HDI index, individual indicators for each component are used, the MPI index uses more than one indicator for each specific component. Due to the inaccessibility of data for all components for calculating the MPI index, (UN, 2019i) it is calculated for only about 100 countries, while the HDI index is calculated for almost all countries in the world.

The figure 16 shows the Multidimensional poverty index for the Balkan countries together with all his committed elements. The highest index for multidimensional poverty belongs to Republic of North Macedonia, therefore meaning that people in this country are living on the verge of poverty conditions described with the MPI index, more specifically 2.53% of the population. On the other hand, Slovenia is one of the countries where this index is extremely low insinuating the opposite situation. Although the index of North Macedonia is farfetched from the highest in the world it shows that there is a lot to be done yet on this field in order to progress to developed countries seen through the specter of MPI, such as Croatia and Slovenia. Albania and Bosnia and Herzegovina are closer to the value of MPI to North Macedonia rather than Croatia and Slovenia, with 2.03% and 2.19% people living in conditions of poverty. Serbia and Montenegro have MPI with tendency closer to the developed countries, but they excel at different point of the enclosed index to MPI i.e. Intensity of deprivation. With 42.47% and 45.70% respectfully of the people who live with some sort of deprivation. The percentage of other countries isn't that far from the maxima of the comparison between the Balkan countries, with Bosnia and Herze-

Figure 15. Indicators of the multidimensional poverty index

Dimensions of Poverty	Indicator	Deprived if they live in a household where....	Participation in the index
Health	Nutrition	An adult under 70 and a child who is under-nutritionally	1/6
	Child mortality	The child who died in the family in the past five years preceding the survey	1/6
Education	Years of schooling	No single member of the household at the age of 10 years or older has completed six years of schooling.	1/6
	School Attendance	Every child of school age does not attend school until the age when the primary school ends (grade 8)	1/6
Living standard	Cooking fuel	Households use feces, wood or coal as a fuel for cooking	1/18
	Sanitation	The sanitary facility of the household has not been improved (according to the guidelines of SDG) or is improving, but is shared with other households.	1/18
	Water for drinking	The household does not have access to healthy drinking water or finds it for 30 minutes walking and walking on foot (according to SDG guidelines)	1/18
	Electric energy	The household has no electricity	1/18
	Housing	The materials of the housing object or at least the roof, the walls and the floor are inadequate: the floor is made of natural materials (earthenware) and / or the roof and / or the walls are made of natural or rudimentary materials.	1/18
	Means	The household does not own more than one of these assets: a radio, a TV set, a telephone, a computer, a cart for animals, a bike, a bike with a motorbike or a refrigerator, and no car or truck.	1/18

Figure 16. Multidimensional Poverty Index: CESSE countries
**The data for the developed countries is not available for this indictor, therefor only development countries of CESSE are presented in this table*

HDI Rank (2017)	Country	Year and survey	Index (Value)	Headcount (%)	Intensity of deprivation (%)	Number of poor (year of the survey) (thousands)	Number of poor (2016) (thousands)	Population vulnerable to multidimensional poverty (%)	Population in severe multidimensional poverty (%)
68	Albania	2008/2009	0,008	2,03	37,81	60	60	7,3	0,16
77	Bosnia and Herzegovina	2011/2012	0,008	2,19	37,93	80	77	4,07	0,06
46	Croatia	2012	0	NA	NA	NA	NA	NA	NA
112	Moldova (Republic of)	2012	0,004	0,9	37,4	38	38	NA	0,1
50	Montenegro	2013	0,002	0,38	45,7	2	2	4,27	0,14
67	Serbia	2014	0,001	0,34	42,47	30	30	3,4	0,1
25	Slovenia	2012	0	NA	NA	NA	NA	NA	NA
80	Republic of North Macedonia	2011	0,01	2,53	37,74	52	53	2,86	0,24
88	Ukraine	2012	0,001	0,2	34,5	109	106	NA	0

govina 37.93%, Albania 37.81% and North Macedonia 37.74%. Albania also has the highest percentage of population vulnerable to multidimensional poverty with 7.3% of population, Bosnia and Herzegovina and Montenegro are close to follow but with severe smaller percentage of population, with 4.07% and 4.27% respectfully. However when talking about extremes North Macedonia is still the country with the highest percentage of people living in a severe multidimensional poverty conditions, with 0.24% of population. According to the data Albania and Montenegro with 0.16% and 0.14% of population follow the Republic of North Macedonia.

VULNERABLE EMPLOYMENT

Vulnerable employment is defined as the sum of the employment status groups of own account workers and contributing family workers. They are less likely to have formal work arrangements, and are therefore more likely to lack decent working conditions, adequate social security and 'voice' through effective representation by trade unions and similar organizations. Vulnerable employment is often characterized by inadequate earnings, low productivity and difficult conditions of work that undermine workers' fundamental rights. (UN Women, 2019) The vulnerable employment rate is the share of vulnerable employment in total employment.

Breaking down employment information by status in employment provides a statistical basis for describing workers' behavior and conditions of work, and for defining an individual's socio-economic group. If the proportion of own-account workers (self-employed without hired employees) is sizeable, it may be an indication of a large agriculture sector and low growth in the formal economy. Contributing family work is a form of labour – generally unpaid, although compensation might come indirectly in the form of family income – that supports production for the market. It is particularly common among women, especially women in households where other members engage in self-employment, specifically in running a family business or in farming. Where large shares of workers are contributing family workers, there is likely to be poor development, little job growth, widespread poverty and often a large rural economy.

Own-account workers and contributing family workers have a lower possibility of having formal work arrangements, and are therefore more likely to lack elements associated with decent employment, such as adequate social security and a voice at work. Therefore, the two statuses are summed to create a classification of "vulnerable employment", while wage and salaried workers together with employers constitute "non-vulnerable employment". Countries that show falling proportions of either the share of own-account workers or contributing family workers, and a complementary rise in the share of employees, accompany the move from a low-income situation with a large informal or rural sector to a higher income situation with high job growth.

According the available data for the CESEE countries, in the period 2010-2017, the highest vulnerable employment rate is characteristic for Albania. The value of this indicator is in the range from 61.5% (2012) to 55.4% (2017). With significantly high value of this indicator is distinguished Republic of Moldova (from 28.6% in 2010 to 36.4% in 2015 and 2016) (Figure 17). (International Labour Office [ILO], 2019a)

Vulnerable employment rates around and higher than 20%, in the last analyzed year, are characteristic for the following countries: Bosnia and Herzegovina (19.4%), Republic of North Macedonia (19.2%), Romania (25.3%), Serbia (27.2%) and Turkey (28.2%). In each of these countries, the share of vulnerable

Figure 17. Rate of vulnerable employment in the CESEE countries, 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
Albania	55,2	59,2	61,5	57,7	56,5	56,6	56,0	55,4
Austria	9,0	8,6	8,5	8,7	8,6	8,5	8,2	7,7
Belarus	3,3	3,3	3,2	3,2	3,2	3,2	3,3	3,5
Bosnia and Herzegovina	21,7	21,0	22,4	20,3	18,4	18,8	19,1	19,4
Bulgaria	8,9	8,5	8,1	8,2	8,7	8,5	8,2	8,3
Croatia	17,1	17,3	15,3	13,7	10,4	10,5	8,7	7,5
Czech Republic	14,1	14,4	15,0	14,5	14,5	13,8	14,0	14,0
Estonia	4,9	4,8	5,0	5,4	5,6	5,7	5,6	5,5
Germany	6,7	6,9	6,8	6,5	6,3	6,1	6,0	5,8
Hungary	6,9	6,9	6,5	6,1	5,8	5,8	5,8	5,7
Latvia	7,5	7,7	7,5	7,3	7,5	8,4	8,6	8,0
Lithuania	8,6	8,2	8,9	9,6	9,8	10,0	10,0	9,5
Moldova, Republic of	28,6	28,7	28,6	30,5	32,0	36,4	36,4	34,5
Montenegro	10,5	9,5	9,0	7,8	10,4	11,6	12,6	13,2
Republic of North Macedonia	23,2	22,4	21,9	23,5	22,8	21,8	19,7	19,2
Poland	18,7	18,7	18,2	17,6	17,2	17,3	16,8	16,4
Romania	33,8	32,0	32,1	31,5	30,9	27,8	25,6	25,3
Russian Federation	5,5	5,8	5,7	6,0	5,8	5,9	6,2	5,3
Serbia	28,8	26,2	26,5	28,6	28,1	26,5	28,0	27,2
Slovakia	12,4	12,4	12,5	12,5	12,2	12,1	12,2	12,0
Slovenia	13,5	13,2	12,8	13,6	15,1	12,9	10,5	10,8
Turkey	33,8	33,1	32,1	31,3	29,4	28,4	27,9	28,2
Ukraine	17,9	18,2	17,7	18,1	14,6	14,7	14,5	14,8

employment in the total employment, is decreasing. It can be result of the decline of the employment in agriculture sector or in the informal economy. However, the values of this indicator are still high, compared to those of the more developed countries, which means that the vulnerable employment continues to be an issue for these countries.

The lowest vulnerable employment rate, during the whole analyzed period, is noted in Belarus and is in range from 3.2% to 3.5%. Besides that, in only four of the rest CESEE countries (Estonia, Germany, Hungary and Russian Federation), in 2017, the value of this indicator is below 6%.

In the Republic of North Macedonia, this indicator is characterized with relative oscillations. The share of the own-account workers and contributing family workers in the total employment was highest in 2013 (23.5%). Then it started to decrease and in 2017 reached to almost one fifth of the total employment.

YOUTH UNEMPLOYMENT

Youth unemployment is set to remain an important global challenge, particularly as demographic shifts in developing countries gather pace and will continue to amplify numerous domestic and global risks, including social exclusion, mass migration and generational clashes over fiscal and labour-market poli-

cies. Youth unemployment includes all the youth (i.e. people between the ages of 15 and 24) who are unemployed.

The main indicator for measuring this unemployment is the youth unemployment rate, which is the percentage of the unemployed in the age group 15 to 24 years old compared to the total labour force (both employed and unemployed) in that age group. However, it should be remembered that a large share of people between these ages are outside the labour market (since many youths are studying full time and thus are not available for work), which explains why youth unemployment rates are generally higher than overall unemployment rates, or those of other age groups. (Eurostat,2019)

The reasons for the youth unemployment can be different. Initially, there is the structural change in industries and the mismatch of qualifications. No less important is the business cycle, since the youth unemployment responds more sensitively to its conditions than adult unemployment. The population growth is also a significant factor. Variation in cohort size depends on both fertility rates and regional mobility or migration. (Dietrich, 2012)

The labour market situation of young persons is highly influenced by their initial experiences, including how quickly and how well they are able to access the labour market, and the skills and competencies acquired through education and training. This is why the youth should be a cause for concern for policymakers. The negative consequences of a labour market which is not totally inclusive for youth can spread across many spheres of society, and amplify in the future labour market patterns of these youth, which is why effective strategies for youth employment are central to sustainable development. (ILOStat, 2019)

The analysis on the youth unemployment in the CESEE countries show that there are significant differences in the youth unemployment rates between these countries (Figure 18).(ILO, 2019b) The highest youth unemployment rates are characteristic for Bosnia and Herzegovina and Republic of North Macedonia. In 2017 it was 45.8% in the first, and 46.7% in the later country.

Most of the CESEE countries, despite the oscillations, are facing a decrease of the youth unemployment rate. Lithuania, Estonia and Latvia are the countries which notes a highest decrease in the value of this indicator (for around 20 percentage points), while in Hungary, Serbia and Slovakia it is for nearly 15 percentage points. The only three countries in which this indicator has increased are Albania, Austria and Turkey.

CONCLUSION

The existence of indicators of human development is of particular importance to the policies of an economy. These indicators are an attempt to measure and determine the social dimension of economic development. Based on the data for these indicators, the trend is determined and appropriate measures and recommendations for their improvement can be identified.

The focus of this paper is the quality of life in the RNM, seen through the HDI, IHDI GINI coefficient, GDI, Poverty line, MPI, vulnerable employment and youth unemployment. The contribution of the analysis is the comparison of these indicators among the country from the CESEE.

Human resources stock arises from the expected duration of life, health status and knowledge and acquired skills during education. The improvement in all of these areas in the RNM in the period from 2010 – 2017 is evident. Life expectancy index, education index and average years of schooling are the confirmation to the achievements of the human development. This means that the health expressed through the life expectancy, education expressed as expected years of schooling and income assessment

Figure 18. Youth unemployment rate in the CESEE countries, 2010-2017

	2010	2011	2012	2013	2014	2015	2016	2017
Albania	50,0	21,2	50,0	45,7	100,0	100,0	100,0	46,3
Austria	16,7	16,7	16,7	16,7	16,7	16,7	16,7	20,0
Belarus	14,3	16,7	16,7	16,7	20,0	20,0	20,0	8,6
Bosnia and Herzegovina	50,0	50,0	50,0	50,0	100,0	50,0	100,0	100,0
Bulgaria	33,3	33,3	50,0	50,0	23,7	19,9	14,1	11,2
Croatia	50,0	50,0	50,0	100,0	50,0	50,0	50,0	22,7
Czech Republic	25,0	25,0	25,0	25,0	25,0	11,0	11,8	8,5
Estonia	22,6	15,3	13,8	11,2	8,4	7,4	7,5	6,9
Germany	10,9	8,5	8,9	8,9	6,8	7,0	7,0	7,0
Hungary	33,3	33,3	33,3	33,3	33,3	25,0	11,7	9,5
Latvia	43,3	32,8	30,0	22,1	17,9	14,5	14,1	13,1
Lithuania	46,4	40,5	33,0	27,8	25,6	20,8	18,7	16,4
Moldova, Republic of	14,6	12,0	18,4	16,5	11,6	13,4	11,9	11,7
Montenegro	35,6	35,8	41,5	40,1	35,7	37,7	36,4	32,0
Poland	100,0	100,0	100,0	100,0	100,0	44,3	41,9	41,2
Romania	21,1	23,5	23,5	25,0	25,0	20,0	20,0	13,3
Russian Federation	25,0	25,0	25,0	28,6	28,6	28,6	16,7	14,3
Serbia	16,9	15,5	14,7	14,3	14,3	15,5	16,7	16,7
Slovakia	66,7	66,7	66,7	66,7	66,7	33,3	33,3	33,3
Slovenia	50,0	50,0	50,0	50,0	50,0	50,0	22,9	19,2
Republic of North Macedonia	**13,6**	**13,2**	**15,4**	**15,5**	**14,1**	**11,7**	**10,2**	**8,5**
Turkey	18,4	16,0	14,3	15,7	16,7	18,2	19,3	20,7
Ukraine	19,2	16,0	17,4	19,0	25,0	23,5	25,0	20,0

as an indicator of the living standard of the population in the RNM show relatively high values and rank the country in the group of countries with a high intermediate level of human development.

The data on the IHDI say that the achieved level of human development is relatively evenly distributed among the population. The GDI indicator determine the country in the category with an intermediate level of equality in the distribution between the sexes (in 2011- 5.7, in 2015 – 5.2 and in 2017, 5.4). Average GINI index for the 2010-2017 is 35.6. According the available data on the poverty line and MPI indicator, RNM compared to CESEE countries, has the highest values, almost in the entire analyzed period. In 2016 the percentage of the population living in poverty was 21.9%, while the index for multidimensional poverty, in 2017, reached 2.53%, which represents the percentage of people who are living on the verge of poverty conditions described with the MPI index. Regarding the vulnerable employment in the Republic of North Macedonia, the share of the own-account workers and contributing family workers in the total employment was highest in 2013 (23.5%), while in 2017 reached to almost one fifth of the total employment.

Most of the CESEE countries, despite the oscillations, are facing a decrease of the youth unemployment rate. Republic of North Macedonia is facing the same change, although in 2017 it has one of the highest youth unemployment rates (46.7%).

The comparation with the country from the CESEE, determined the RNM in the least category, together with Albania, Turkey, Moldova, far behind developed countries like Germany, Austria, Czechia

and Slovenia. The general conclusion is that economic growth in the RNM in the past period has failed to produce the expected positive effects and improvement in the quality of life.

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KEY TERMS AND DEFINITIONS

Central, East, South East European Country (CESEE Country): That that are considered in this paper are (Albania, Austria, Belarus, Bulgaria, Bosna and Hercegovina, Croatia, Czech Republic, Estonia, Germany, Hungary, Latvia, Lithuania, Moldova, Montenegro, Poland, Republic of North Macedonia, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Turkey and Ukraine).

Education Index: Education Index has been measured by combining average adult years of schooling with expected years of schooling for children, each receiving 50% weighting. It is calculated by dividing the sum of the mean years of schooling and the expected years of schooling by 15.

Expected Years of Schooling: Expected years of schooling is a calculation of the number of years a child is expected to attend school, or university, including the years spent on repetition. It is the sum of the age-specific enrollment ratios for primary, secondary, post-secondary non-tertiary and tertiary education and is calculated assuming the prevailing patterns of age-specific enrollment rates were to stay the same throughout the child's life. Expected years of schooling is capped at 18 years. Eighteen is equivalent to achieving a master's degree in most countries.

Gender Development Index: Is an index designed to measure gender inequality. The GDI is often considered a "gender-sensitive extension of the HDI". It addresses gender-gaps in life expectancy, education, and incomes. It uses an "inequality aversion" penalty, which creates a development score penalty for gender gaps in any of the categories of the Human Development Index which include life expectancy, adult literacy, school enrollment, and logarithmic transformations of per-capita income.

GINI Coefficient: The Gini coefficient measures the distribution of income in a society. The value of the coefficient can range from 0 to 100, where 0 means total equality, and 100 means total inequality. The higher the coefficient of 0, the more unequal the distribution of income is present in society.

Mean Years of Schooling (MYS): Is a calculation of the average number of years of education received by people ages 25 and older in their lifetime based on education attainment levels of the population converted into years of schooling based on theoretical duration of each level of education attended. Fifteen is the projected maximum of this indicator for 2025.

Multidimensional Poverty Index: The global Multidimensional Poverty Index (MPI) is an international measure of acute multidimensional poverty covering over 100 developing countries. It complements traditional monetary-based poverty measures by capturing the acute deprivations that each person faces at the same time with respect to education, health and living standards. The MPI assesses poverty at the individual level. If someone is deprived in a third or more of ten (weighted) indicators, the global index identifies them as 'MPI poor', and the extent – or intensity – of their poverty is measured by the percentage of deprivations they are experiencing. The global MPI was developed by OPHI with the UN Development Programme (UNDP) for inclusion in UNDP's flagship *Human Development Report* in 2010. It has been published in the *HDR* and by OPHI ever since.

Poverty Line: The poverty threshold, poverty limit or poverty line is the minimum level of income deemed adequate in a particular country. Determining the poverty line is usually done by finding the total cost of all the essential resources that an average human adult consumes in one year. The largest of these expenses is typically the rent required to live in an apartment, so historically, economists have paid particular attention to the real estate market and housing prices as a strong poverty line affecter. Individual factors are often used to account for various circumstances, such as whether one is a parent, elderly, a child, married, etc. The poverty threshold may be adjusted annually.

Vulnerable Employment: Vulnerable employment is defined as the sum of the employment status groups of own account workers and contributing family workers. They are less likely to have formal work arrangements, and are therefore more likely to lack decent working conditions, adequate social security and 'voice' through effective representation by trade unions and similar organizations.

Youth Unemployment: Youth unemployment is the unemployment of young people, defined by the United Nations as 15–24 years old. An unemployed person is defined as someone who does not have a job but is actively seeking work. In order to qualify as unemployed for official and statistical measurement, the individual must be without employment, willing and able to work, of the officially designated 'working age' and actively searching for a position. Youth unemployment rates tend to be higher than the adult rates in every country in the world.

ENDNOTE

[1] **Atkinson Inequality Measures:** There was an attempt to apply the GINI index to measure inequality in the HDI distribution. The choice of the Atkinson inequality measures was guided by three factors: 1. Subgroup consistency, 2. Sensitivity to the inequality in the lower end of distribution and 3. Simplicity of computation and mathematical elegance of the resulting composite IHDI. Subgroup consistency means that if inequality declines in one subgroup (region, ethnic group etc.) and remains unchanged in the rest of population, then the overall inequality declines. The Gini coefficient puts equal weights to the entire distribution, while the Atkinson inequality measures puts more weight to the lower end, thus it accounts better for child mortality, literacy and income poverty. Finally, the geometric form of the HDI in combination with the Atkinson index provides a simple and elegant composite IHDI, obtained by first computing inequality for each dimension and then across dimensions, which further implies that if can be computed by combining data from different sources (life tables and different surveys for education and income).

Chapter 26
Social Component of Sustainable Development and Quality of Life:
Region of the Balkans, Eastern Serbia

Biljana Stojan Ilic
Megatrend University of Belgrade, Serbia

ABSTRACT

Sustainability is the basis for survival on Earth, as well as for the survival of mankind. Sustainability is connecting with growing population. Sustainable development implies the merger of the three components in a single unit. The first one is the economic viability, the second includes social sustainability, while the third is linked to environmental sustainability. The social component of development relates to the quality of life of people their habits and lifestyles. This chapter put emphasis on the social component of sustainability in Serbia that includes quality of life but also the index of human development. The results of PEST analysis of the Eastern Serbia will explain factors that affect the implementation of sustainable development in the Balkan region. With PESTEL analysis applied to the eastern part of Serbia, it can be observed a wider picture of social life in other smaller countries of the Balkans with similar economic and social characteristics such as Montenegro, Bosnia and Herzegovina, Republic of Srpska, Macedonia.

INTRODUCTION

Since each activity, starting from the primary biological, through production, and eventually social, takes place in a particular environment, it is necessary to research environment factors that directly or indirectly have an impact on these primary activities. From the point of sustainable development, there are many factors that have impact on the quality of life of people in some region. These are political, economic, social, environmental... The region of the Balkans has always been interesting for studying various social movements and turmoil. Because of the fact that Serbia represents one segment in the region, it is interesting for observation Serbia in terms of social development (SD). Uneven regional development

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is evident in Serbia. On the one hand, Belgrade, Novi Sad (big cities in Serbia) and the region of central Serbia represent the developed regions, while on the other hand the regions in the south and east of the country stand out as less developed. In less developed regions, natural resources which can be used in a sustainable way, and which can improve the quality of life of citizens are more concentrated. The concept of sustainable use of natural resources can be considered as a substitution renewable energy resources with the non-renewable. Less developed regions in Serbia are abundant with renewable energy resources, and it is advisable to use such sources. The use of renewable energy resources also depends on the level of environmental awareness of a particular community. The region of Eastern Serbia includes cities such as Zajecar, Bor and Negotin which are among the larger centers of this part of Serbia.

This part of the county are rich in geothermal energy which are not used in the properly manner - these energy is irretrievably lost. To take advantage of the renewable energy sources and to raise social awareness to a higher level (when renewable energy sources is considered for using), the PESTEL analysis applied in the Eastern part of Serbia will point the implementation of sustainable development in this part of the region. PESTEL (in its original) analyzes the environment for a new market or analyzes an existing market, providing an overview of the external situation which can affect global business, or business operators. This analysis can also be applied in cases where some factors affecting a particular phenomenon are analyzed, in this case the factors that have influence on the application of sustainability and development in a particular region. PESTEL analysis that is applied in this chapter includes political, economic, social, technological, ecological and legal aspects of the development of the Eastern Serbia region that affect the quality of life of the examined part of the country.

BACKGROUND

Coordination of activities is a process in which, in addition to the economic level of industrial production, also observed the ecological level, i.e. the influence that human activity has on the natural environment. Considering the fact that human society has the greatest impact on the environment, it is necessary to emphasize the importance of the social component of development, which includes the quality of life. The problem of sustainable development is discussed on the world highest level, as evidenced by numerous documents. The UN document titled "Report of the World Commission on Environment and Development (WCED):Our Common Future", in the 1987, presents one of such documents. The same year (1987), Gro Harlem Brundtland, a Norwegian politician, the leader of sustainable development and public health policy, presented basic recommendations for sustainable development in this report. That include long-term ecological strategies for sustainable development, up to and beyond the year 2000, as well as solutions of the environment protecting that can be achieved through better cooperation between countries at different stages of economic and social development. Although there is no generally accepted unique definition of sustainable development, it is commonly referred to the one from the Common Future Report: "Sustainable development is a development that meets the needs of the present generations without disturbing the ability of future generations to meet their own needs." By the second definition, sustainable development implies a balance between resource consumption and the ability of natural systems to meet the needs of future generations (http://sr.wikipedia.org/sr/Održivi_razvoj). One of the definitions of sustainable development, from the same source, is: "Sustainable development is integral economic, technological, social and cultural development, in line with the needs of protection and improvement of the environment, enabling current and future generations to meet their needs and

improve the quality of life on our planets". The idea of sustainable development is more convincing if it is interpreted in a way that an additional level of development can be socially unnecessary if the environment is disastrously degraded and if the inequality of resources distribution leads to political uncertainty. In recent years, many authors have considered the concept of sustainable development (Steurer, Martinuzzi, 2005) (Carew-Reid at al., 1994). Sustainable development strives to economic development, which is traditionally understanding as an increase in the „per capita" welfare, but it also includes the demand for poverty reduction and unfairness, as well as the requirement that the "resource base" of national economies and the world economy must be preserved" (Gavrilovic, Jovanovic, 1998). It can be concluded that sustainability includes all spheres of modern society, and that it is closely related to the quality of life and the quality of the environment in which life takes the first place.

SOCIAL COMPONENT AND QUALITY OF LIFE IN SERBIA

Sustainable development focuses on meeting people's needs and overcoming the conflict between economy and ecology. By realizing this model in practice, it is possible to create the conditions for economy and ecology to go "hand in hand".

This development must at the same time take into account social issues, starting from the lowest (local) to the highest (global) level of their manifestation in order to be harmonized (Štrbac et al., 2012). Aesthetics respects harmony and at the same time ecology requires harmony. Aesthetically unsettled environment has a bad influence on humans. Pure and healthy environment that is aesthetically refined is an integral part of contemporary ecological culture (Koković, 2010). There is a relatively low level of ecological awareness in Serbia and therefore the average citizen does not have a positive attitude to act and live in a way to reduce pollution, rational use of energy and change the attitude to non-renewable resources. A large number of citizens of Serbia do not have healthy lifestyle habits, while in some fields of social life there is an evident violence increasing (above animals, in the family, etc.). The problem in Serbia is also the treatment of national minorities and smaller communities (for example, religious). According to the reports from the National Development Strategy of Serbia, almost a quarter of citizens do not have enough confidence, and there is no trust in others' attitudes (on the state level), while in some absurd way some of the citizens believe in their own superiority and omniscience. There is a small percentage of youth who participate and decide in political parties and in general there are no youth in various social associations. Because of the poor economic situation, young people in Serbia have low chances to build better life styles. Poor developed areas in Serbia do not provide almost any or give a small chance for the participation of young people in the creation of various projects. In spite of the evident socio-economic disparity in Serbia (and its regions), there are two problems that currently dominated in terms of social values. The first problem is how to generate too many differences between the political and economic elite in normative framework of the new social order. These differences are the reason that at the same time there are three models of social reproduction in the country: command, market and "wild" (informal). Another problem is the fact that approximately 50 percent of people who live in Serbia think that economic development and the creation of new jobs should have priority over the healthy and unpolluted environment. So, Serbia faces two tasks: the first is to eliminate contradictions that hinder the establishment of a stable social form, and the other is to avoid such contradictions on the global level and to fit into the global trend of sustainable development (http://public-debate-sors.blogspot.rs/2007/09/91.html).

Inherited economic difficulties and poverty that exist in Serbia affect the materialistic goals of the country, the feeling of insecurity and risk exposure. The mismatch of the rural population with natural resources in its surroundings is very manifested. The concept of social capital, highlights the social and cultural aspects of human behavior, in other words it indicates that these dimensions have economic implications (Golubovic, 2009). Citizens of Serbia, especially the older generations, have more faith in former institutions (that existed in the country in the previous period of time) than in contemporary ones. When it comes to the well-being and quality of life of Serbian citizens, it also implies freedom from fears, the freedom of thought, security from various criminal groups, and in general the existence of threats for peaceful life and family stability in a state. Serbian citizens have a fear that public state security can not provide them sufficient protection but also the possibility of proclaiming justice. Serbian national identity indicates that structural socio-economic variables may be necessary, but not sufficient elements, for development of civic national identity. For development of national identity in Serbia, stable international framework is one of the necessary conditions (Manetovic, 2016). Collective identity is also one of the Serbian national issues. The insufficiently studied scientific question is the collective consciousness, i.e. the mentality and character of certain smaller or larger social groups (Radakovic, 2012). Because of the fact that it has undergone certain changes and influences over various periods of time, the collective identity of the Serbian citizens is diverse. Talking about identities in a global way, the following terms can be cited: gender identity, professional, cultural, ethnic, religious, regional ... All of these identities are subject of one, unique and comprehensive, the European identity. Citizens of Serbia want to be part of a developed Europe. Citizens of Serbia are increasingly become involved in to churches and religion, especially in the past decades, and this fact gives a new image of Serbian society. In the creation of a national identity and acceptance of certain norms of behavior, mass media have a major role.

Based on the all mentioned, it can be concluded that the social component of development is closely related to the quality of life. The quality of life could be explained in the following ways. If the quality of life was placed in the center of some imaginary images, and around it concentric circles were drawn, the nearest circle to the center would include the following elements: economy, culture, environment, people and space, health and social welfare, transport, social security, household, education, social cohesion and inclusion. The surrounding concepts, that are a bit further away from the center, but in correlation with it would include economic, social, state and environmental development. At the end of these circles, the next drawn ring which is also in relation to the previous two circles, would include reproducibility, vulnerability and risks. Thus, quality life centers can be graphically presented as points of the circles development (influential spheres) entering into horizontal (linear) and vertical (hierarchical) relationships. The center and the periphery are interconnected by flows of: information, capital, labor and ideas (Grcic, 2008). The quality model that is described as an integrative model of sustainability and quality of life, is a part of sustainable development strategy at the national level (Local Indicators of Quality of Life, 2000). Depending on the purpose of the examination, certain aspects, relations and limitations of this model can be distinguished. Considering that the quality of life refers to an individual and a regional (local community) elements, it includes the psychosocial but also the economic aspect of quality. The economic aspect is related to the investment and quality of the economy. The psychosocial aspect relates to physical and mental health, social security, social institutions (health, education, justice), political stability and to the environment protection (Arsovski, 2005).

Human Development Index for Serbia

How much Serbia is really sociological, i.e. socially rich it can be seen through the Human Development Index (HDI). HDI is a composite development index for a particular territory (http://www.undp.org.rs/download/nhdr2008_ser.pdf). The general quality of life, expressed by the expected duration of life, literacy and population coverage, by education and economic well-being (expressed in production) are the part of the HDI. The index was created by United Nations Development Program experts (HDI, 1993) as a result of linking indicators from different groups - economic, social and environmental - to extent the achieved development level of a particular country, (https://sr.wikipedia.org/sr/Local_Human_Developer). It should be noted that there are problems in monitoring the temporal dynamics of the index calculation for Serbia.

According to the 2013 world map of HDI, elements of index indicate that Serbia is in the group of developing countries, and that social wellbeing in Serbia is directly related to economic development indicators (https://www.google.com/search?q=world + map + hdi + 2013). To achieve social well-being in Serbia, it is necessary to achieve smaller goals, which include improving the economic situation through various investments (among others, green investments) (using modern technologies, renewable forms of energy, etc.). Raising public awareness about the importance of citizen's involvement in Serbia's social life, would lead to the creation of "sustainable lifestyles". Such styles will improve the quality of life in the country.

PESTEL ANALYSIS OF EASTERN SERBIA: CASE STUDY DESTRICT OF ZAJECAR CITY

PEST analysis is the acronym of the following words: political, economic, sociological and technological environment. It is a special method of business environment analysis that is used for planning of strategic development. PEST, in its original meaning, analyzes the environment for the emerging market or analyzes the existing market, providing the external situation that affect business operations. However, this analysis can also be applied in cases where factors affecting a particular phenomenon, in this case, factors that influence on the application of sustainable development in a particular region.

To make the PEST analysis more understanding, it is necessary to explain the segments that it deals with (www.ebizmags.com/sto-je-pest-analiza-i-cem). Political environment - the political environment is a relevant factor, because the national culture can be explained by understanding of the political situation in one country. Understanding political circumstances can be invaluable, since some political regulations i.e. the current political situation, can hinder economically and socially development. This is particularly important for developing countries or for „transition" countries (process of transition), based on the fact that political factors may have positive or negative influences for development of various business operations. Economic environment – „healthy" economy means the wealth of a state, nation or region, and in that way affects the planning of certain business and other processes. If the area is economically healthier, it is more than expected that the quality of life will be better, and the citizens will be more willing to accept the changes. Sociological- demographic environment - trends and factors of the population, i.e. the population of consumers (who are the actors in the market and in the society) can be monitored through the sociological and demographic environment. Existing of the social attitudes, can be advantage or a drawback in certain processes. This part of the analysis includes the level of education in the

local area (employees), and it is important element, both for potential workforce and for potential clients (consumers and services users). If the employees are not sufficiently educated, the costs of education will definitely be higher. Technological environment - Technology not only refers in terms of computers and apparatus for business (that contribute to greater performance), but also to the infrastructure that is need for supporting modern technologies. E-commerce and diffusion, Web-based technologies have influenced on improvement of many business processes. Despite the fact of the smallest degree of global presence, modern e-commerce attempts to achieve numerous business and social processes.

There are several extended versions of the PEST analysis, and the PESTEL version, which adds to the existing environment (political, economic, sociological, demographic and technological) the legal, as well as ecological framework of the research is presented. PESTEL analysis have the greatest significance of comprehensiveness, clearly defined by positive and negative system indicators. Its function is to objectively present validation and constraints for the successful management of primarily sustainable business processes, but also for social relations, and it can be applied to business and development factors research. PESTEL analysis separates the advantages and disadvantages of a particular process from the aspect of the influence of political, economic and social factors in the technical and technological level of development, as well as from the aspect of environmental opportunities and legal frameworks in which the process takes place. After a successful presentation of the environment in which a particular process is showen, SWOT analysis which gives strengths, weaknesses, opportunities and threats through the parameters of PESTEL, can also be applied. PESTEL analysis of the district of Zajecar city is shown in Table 1

FUTURE RESEARCH DIRECTIONS

It is necessary to find ways to exploit the potentials of the Eastern region of Serbia. In this way, the economic development of the region will be accelerated, as well as the social benefits, as well as greater care for the environment. Without adequate education, development policies and raising social awareness, some progress can not be achieved. Raising quality of life in Serbia implies raising quality in its regions. It is necessary to do a lot of things for the actors at the state and political parties of the country to agree and accept the only truth, that without a systematic, adequate and responsible political administration, no improvement can be achieved for the citizens in Serbia. An adequate policy can also influence the improvement of the economic situation in the country. A stable political field, attracts foreign investors to invest capital, especially in countries that are abundant with natural resources. The resource base must be preserved in an adequate manner, which means that it is adequately protected. Thus legal factors from the environment have a significant impact when regulating the consumption of natural resources and pollution of the natural environment. Technological factors can be linked to the introduction of new, cleaner technologies. The chapter presents basic technological impacts, but only using technology to reduce environmental pollution, sustainability in development can be achieved. Sustainable development is linked to the quality of all the processes that mankind takes and in which it is the main actor. Raising awareness of a different, more attentive attitude towards nature, and therefore indirectly towards society, leads to raising the quality of life. It is necessary to implement in Serbia a policy that will lead the country through sustainable development, sustainable economy and sustainable lifestyles of its citizens. In this way, Serbia would get a better image in the Balkans as well as in Europe and the rest of the world.

Table 1. PESTEL analysis of eastern Serbia (district of Zajecar city)

FACTORS	ADVANTAGES	DISADVANTAGES
Political	■ *The majority of citizens and political parties are aware that the municipality is in a difficult situation and that it is necessary to introduce a new form of political administration in the future* ■ *Local authorities accept the fact that it is not possible to achieve further progress and development without the concept of long-term sustainable development* ■ *Possibility of foreign investments and privatization accepted by city management authorities* ■ *The declarative political willingness of local committees is in favor of a responsible and long-term quality, taking into account the opinions of experts* ■ *The majority of the population who understands the concept of long-term sustainability wants the government to accept changes to sustainable development* ■ *The realization of sustainability must be focused on the motivation of human resources, in order for human resources to have confidence in the local self-government* ■ *Implementation of the process of sustainable development of the region - cooperation with managers who accept the concept of sustainability*	■ *Great political tension within political leadership between political parties after the election* ■ *The possibility of rapid political changes at the local level* ■ *Lack of competent experts when making important decisions for development* ■ *Political authorities avoid the fact that without the protection of natural resources, long-term economic development is not possible, nor does the quality of life* ■ *Setting short-term individual goals as priorities* ■ *Great pressure from experts and political authorities on the part of the region, in the sense that it is very difficult to achieve any form of development in the district* ■ *Negative political influences from larger regions, such as Belgrade destrect, Novi Sad destrect (city of north Serbia)* ■ *Slight political parties disagreements have a negative impact on advertising of the Serbian destricts in the media* ■ *Lack of well-argued public criticism and reaction to criticism* ■ *Lack of good and clear communication* ■ *Poor public criticism and public opinion* ■ *Media „overlaps“ on a political level* ■ *Lack of patience, motivation and mutual cooperation in promoting sustainable development* ■ *Lack of media focus on promoting the concept of sustainability at the local and national levels* ■ *Systemic weakness of the political state top management* ■ *Insufficient participation of foreign and domestic funds for financial investments in sustainable development programs* ■ *Insufficient support and support of local government and public enterprises in the implementation of sustainable spa tourism* ■ *Strong belief that the following events (destiny) are inevitability - the lack of faith of the citizens in a better future*
Economic	■ *A relatively good and favorable geographical position, which could be valorized in the future* ■ *Reconstruction of the mining basin in Bor (RTB Bor) by finding more abundant copper ore and bringing foreign investors i.e. customers* ■ *Closenes of the mining-smelter basin in Bor (RTB Bor)* ■ *Significant existing development capacities that can be restored* ■ *Possibility of supplying the local market with healthy food* ■ *Possibility of developing economic activities with a certain satisfaction of agricultural producers* ■ *Utilization of existing geothermal sources for the heating of certain entities* ■ *Utilization of existing geothermal sources for heating greenhouses* ■ *Using many tourist attractions, in order to achieve greater visitor interest in this region by foreign tourists* ■ *Investments in craft production that are almost forgotten*	■ *Predominant extensive agriculture* ■ *Most of the staff involved in rural development do not have a satisfactory level of competence or awareness for sustainable development* ■ *Lack of adequate content for tourists* ■ *Low economic productivity and competencies* ■ *Lack of investment and infrastructure* ■ *Low share of agriculture, as well as inadequate supply of healthy food in stores* ■ *Lack of smaller shops or supermarkets for the supply of domestic products*
Socio-demographic	■ *The warm hospitality of the Serbian people is still present in many parts of the region* ■ *The presence of middle-aged people who are resolved to stay in the country (do not want to leave their country)* ■ *Improving social policy in terms of greater engagement of women in managerial positions* ■ *Possibility of education through secondary, higher and faculty education of young population*	■ *Insufficiently developed professional business relations* ■ *Lack of young people who could be further educated in the direction of sustainable development* ■ *Apathy among people and generally lack of optimism when it is necessary to initiate development and progress* ■ *There are still many prejudices in the younger and older population* ■ *Poor demographic picture of the population in the region* ■ *Departure of young people outside the region* ■ *Deeply entrenched jealousy among people and a lack of self-confidence* ■ *The absence of wider awareness of ecology* ■ *Lack of eco-marketing and uncertainty with sustainable development* ■ *Insufficiently well-developed social policy for people with special needs* ■ *Lack of care for older relatives* ■ *Insufficient inclusion of youth and women in social activities* ■ *High level of unemployment, especially young population*

continued on following page

Table 1. Continued

FACTORS	*ADVANTAGES*	*DISADVANTAGES*
Technological	■ *Solid connection with the main national and international roads (Paracin-Zajecar-Kula to Bulgaria, Paraćin-Zaječar-Negotin-Kladovo to the Romanian border, Paraćin-Zaječar-Knjaževac-Niš-Macedonia-Greece, Negotin-Zaječar-Knjaževac-Niš-Bulgaria)* ■ *Possible construction of pipeline* ■ *Supplementation of technical documentation for the construction of the regional landfill (Halovo near Zajecar)* ■ *TV signal available and coverage of mobile networks (70%)* ■ *Possibility to acquire and advance knowledge through education and advanced technology*	■ *Lack of good road infrastructure (regional and local)* ■ *Not all travel directions are of the same quality* ■ *Insufficient integration of computer technology and networks across the region* ■ *Lack of web sites conected (presented) with ecology and sustainable developments in the municipality* ■ *Almost 30% of the territory is not covered by mobile networks* ■ *Poor equipment of agriculture* ■ *Insufficient utilization of hydrogeothermal potentials in the Gamzigrad, Brestovacka and Nikoliceva Spas, i.e. in the spas of the eastern region of the country*
Ecological	■ *Relatively preserved healthy nature, but with a growing risk of pollution* ■ *Familiarizing citizens with the possibility of using gas and other sources of sustainable energy (solar panels, geothermal energy ...)* ■ *The landfill located in Halovo (near Zaječar) is a positive example of waste management* ■ *Possibility of improving the types of hunting, rural, congress and health tourism*	■ *Lack of healthy drinking water in smaller towns located near major cities (example: Gamzigradska Banja)* ■ *Inadequate use of geothermal energy sources* ■ *Frequent use of pesticides and herbicides* ■ *Insufficient protection against possible floods and natural disasters* ■ *Insufficient monitoring, monitoring of air and water pollution* ■ *Insufficient analysis of planned construction and its impact on the environment* ■ *Existence of agricultural households that directly threaten the purity of waterNeadekvatna briga za pse lutalice*
Legal	■ *Possibility of introducing appropriate laws, taxes on environmental pollution* ■ *The possibility of prescribing a local document on proper waste management, as well as the proper use of land agricultural resources*	■ *Citizens have lost their faith in the judiciary, as well as in the judicial authorities - in view of the negative experiences of the past* ■ *Insufficient understanding of legal acts and laws in the field of environmental protection* ■ *Insufficient legal protection of the environment* ■ *Legal acts dealing with environmental protection are insufficiently consistent* ■ *Inadequate distribution of environmental responsibilities*

Source: (Authors research, 2016).

CONCLUSION

Based on the research, from the obtained factors of PESTEL analysis, which gives the advantages and disadvantages of East Serbia - the city of Zajecar, it can be concluded that the social and ecological awareness of the population is rather underdeveloped in understanding the concept of sustainability i.e. the concept of sustainable development. Risk factors (disadvantages) from all groups are more dominant and expressed than advantages. This is particularly evident in political factors. Policy is a complex and dynamic real social phenomenon that includes political awareness, procedural and systematic political action and other political activities. It involves various types of actors who are fighting for the power of decision-making. They communicate within the framework of the accepted rules to harmonize and realize their narrower and wider interests and needs within the allocation of values.

The political environment provides a specific organizational and institutional structure, which is intended for conducting public affairs and solving problems in the social community. However, the influence of political factors can have a decisive influence on development in a particular social system. This is especially pronounced in the countries of transition, which also includes Serbia. Policy factors influence the implementation of sustainable development, more on the negative side, because from the PESTEL analysis, the impression is that the policy of Sustainable Development in Serbia is not advocated. In this way, the consciousness of society in the sustainable area does not rise to a higher level and does not extend for a new concept of value. Serbia is rich in natural resources, especially in renewable energy potentials, and the country's policy can be crucial that they can be used in a sustainable and hostile manner.

Serbian state policy should give the support to a sustainable economy in order to raise the quality of life of Serbian citizens. In this way, lifestyles of citizens of the Eastern region (and in whole state) can become sustainable. Given the fact that Serbia is located in the Balkans, as well as other countries of the former Yugoslavia, that is, the country of the former socialist system, the analysis of factors that the author has shown in this chapter can be applied to other regions of the Balkans, to countries closest to Serbia i.e. to Serbia's neighbors.

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KEY TERMS AND DEFINITIONS

HDI: Human Development Index.
PEST: Politics, Economy, Society, Technology.
PESTEL: Politics, Economy, Society, Technology, Environment, Legislation.
SD: Social Development.
WCED: World Commission on Environment and Development.

Chapter 27
Sustainable Development of Cultural Tourism on Example of Botevgrad Municipality: A Model for Local Tourist Development

Dessislava Ivanova Alexova
International Business School, Bulgaria

ABSTRACT

The survey includes a study of the potential for sustainable tourist development of cultural tourism on example of Botevgrad Municipality, Bulgaria. The main accents are focused on theoretical formulations as system methods for territorial development of cultural tourism in the former tourist destination and practical researches which include proposals for tourism product development. The main approaches are the systemic, related to the systemic character of the territorial system for recreation and tourism at the local level and the empirical, used for gathering the necessary, in volume and character, primary quantitative and qualitative information. The research methods used are based on a deductive approach. The main limiting factors of the study are the lack of monitoring of tourist visits, sufficient statistical information and previous systematic research studies, the lack of traditions in the tourism sector, and the fact that the municipality has never worked preoperatively for the tourist development.

INTRODUCTION

The development of tourism and, in particular, of cultural tourism depends to a large extent on the public sector's involvement, as this business is too much integrated with other public services, the state of the transport infrastructure, access towards and to tourist attractions and sites, cleanliness, security. The presence or absence of projects supporting tourism infrastructure on a given territory is essential for the competitiveness of tourism. Therefore, the policy of the municipal authorities and their attitude towards the issues of the sector are among the key factors for the development of a tourist destination.

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In the context of the political environment in Bulgaria, Botevgrad municipality is in a comparatively favourable position. In Botevgrad municipality the tourist services sector is not developed in line with the national proportions, at the expense of a well-functioning economy with an industrial-agrarian structure.

As a tourist destination, the municipality has limited resources for the development of cultural tourism. They are still not used rationally, despite the crossroads location of the region and good transport accessibility to the capital. Historical and religious monuments are the basis for a comprehensive offering of cultural and religious tourism. Tourism is included in the vision of programming documents and is on the agenda of the municipality but practically there are still no implemented targeted local policies in the sector. At the same time, sustainable development is embedded in the National Tourism Development Strategy and is a priority of the World Tourism Organization. This necessitates the adaptation and implementation of established methods for the sustainable development of a tourist destination.

The aim of the study is to analyse and assess the resource potential, as well as to formulate strategic objectives and priorities for the sustainable development of cultural tourism in the municipality of Botevgrad.

Botevgrad Municipality has a varied but limited and insufficiently utilized resource potential, the development of which will contribute to:

- A diversification and improvement of the quality of the local tourist product;
- A possibility of year-round tourist offer;
- Raising visitor interest, promoting entrepreneurship for the development of rural and cultural tourism, improving the quality and expanding the material and technical facilities;
- Creating employment in smaller settlements in the municipality by offering specialized services related to local culture, craft development, production and supply of local produce;
- Enhancing the competitiveness of specialized tourism products for cultural tourism by applying new forms of spatial integration, including a regional tourist product with the neighbouring municipalities.

The research objective of the present work is the development and implementation of mechanisms for sustainable tourism development of cultural tourism at a local level based on the analysis and assessment of the resource potential in Botevgrad Municipality, especially the cultural heritage and the possibilities of traditional and innovative events. The objective of the study is the sustainable development of cultural tourism in the municipality of Botevgrad and its positioning as an attractive tourist destination. The resources for cultural tourism of Botevgrad Municipality are not yet rationally used for the sustainable tourism development and planning of tourism on a local level, despite the crossroads position of the region and good transport accessibility with the capital. The subject of this work is the study, analysis and definition of opportunities for sustainable development of cultural tourism at a local level as a model that can be multiplied to be used in other developing tourist destinations. To achieve the research goal, a set of general and private methods corresponding to the interdisciplinary and heterogeneous nature of the study are used: methods of analysis and synthesis, cameral method (literary review, official information sources, etc.), cartographic method (for spatial analysis of the surveyed objects and phenomena within the studied municipality), geographic methods of research: spatial analysis of the resource potential, localization of the surveyed sites.

BACKGROUND

For the purpose of this study, a retrospection of sustainable tourism development has been made, and definitions and productions of different authors from the beginning of the 1980s to the present day have been studied. The methodological framework is based on a methodology for assessing the cultural and historical potential of Bulgaria (Popova, 2011), for whose development widely used theoretical and methodological productions in the theory of recreation and recreation (Murphey, P. 1985; Cffoper, C and Wanhill, S., 1997, etc.) have been used. The territorial systems of recreation and tourism have been studied as an opportunity to apply a systematic approach to complex tourism research, with the aim of helping to draw conclusions for the whole system by examining its individual elements and structures.

The results of the Project "Exploring the Tourism Potential, Conditions and Opportunities for Tourism Development in the Municipality of Botevgrad" (2017) and the dissertation "Research of the tourism potential of Botevgrad municipality for sustainable development of the destination" (2019) were used as a basis for the study in this chapter, during which surveys, working group meetings and discussions with focus groups were conducted. The author has participated as a key expert on the project, including in developing questionnaires, coordinating fieldwork, as a moderator for the focus groups, in processing audio recordings and analyzing data, as well as in systematizing and summarizing them.

MAIN FOCUS OF THE CHAPTER

Issues, Controversies, Problems

As a tourist destination, the municipality has limited resources for the development of cultural tourism. They are still not used rationally, despite the crossroads location of the region and good transport accessibility to the capital. Historical and religious monuments are the basis for a comprehensive offering of cultural and religious tourism. The aim of the study is to analyse and assess the resource potential, as well as to formulate strategic objectives and priorities for the sustainable development of cultural tourism in the municipality of Botevgrad.

The main limiting factors of the study are the lack of previous systematic research studies, the lack of traditions in the field of tourism and the fact that the municipality has never worked preoperatively for the development of the sector, as there are no updated registers of the categorized tourist sites. There is no monitoring of tourist visits and sufficient statistical information, and the available data is partial and shows that an important part of the tourist sites in the municipality is still in the grey sector.

The stated research argument is that the achievement of sustainable development of cultural tourism at a local level is possible only by clearly defining and following the strategic objectives and priorities for sustainable development for the development of the tourist destination of Botevgrad.

METHODOLOGY FOR THE EXPLORATION OF TOURIST RESOURCES FOR THE SUSTAINABLE DEVELOPMENT OF TOURISM IN BOTEVGRAD MUNICIPALITY

Guidelines for the sustainable development of cultural tourism at the local level are closely linked to three main priorities of the Europe 2020 Strategy: for sustainable growth, through a more resource-efficient

promotion of a greener and more competitive economy and for inclusive growth, achieving a social and territorial cohesion through effective integration of territorial governance, based on the disclosure and assessment of the resource potential of Botevgrad Municipality.

The main research objective of the present study is to reveal the essential characteristics and peculiarities of spatial distribution of tourism resources, their potential for the sustainable development of cultural tourism in Botevgrad Municipality and its assessment in terms of the possibility of applying new approaches in spatial organization, territorial management of tourism at a local level in line with the European policies in the field of sustainable tourism development (ESTG 2007). The results will help solve one of the main tasks for the planning and formation of local tourism policies in tourism: achieving integrated tourism development of the territorial units and of the whole municipality as an administrative-territorial unit.

At the basis of the methodological framework is the methodology for assessing the cultural and historical potential of Bulgaria, for the development of which, theoretical and methodological formulations widely popular in the theory of recreation and recreation have been used, as well as the theoretical and methodological formulations of contemporary European political practice dealing with tourism as:

- A highly dynamic phenomenon that is spatially uneven and results in territorial imbalances in its development at different spatial levels;
- The understanding that issues related to the organization and management of tourism arise and are resolved in local communities (municipal and urban), which is why local authorities and local non-governmental tourism organizations play a key role;
- It is precisely at the local level that policies for the sustainable and balanced utilization of tourism resources should be formulated and implemented;
- Tourism resources are the main territorial localization factor of tourism, influencing the formation and functioning of regional and local tourist structures at different spatial levels, including municipalities, towns and villages;
- The qualitative and quantitative characteristics of tourism resources are one of the reasons for the horizontal differences in tourism development, leading to the formation and development of heterogeneous territorial structures with specific characteristics: capacity, comfort, reliability, sustainability and efficiency, which in turn justifies the need for the introduction of standard criteria for analysis and assessment of the resource potential.

Typical criteria for resource analysis and assessment are related to some of their basic quantitative and qualitative parameters: attractiveness, diversity, volume, territorial character, and need for conservation. The Sustainable Tourist Group (STG), UNWTO, in turn, justifies the binding of their assessment to the features of spatial development: development of *tourist centers* (larger cities with a critical mass of infrastructure elements); the development of cultural and *tourist corridors*, which are turning into pillars for creation of additional tourist production activity; the development of *tourist chains*.

The above stated main theoretical formulations outline the key aspects of the methodology, namely:

- Implementation of a local approach (at a municipal level) for disclosure, measurement, analysis and assessment of the resource potential for the sustainable development of a tourist destination;
- The necessity of a scientifically-based methodology with a praxis-applied character for rapid and accurate assessment of the resource potential for the sustainable development of cultural tourism;

- Introducing simplified standard indicators/criteria to be used for a rapid and accurate assessment of the resource potential in response to the specific needs of tourism management practice: for territorial management purposes, for regional marketing purposes, for diversification of the tourist product, etc.

The application of the methodology will allow to reveal the regional differences in the spatial distribution of tourism resources and to define the specific priorities of the local authorities in the organization, planning and territorial management of tourism. A limiting factor is the lack of standard indicators for assessing the different characteristics, properties and qualities of tourism resources, which necessitates the use of a new approach to discovering, measuring and assessing the tourism potential.

The introduction and rationale of simplified standard indicators, characterizing the general and specific features of the resource potential, using a modern GIS method for recording and processing information, allows the creation of a database that can be complemented and interpreted for different purposes while allowing comparability of the data with future research to identify occurring changes. The comparative assessment is an irrevocable element of tourism development monitoring in local tourism management, and the results of the applied methodology give answers to important management issues for:

- An up-to-date territorial differentiation of the resource potential assessment and the identification of the main problems related to the spatial differences in its distribution;
- The most promising tourist areas for the development of cultural tourism at the local level;
- An updated typology of municipalities based on the identified resource potential, by volume, structure and degree of utilization, for applying appropriate spatially differentiated policies for the development of specialized tourism types formulated on the basis of informed management decisions;
- Creating and supporting an updated territorial and type-differentiated database on the local resource potential.

For the purpose of analysing tourism resource potential and effective monitoring of the development of specialized tourism types, it is appropriate to use modern methods of geographic information systems (GIS) that create databases to serve as the basis for a comparative analysis of future dynamic changes, as well as clustering (typology) of local administrative-territorial units (municipalities) and territorial units (settlements, tourist complexes, etc.) to reveal spatial inconsistencies in the existing development of different types of tourism. The type criteria for a rapid assessment, which corresponds to the contemporary need of the tourist management and production practices, which are in accordance with the theoretical and methodological formulations, include: tourist *attractiveness* (appeal), *accessibility*, *volume* (quantity, number), *structure* (diversity, types), *territorial concentration* (density per unit area). The standard accessibility criterion shows the time accessibility to the sites, respectively: up to 30 minutes, between 30 minutes and 1 hour, over 1 hour. It is particularly important for the accessibility to cultural and historical resource potential and the possibility of developing cultural corridors, including a cross-border; for hiking routes (hiking, cycling and horse riding) and the opportunities for tourist interpretation in a thematic direction; for the natural tourism potential and the opportunities for practising adventure, mountain, extreme and ecotourism aimed at the respective target tourists. According to the standard indicator, the number of *tourist sites* is divided into 5 groups of municipalities, which have cultural and historical sites of national importance. Approximately half of the municipalities

in Bulgaria do not have cultural and historical sites of national importance (112), with more than 100 sites being one municipality - Plovdiv, between 41 and 100 are the municipalities of Nessebar, Shumen, Veliki Preslav and Varna, 31 municipalities have between 11 and 40 cultural and historical sites of national importance, 53 municipalities, including Botevgrad, host between 5 and 10 and the other 63 municipalities - between 1 and 4.

The use of simplified standard criteria for conducting resource potential assessments at a local level allows an accurate assessment of the peculiarities and specificities of the spatial characteristics of resources and the application of new approaches in their analysis in accordance with the new spatial organization concept, providing for a competitive ability of the tourist product. Better spatial coordination and territorial integration of cross-border projects will be achieved through a project synergy and application of new forms of the spatial organization of tourism: cross-border cultural corridors and tourist areas to the major ones.

The application of the methodology is also associated with certain restrictions, notably with regard to insufficient information provision with statistical, regulatory, administrative and marketing information, which makes it difficult to carry out systematic and regular practical studies and to monitor the development of specialized types of tourism. There are also gaps in the legal regulation of tourist sites based on a market-based approach and thus making it difficult to make management decisions, related to their use for tourism purposes.

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Its successful implementation is related to the introduction of tourist monitoring at a local level, generation of an information database on key type criteria, development of systematic inventory lists of tourist sites on the territory of the municipality, conducting regular and systematic surveys of the tourism resource potential: volume, diversity, degree of utilization and spatial configuration by applying a unified methodology to ensure comparability of results as a basis for taking information-based solutions. The development of methodologies for the provision of statistical information regulated by the Law on Tourism will provide additional advantages. The development of private methodological issues related to the sources and technologies for generating data on the type criteria and other key indicators related to the exploration of tourism potential, as well as the regulation of a basic type criterion for tourist attractiveness, will further contribute to the successful implementation of the methodology.

TOURISM RESOURCES FOR THE DEVELOPMENT OF CULTURAL TOURISM IN BOTEVGRAD MUNICIPALITY

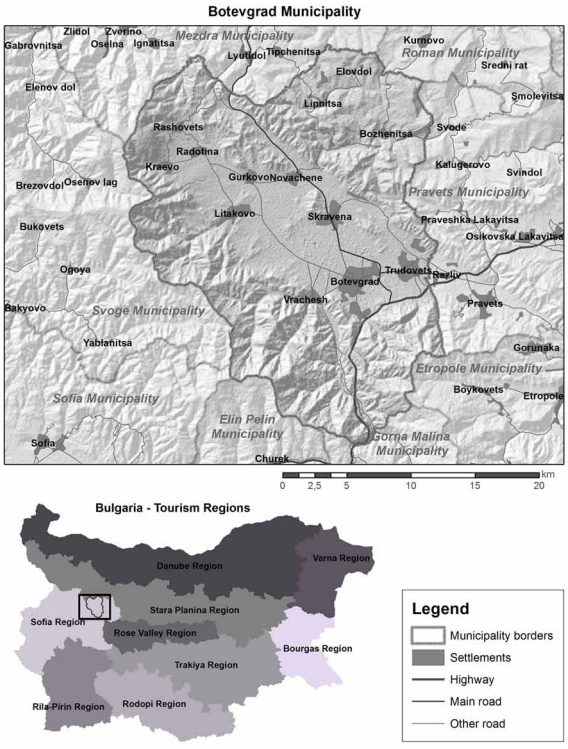
The resource potential of the municipality includes mainly anthropogenic tourism resources and conditions for the development of tourism – the state of the available material and technical facilities, accessibility and attractiveness of the cultural and tourist sites and routes. The local conditions and resources set the framework for opportunities and constraints, related to the development of tourism in the short, medium and long term.

Botevgrad Municipality has a favourable geographical location: proximity to the capital; quick access via the Hemus highway and the transport corridor to Romania; nearness to the town of Vratsa; a relatively good road network and transport infrastructure within the municipality. (*See: Fugure 1.*)

On the territory of Botevgrad Municipality, there have been found remains of old Bulgarian fortresses, ancient Roman roads, churches, rock inscriptions, wells, monuments from antiquity and medieval times, a Roman fortress, a monastery and a number of local monuments.

The tourism resources are generally identified with the conditions and factors that determine the tourism development and influence the tourism process. They are also called localization factors because they determine the location to which the tourist demand is directed. According to some authors (Mc-Connell, Apostolov, 2003), tourism resources cannot exist as such without 1) the tourist who uses them; 2) a place where they are located and can be used, 3) a characteristic mark of theirs that makes them exceptional. An important quality of tourism resources in the context of sustainable development is that after their use by tourists, their qualities are preserved, not lost or destroyed. Their main characteristics are related to the fact that the tourism resources are territorially fixed (spatial conservatism), divided into two large groups: natural and anthropogenic, their main property attracting the tourist's interest is their attractiveness, their capacity and dynamism (a change under the influence of external factors), multiplicity of use, which determines the necessity of preservation, a comparatively low absorption capital and complex assessment, with the purpose of their sustainable management, use and absorption.

Figure 1.Location and transport accessibility of Botevgrad Municipality
Source: (IGI, 2019)



The undertaking should comply with the conditions for utilization of the resources in general: technical feasibility, economic necessity, social need and sufficient research.

Anthropogenic tourism resources are objects and events of a non-natural nature, which are an immediate purpose for travel. They are man-made and have qualities to satisfy healing, recreational, cognitive, business or leisure needs, and attract tourists. Most importantly, after using by tourists, these qualities are usually preserved - they are not lost or destroyed.

Botevgrad Municipality has a variety of objects of the material cultural heritage: archaeological, historical and religious. However, a small number of them are attractive and accessible to tourists, which necessitates the municipal leadership to take action to improve their operation.

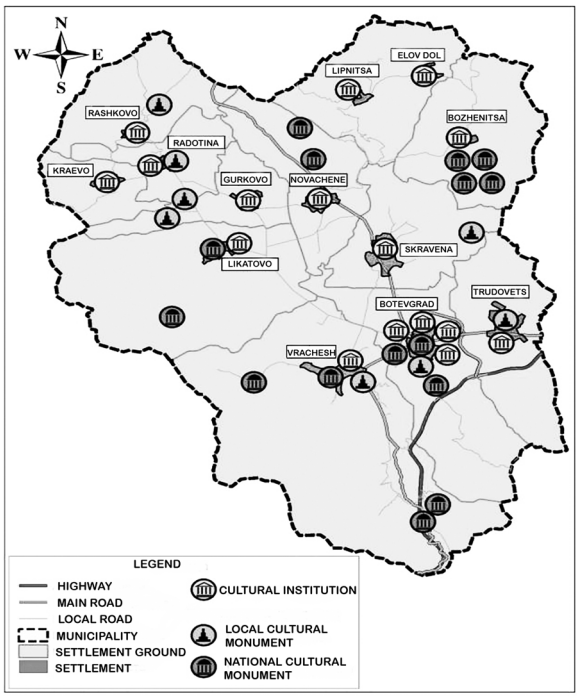
On the territory of the Municipality of Botevgrad, there have been preserved remains of an old Bulgarian fortress, churches, rock signs, wells, monuments from antiquity and medieval times, a Roman fortress, a monastery and a number of local monuments. An ancient Roman road passes close to the municipal centre of Botevgrad. Archaeological studies and literature data prove that Botevgrad region has been inhabited since ancient times. The traces of human activity here date back to the Palaeolithic and Stone Age.

The cultural heritage in the town of Botevgrad is represented by architectural, construction and historical monuments of national and local importance. There are 2 cultural monuments of national importance in the city. On the municipality's territory, there are another 5 sites which are categorized as cultural monuments of national significance - 4 on the land of the village of Bozhenitsa and 1 in the southeast of the town of Botevgrad near "Arabakonak pass". On the territory of the municipality there are several churches and monasteries: the temple "Holy Ascension of the Lord", the temple "Assumption of the Most Holy Virgin" and the monastery "St. Birth of Virgin Mary" in the village of Zelin, Vrachesh Monastery "St. Forty Martyrs ", to the west of the village of Vrachesh, Skravena Monastery "St. Nikolay" to the northeast of the village of Skravena, the monastery "St. Georgi", Trudovets village. (*See: Figure 2.)*

The History Museum Botevgrad has a well-developed exhibition and a conference hall, equipped with the necessary presentation equipment. There are opportunities for exhibiting visiting art, applied and documentary exhibitions, for conducting lectures, meetings-talks, open lessons, lectures, and celebrations. As a cultural and scientific institution, the museum develops research, collecting, educational, and promotional activities. It is included in the implementation of events from the cultural calendar of Botevgrad Municipality.

A resource for the development of cultural tourism is also the intangible heritage of the municipality. Many forms of intangible cultural heritage - typical customs, rituals, beliefs, artistic and performing arts, culinary traditions, and others manifest themselves during religious and secular holidays. They are kept and performed by the local population as well as by folklore and amateur groups the Culture Community Center called "Chitalishte". All villages have kept the tradition of organizing annual village gatherings. Part of the holidays have been kept and preserved over the years, and their celebration is performed with preserved traditions and rituals. Culinary is significant for traditional holidays and celebrations. The local cuisine in Botevgrad region stands out with the banitsa - sweet and salty pastry: onion pie, cabbage pie, pumpkin pastry, and strudel with scrambled apples, walnuts and cinnamon. Typical dishes are different types of salads with potato, sorrel plant, nettle dish and Botevgrad topenitsa. Some bean dishes are also quite popular for Botevgrad region - smashed beans, fried beans, fish and beans in the oven (including carp with beans for St. Nickola's Day) and lamb with beans. Old recipes for sour plum soup, tartar with sour cherries or plums, plum stew and beef meat are known to the local population.

Figure 2.Cultural Heritage of Botevgrad Municipality
Source: Botevgrad Municipality, 2014, Municipal development plan 2014-2020, p. 45, available at: http://botevgrad.bg/data/pages/files/1458201230.pdf?%D0%B0=46



Some locals still prepare green sour plums sterilized in a jar, white mash (warm yellow cheese), and chopped cabbage in water.

The area of Botevgrad belongs to the North Wine Region known for the ruby and Merlot varieties, but it is not a vineyard place and therefore no mass wines are produced. Only Yankovo and Vrachesh wines are known. It is characterised by the production of double boiled plums and grapes Rakia. In the southern part of the town, there are still plums orchards. The region is also known for its characteristic varieties of cherry - Botevgrad soar cherry. Impressive cherry complexes are preserved. “Yablena natura” farm in the village of Radotina is home to organic apples and pears. There are two dairies in the municipality: one is in the village of Gurkovo - specialized in the production of cow’s milk and the other in the village of Rashkovo - for goat’s cheese. They can sell their products only within the municipality and its neighbouring municipalities, which would be of interest to tourists who prefer authentic food.

One of the effective tools for attracting new visitors from Sofia and the neighbouring municipalities, as well as organized Bulgarian and foreign tourists, is the creation and implementation of traditional and innovative cultural events. The implementation of a successful cultural event contains several key elements of an added value:

- The attractiveness of the event - regardless of its direction (sports, cultural, etc.) it brings with it an otherness from the events, offered by other municipalities;

- Promoting the most interesting sites and landmarks in the area and in the municipality as a whole (including information about everything interesting when publishing content in the communication mix);
- Content of the event: promotion of unique formats and models for the presentation of information about the opportunities for tourism on the territory of the municipality before, during and after the event;
- Creating digital content on the Internet channels and national media, this leaves long-lasting effects on the audiences and participants in the event;
- Possibility through modern social networking techniques to address information to the maximum number of potential tourists through a targeted and planned Internet campaign;
- The local community and local entrepreneurs receive the material (direct income from potential tourists and guests of the event) and non-material added value (level of change of the environment and understanding of the Municipality's efforts to achieve concrete results in the field of tourism);
- Feedback by activating the structures of NGOs, experts and citizens for the final outcome of the event.

At this stage, however, the traditional events in the municipality are usually local and regional and do not create conditions for attracting potential tourists. Attracting external visitors other than visiting friends and relatives can only be done if their content is enriched and updated. Typically, these events follow a format that brings benefits to uniting and supporting the local community. From a media point of view, the coverage is only regional.

The most attractive traditional events that can be enriched with content according to the above-mentioned elements and developed at the national and international level are the parades of Brass Orchestras and Majorette Ensembles, the Barrel Festival in the village of Vrachesh and the Easter Fair in Botevgrad. The feast in the village of Bozhenitsa, which is bound to traditional and authentic folklore, can also gain popularity outside the municipality.

Material resources are a basic unit in the process of creating, implementing and consuming the tourist product. They are also an important condition for the absorption and commercialization of the tourism resources and at the same time generate many of the strategic issues and management decisions within the activity of the tourist enterprise. The material base of tourism can be defined as a set of material services for the production and implementation of basic and auxiliary services to satisfy the needs of tourists in connection with their travel to and residence in the tourist place. The main function of the material resources is to provide conditions for the production, implementation and consumption of the tourist product. The concrete implementation is done by means of various elements of the material base of buildings, machinery, equipment, furniture, equipment, roads, water and communications. Tourist infrastructure includes access to and communications to the tourist area, water supply, sewerage, urban planning and architectural appearance. The tourist superstructure includes the buildings of the residence, food and entertainment establishments, tour operators and intermediaries, health and sports centres. It contributes to development of hybrid cultural tourism in urban historical environment.

The total number of licensed accommodation places is 10. Along with the existing hotel establishments from the last century, several new accommodation places have been created, which are successfully present on the market and attract tourists in the municipality. Their number is limited and to some extent corresponds to the available tourist attractions in the area. They are not evenly distributed in the municipality and some of them do not meet the modern requirements of tourism or do not function at

all. There is still a lack of accurate information, including data on categorized catering and entertainment establishments for the territory of Botevgrad Municipality. The Consolidated Municipal Register of Accommodation and Catering Facilities have not yet been updated, and reliable statistical information is missing. It is not clear how many Bulgarians and foreigners have spent the last five years on individual tourist sites, what the average annual employment of the base is, the purposes of travelling visitors, which prevents the development of basic analyses and outlines trends for the development of tourism in the municipality. The collection of the tourist tax is also relatively low.

The lack of a targeted national policy in this direction also has a negative impact. The Ministry of Tourism has not drafted yet regulation and strategy for the management of the tourist attractions included in the National Tourist Register. It is not yet clear which tourist sites a tax can be collected from, which taxes can be reimbursed for the maintenance of the sites, which can be used for public-private partnerships, which can attract investment. Local service providers and tourist sites owners do not exploit yet the potential for diversification of the tourist product, offering comprehensive tourism and modern forms of tourist animation to ensure the visitor's emotion and experience guaranteeing a return visit and creating a loyal clientele.

The improvement of the general infrastructure and the accessibility of the environment, set out in the program and strategic documents of Botevgrad Municipality, is focused mainly on the development of the general infrastructure and the physical environment related to tourism, with emphasis on the role of Botevgrad Municipality as an investor, initiator and organizer of the processes, aimed at improving and developing the material environment in qualitative and quantitative terms, to maximize the potential of the region, stimulating the year-round, sustainable development of tourism. Poor access, insufficient information and undeveloped environment are an obstacle to the development of a competitive tourism product for cultural tourism and must be overcome through targeted measures. The necessary measures to overcome these problems include improving the tourist infrastructure, the functioning of the tourist sites and the quality of the offered tourist services on the territory of the municipality such as identification, GPS capture and building new cultural and historical routes and thematic paths; creating new modern cultural and historical tourist attractions; diversification of tourist flows and extension of the stay on the territory of the municipality; creating favourable conditions for the development of innovative and integrated cultural and tourist products and services; digitalization of the offered tourist products and services; stimulating investment in tourism.

The accessibility to the tourist sites is mainly related to the maintenance and improvement of the general infrastructure, adjacent green areas, as well as the construction of light specialized tourist infrastructure, the provision of signboards and information boards providing adequate tourist interpretation. It is necessary to improve the functioning of the cultural-historical and religious sites on the territory of the municipality, including fixed working hours, opportunities for visiting non-functioning sites if desired by the tourists, with clear indications which phones and to which persons/institutions the visitors can approach in the case of an interest on their part.

The creation and development of modern attractions is an instrument for the development of sustainable cultural tourism. They attract tourists, adding a high consumer value to nearby natural or cultural-historical sites, or developing a new tourist area. To a great extent, such projects have to meet certain criteria depending on the objectives and effects that will be set in perspective, as they have community, image and other added benefits in addition to a purely economic aspect.

All this necessitates the introduction of a system of exemplary criteria for the development of tourist attractions ranked according to a degree of importance:

1. **Mandatory:** Municipal/state-owned property suitable for the implementation of an investment; accessible road infrastructure; proximity of urban / intercity or rail transport stops to intervention areas; availability of human resources in the local community to serve potential tourists; presence in the area of existing routes for mountain (eco trails), bicycle, horse, off-road, rock climbing, cave, etc. tourism; presence in the vicinity of cultural-historical and/or natural landmarks
2. **Recommended:** A potential for building new eco paths; biking/rock climbing routes and other types of alternative tourism; the potential to create connectivity between the existing tourist infrastructure eco paths/routes and the planned investment in the attraction; existing tourist infrastructure - hotels, guest houses and restaurants; proximity to suppliers of tourism products and services.
3. **Strategic:** Opportunities after implementation of the investment to offer integrated tourism products and services that bring a high added value to the local community (tourism products and services involving several local entrepreneurs in its implementation); possibilities for gradual upgrading/ further development/ implementation of projects against the potential of the intervention area - for building of attractions/eco paths/ availability of archaeological sites /routes/ natural phenomena/ infrastructure for financing with European means in different directions: for the business/ municipality /NGO and the local community.

A great part of the tourism-related challenges was identified during the Study of the Tourism Potential, Conditions and Opportunities for Tourism Development in Botevgrad Municipality, conducted in 2017[1]. One of the key factors for the successful development of tourism in contemporary conditions is the building of the human capacity and the development of competence in the field of tourism. The availability of qualified human resources is linked to the availability of professional, scientific and analytical capabilities that are sufficiently high to be able to meet the needs of the tourism market.

The percentage of people who would like to do tourism in Botevgrad Municipality is not high. If efforts are made to develop tourism, local entrepreneurs who already have some declared interest in creating and developing some tourist products should be encouraged. It is logical that at a later stage they will also attract others who want to develop something similar (the "motivation by example" principle). What they will need today is their unification for the common cause: tourism in Botevgrad - specialized training and access to financial resources. Existing NGOs working on tourism in the municipality should create an informal partner network and coordinate their actions to achieve the commonly agreed strategic objectives of the municipal development. They should be helped by training their representatives on alternative tourism issues, such as sustainable economic development, tourism regulations, product packaging, customer service standards, quality systems, tourist information and advertising, heritage interpretation, etc., including familiarizing with good practices in other parts of Bulgaria.

The human resource development process involves five main stages: designing, planning, collecting, analysing the necessary information, deciding on the part of the managers. Competency-based training needs analysis provides information on the knowledge, skills and potential for employee development. It is based on an assessment of the discrepancy between:

- **Target Level:** Competence development requirements.
- **Actual Level:** The current level of knowledge and skills of employees.

The necessary actions to support the development of human resources include tangible support and encouragement of local initiatives and individuals who have expressed their interest and actions for the

creation and development of some tourist products; provision of specialized training for people involved in offering and adapting tourist products and attractions; facilitating access to financial resources for entrepreneurial initiatives in the field of tourism; a support for the establishment of a partner network of NGOs and activists for co-ordination and support of common actions for the achievement of the commonly agreed strategic objectives of the municipal development; training related to the development of sustainable tourism topics; training of municipal employees regarding the tourist regulatory base; training of municipal employees in the preparation and management of projects for tourism purposes; familiarizing with good practices for sustainable tourism.

HETEROTOPIAS PROJECT: STIMULI FOR SUSTAINABLE DEVELOPMENT OF CULTURAL TOURISM IN BOTEVGRAD MUNICIPALITY

The interest in the cultural heritage of Botevgrad Municipality as a tourist destination has existed but it has never been used as part of a comprehensive strategy for the creation, development and popularization of a tourist product on the territory of the municipality. Attractive cultural and historical monuments from Botevgrad are Botevgrad History Museum, the Clock Tower, and the Monument-Ossuary of Botev's detachment rebellions, Vrachesh, Zelin and Skravena Monasteries and Bojenishki Urvich Fortress. Some archaeological sites such as medieval churches and monasteries on the territory of the municipality, remains of fortresses, etc. have a potential for the sustainable development of cultural tourism after their restoration, improvement of the accessibility and tourist interpretation.

An incentive for the modern development of cultural tourism will be given by the project „Heterotopias. Botevgrad – Leskovac", developed by Botevgrad Municipality in partnership with-the National Museum in Leskovac in the sustainable tourism development of Botevgrad Municipality. The project includes the construction of an *"Open-air Museum",* "*the Clock Tower - an Alternative Stage for Botevgrad*" and a *Promotion Center*, which could also be used independently to telepresence cross-border communication, broadcast movies - documentaries, educators, performances of contemporary art, interviews, etc.

The concept for creating an integrating open-structure of different, heterogeneous, self-complete cultural-information cores that regenerate and reinvigorate identity for the community is developed by architect Mariela Andreevska with the participation of landscape architect Evelina Donkova. The concept sets the following goals for implementation such as effective rethinking of the eternal, primordial values; reconsidering and prioritizing places that accrue identity; reconstruction of existing spatial structures into new, enabling conditions and open for different, smarter development, spanning through dreams; creating conditions for growing authenticity in redesigned spaces; promoting the encapsulated and blooming potential that is worthwhile as experience and inspiration. The cultural information cores are of a character, which serves to activate functional catalysts and modulators, to make internal and external connections to the system - with the symbolism they have, they build mechanisms for producing messages and value reflections in man from the rediscovered and newly created heterotopias.

The cultural information cores for Botevgrad, which are included in the project, are a clock tower, a history museum and a promotion centre, which are located in the central part of the town under the current detailed spatial plans of Botevgrad.

The aim of the Heterotopias project is to increase the tourist attractiveness of the different cultural and information cores involved in cross-border interaction and cooperation networks and investing in the development of the social capital of Botevgrad to promote the sustainable development of cultural tour-

ism and the nature of the town, the quality of life in the cross-border region with Serbia and stimulating the processes of getting to know, understanding and integrating communities in the common European cultural-information area.

The project is an open-ended system and provides for consistent input and development of measures for other public spaces / outdoor library, etc. to improve their key qualities and animate them in community networks with a new urban sense. This pattern of urban understanding follows Michel Foucault's philosophy of a universally variable, accomplished utopian model of life and the world. Having explained it through the prism of the cultural, historical, educational and social-administrative experience of society, he makes a specific reading of human mythological and pragmatic achievements. Defining space as an ensemble of interconnected and interacting elements and exploiting them in a way to achieve a balanced and time-lasting entity is done through structural analysis. Structuralism is an experimental means of proving our attitudes to time and history. Heterotopia /"another different place" in etymology from Greek/ "other spaces" of Foucault is a different place. It is a reality-image, it is also an effect. It is forever. It is an axiom - an ideological-essential centre at any time, in any society and in any culture that provides its own regeneration on its own, based on the core values. The creative achievement of the heterotopic theory consists in the creation of influential spaces of symbolic forms, in which the modern person experiences the time. Therefore, these distinctive, and in parallel, different in their different topographies, have a particular functionality in terms of self-knowledge and/or the disclosure of human oscillations. This seemingly adventurous form of heterotopia guarantees the infinite variability of emotional spaces and the infinite openness of physical spaces.

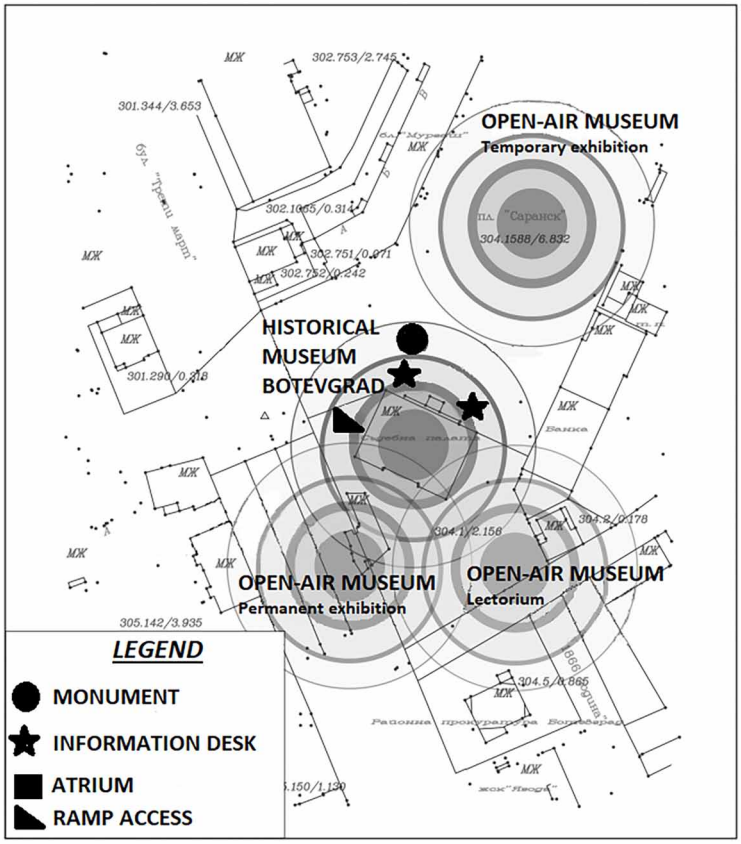
The configuration of incomparable and unobstructed places and objects, even connected to neighbours, creates complex spaces (multi-component, multi-layered and multi-functional. Their treatment is inevitable from a demographic, cultural and economic point of view and needs. The active absorption and far-sighted interpretation of living space, as the primary mission of architects, is designed to solve complex moral, ethical, interdisciplinary and artistic problems. The main one - discovering and storing those urban topples that most capture the authenticity of the city.

The Open-air Museum is a part of the overall concept of the museum's development, developed by the director of Botevgrad History Museum. The overall concept includes the development of the Museum in three stages - improving the base of Botevgrad History Museum, building an Open-air Museum and creating a Virtual Museum. The purpose is with the project „Heterotopias. Botevgrad-Leskovac" to create the material and technical conditions for the implementation of the Open-air Museum - a stage for increasing the tourist attractiveness of the History Museum by providing opportunities for developing its activity outside the building and creating a base for different age groups for inclusion in the museum life. (*See Figure 3*)

The creation of the Museum in the open air aims to show and celebrate, re-experiencing the rich and varied history of Botevgrad and its surroundings with the locals and guests of the town, thus increasing the tourist attractiveness of the region. It is implemented externally around the existing building of the museum and includes three sectors - permanent, temporary exposition and lecture theatre.

The "Clock Tower - an Alternative Stage for Botevgrad" is an important part of project`s concept and it is a methodological continuation of the activities carried out during the period 2010-2014 works on "Restoration, conservation and restoration of the clock tower in Botevgrad" on a detailed design in architectural and constructive parts, coordinated through a letter with a ref. No. 33-HH-0405 / 31.05.2010 by the Ministry of Culture, as well as the respective commissioning thereof. The aim of the project is

Figure 3.Cultural information cores: Historical Museum Botevgrad and Open-Air Museum
Source: (IGI, 2019)



to create conditions for exposure and socialization of the site to increase its tourist attractiveness by providing visitors with access to the interior of the site.

Expression and socialization are achieved by turning the spaces inside and around the tower into the Alternative Stage for Botevgrad. The aim is to bring the clock tower into a new dimension - from a stationary sign-identifier to the city in a space of culture that is committed to the development of community identity. Direct beneficiaries are all teams of artists, creators of imaginative performances and video art-installations, alternative literary, dramatic and photo-audio performances in the womb of the tower, as well as orchestra parades, 3D-mapping shows, flash mob actions and others in its adjoining exterior space by setting up temporary stages at the level of the square pavement.

Botevgrad Promotion Centre, on the one hand, is envisaged as a new unit in the construction of the municipal administration with an information-communication function. It unites and focuses the activities of experts in the fields of culture, tourism and municipal media on the creation and development of a concept and a real representation of the identity and attractiveness of Botevgrad Municipality. The purpose of the construction and technical project is to provide the facilities for the collaboration of the Promotion Centre and the Heterotopias Project through the formation of exterior and technological equipment of the atrium space and the premises of the Promotion Centre, thus creating conditions for

long-lasting and sustainable work for increasing the tourist attractiveness of Botevgrad Municipality. (*See: Figure 4.)*

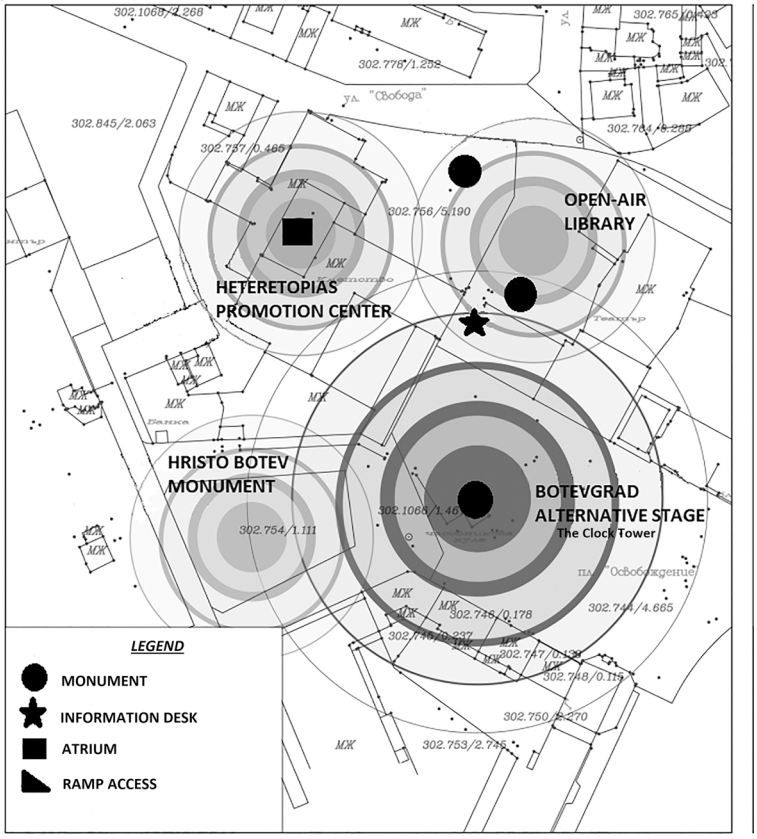
The integration of projects and proposals of the cultural institutes in the municipality will contribute to the interactive and modern provision of information on the tourist supply on the territory of the municipality, promotion of the cultural and historical sites and events.

ESTABLISHMENT OF THE THEMATIC ATTRACTIONS AND DEVELOPMENT OF THE TOURISM PRODUCT FOR CULTURAL TOURISM

Cultural tourism in Botevgrad municipality, although not well developed, already exists. Some of the cultural-historical and religious sites are included in the tourist programs of tour operators, but individual visitors predominate.

The development of cultural tourism will contribute to the creation of cultural and historical routes on the territory of the municipality. The building of thematic attractions related to Botev's rebels is related

Figure 4.Cultural information cores: Promotion Center, Hristo Botev Monument, Botevgrad Alternative Stage and Open-Air Library Heterotopias
Source: (IGI, 2019)



to the tragic death of 12 warriors from the detachment of the famous Bulgarian revolutionary and poet Hristo Botev. Routes connected with the historical path of Botev's rebels can be built, depending on the financing possibilities and the desire for cooperation of the neighbouring municipalities in this direction, and the implementation of the measure can include construction of a horse-riding and cycling route on the territory of the municipalities of Botevgrad and Vratsa "On the way of Botev rebels"; a promenade in memory of Botev rebels, connected with the monument-ossuary in Skravena; restoration of the water mill in the Botovina River near the village of Litakovo, where Botev rebels were concealed, its attachment to the Ossuary-monument and its adaptation as a tourist attraction; building a memorial in the village of Gurkovo where two skulls are kept currently in the town hall and its inclusion in a thematic route; organizing a school thematic tour, etc.

The development of thematic touristic routes of cultural, historical, archaeological and religious orientation could cover:

- Building a thematic route "Medieval churches and monasteries", including the ancient churches "St. Georgi" near the village of Trudovets, Preobrazhenski Monastery in Skravena and Nankovski Monastery near the village of Lipnitsa. The churches are of the same type, located at the same distance from each other and can be connected through a trail.
- Building a thematic route "Defensive fortresses and facilities", including a pedestrian and horse trail connecting the Gramade fortresses in the village of Skravena, Bozhenishki Urvich near the village of Bozhenitsa, the fortress Kaleto near Lipnitsa and others archaeological sites on the territory of the municipality, as well as a regional tourist product with the neighbouring municipalities of Pravets and Etropole, including Etropole - St. Atanas peak - Thracian fortress "Chertigrad", etc.
- Religious routes including churches and monasteries on the territory of the municipality, as well as joint tourist routes for religious tourism with the neighbouring municipalities of Pravets and Etropole.
- Creation of a tourist attraction "Chavdar" - one of the symbols of Botevgrad during the socialist regime related to the functioning of the bus factory "Chavdar". The measure includes the restoration of Chavdar bus and offering it as a tourist attraction during various events in the municipality of Botevgrad. The purpose of the bus is to ensure the safety and comfort of the tourists, equipped with air conditioning and all the necessary amenities while recreating the atmosphere from the time when Chavdar factory flourished. Chavdar buses became an indisputable symbol of Botevgrad during the work with focus groups and surveys among local residents and visitors to the municipality.

A potential for development is the proposal of attractions related to crafts: "On the way of the barrel" - a demonstration of barrels production and involvement of tourists in the overall production process; "Pottery and carving in the village of Bozhenitsa" - conducting of artisans' plain-airs and workshops; "Honey bee secrets and the path of honey" – turning a bee-garden into a tourist attraction, getting acquainted with honey production, bee life and tasting bee products; creating a demonstration area to the icon production workshop and linking it with organized visits to Vratchesh Monastery; getting acquainted with the production process of organic fruits and tasting in the ethnic corner of Yablena Natura farm.

The woodcarving and ceramics workshop in the village of Bozhenitsa "On the turn of the river" has the potential to contribute to the enrichment of the tourist product of organized visits of students in the church school of the village of Bozhenitsa, as well as organization of demonstration workshops during

the folklore gathering of the village of Bozhenitsa; to provide an added value to products related to visits and events to the fortress Bozhenishki Urvich, tourist tours along the old Roman road to the village of Skravena, etc. An attraction of interest to tourists will be organizing and a workshop in the village of Bozhenitsa, to be held annually on June 29 – Petrovden (St. Peter's Day), when the day of craftsmen is celebrated. The aim is to invite different artists from the country who will work outdoors for a few days, thus demonstrating the good correspondence between different arts, techniques and materials.

The cultural tourism is also excellent with the development of student tourism related to thematic visits to the Monument Ossuary of Botev rebels, the church school in the village of Bozhenitsa and others.

The organizing of events with cultural and artistic-creative orientation provides opportunities for the implementation of formed proposals during the study of the tourist potential of Botevgrad Municipality as restoration of the three-day market of ceramics; determining a square space to hold a Christmas market; building a large site for a weekly domestic market to be held every Saturday; farmer markets, initiation of the Barrel Fair and establishment of a demonstration workshop for the production of barrels in the village of Vrachesh and others.

A separate specific segment with a prospect of development is the conduct of a series of workshop to demonstrate ancient crafts at the fortress of Bojenishki Urvich - making antique weapons, ceramics, carving, glass casting. The aim is to organize plain-airs for various ancient crafts - spring and autumn edition, which will be directed not only to prominent artists from all over the country but also to the wide audience, which will observe demonstrations and learn basic techniques. The purpose of the attraction is to get acquainted with the local sights, ancient Bulgarian traditions, beliefs, myths and legends. For the purpose artists and exhibitors from across the country should be attracted to perform demonstrations, to conduct plainer-airs with a small exhibition, workshops with the audience. The attraction of the participants and the coordination will be carried out by a workshop for carving and ceramics "At the turn of the river". The municipal leadership should support the whole event, including the construction of stands, temporary workshops, accommodation of the authors and guests, security, logistics, etc. The expected results are the creation of a new traditional event in the national calendar promoting the region; attracting a new type of tourists with a wide profile - interested in history, culture, customs; additional promotion of the region. Target visitors are mass tourists from Sofia, Botevgrad and the region; people interested in arts, culture and historical tourism; artists from all over the country practising various artistic crafts, which will also naturally promote the initiative and attract visitors from their regions.

Establishing a specialized festival for equestrian tourism "In harmony with nature" would aim, on the one hand, to show young people that they can spend their free time together with friends in an interesting and fun way in the nature and on the other - demonstrating good practices, paying special attention and introducing participants how to create a relationship, partnership with animals. It is aimed at tourists from the country and abroad. Its philosophy encompasses an ecological, friendly attitude towards nature, with an emphasis on the harmony between humans and animals.

The event includes physical activity in nature, experience, a touch to the cultural heritage. It is achieved by riding to historical and natural attractions in the region and by doing sport - mainly adolescent-oriented and organized in the form of daily riding and children's sports camps. Various theme areas equipped with tents will be organized at the festival. Demonstration-manege area, ecological food area, nature-related nature area, children's area - playground, caravan area, dining area, stage, sound-popular music, bards. The aim is to awaken interest in the benefits of proper communication and interaction with the world around us, of harmony between man and animals as part of nature. Knowledge, skills, the experience will

be shared, and various products, a gift by nature, will be presented to us during the event. An innovative event can be held in cooperation between "Zdravetz" Horse Riding Club and Botevgrad Municipality.

The Day of the Frog Swamp is associated with a unique phenomenon: the longest documented migration of a mountain frog (Rana temporaria), which takes place annually in the Muhalnitsa protected area, located in the villa zone of Botevgrad. Mountain frogs, which do not generally habituate such low altitudes, go down to the marsh during their breeding season. Each year, they travel approximately 7 kilometres from the surrounding hills of Mount Bilo to spawn. It is assumed that this unique worldwide migration, documented in the late 1960s by the doyen of Bulgarian herpetology, Dr Vladimir Beshkov, began nearly 10-12 thousand years ago.

In connection with the preservation and promotion of this phenomenon, the celebration of the Frog Swamp Day began on March 22, 2018 (2019). The holiday of the same name attracts more than 350 participants and more and more supporters every year, both from locals and tourists. The holiday gives people the opportunity to learn about the unique nature around them, directs their minds towards protecting and respecting the environment, provoking their creative thinking and provides for engaging young and old in fun games, for creative workshops, visiting tourist sites and routes related to the natural and cultural wealth of the municipality. The holiday is included in the event calendar of the Municipality and has the potential to be enriched with a culinary competition, theatre productions, movie screenings, international photo competitions etc. thus gaining national and international importance.

SOLUTIONS AND RECOMMENDATIONS

The sustainable development of cultural tourism in Botevgrad Municipality is only possible through the implementation of targeted local policies. For this purpose, it is necessary to carry out systematic studies and analyzes related to the tangible and intangible cultural heritage and its tourist interpretation. The updating and support of the databases, as well as the implementation of the methodology for evaluating tourist resources and monitoring the visitors of tourist sites and events, are of substantial importance.

The availability of up-to-date and realistic program and strategic documents, the result of two-year studies and serious scientific research, approved by the Mayor and voted at a meeting of the Municipal Council in 2018, is a prerequisite for implementing clear priorities for the sustainable development of cultural tourism and its integration with others specialized types of tourism and economic sectors on the territory of the municipality.

The Strategy for Sustainable Tourism Development in Botevgrad Municipality 2019-2025 includes five strategic priorities related to the establishment of a Botevgrad tourism brand, the creation and development of a regional tourism product, improvement of the overall infrastructure and accessibility of the environment, institutional development and partnership with stakeholders, as well as sustainable development of specialized types of tourism on the territory of Botevgrad Municipality. Cultural tourism is more or less present in each of these strategic priorities. Setting specific measures related to the implementation of the "Heterotopias" project, improving the functioning of cultural, historical and religious sites, developing new tourist attractions, thematic routes and low-budget events with thematic focus, allows planning the way of implementing sustainable tourism product. This can only be achieved through partnerships with stakeholders, involvement of the local public and involvement of established experts.

FUTURE RESEARCH DIRECTIONS

The methodological aspects for the analysis and assessment of the tourism potential for sustainable development of cultural tourism cover the basic principles and approaches to the analysis and evaluation of tourism potential for sustainable development at a local level. Along with the methodology for evaluating tourism resources, they can also be applied in developing models for the development of other specialized types of tourism.

The model for sustainable development of cultural tourism in the municipality of Botevgrad can be used in planning and development, both in the local tourism policies of other municipalities with similar indicators and at a national level by the line ministry and tourist management organizations.

CONCLUSION

The sustainable development of cultural tourism in the municipality of Botevgrad requires focused and sustained efforts by the municipal leadership, in partnership with other stakeholders, to position it as a unique and competitive tourist destination, including the building and consolidation of a tourist brand, related to adventure and innovations. The emphasis on local traditions and natural resources, as well as a different type of events - traditional and innovative to highlight and enforce the brand Botevgrad - is the key to the sustainable development of tourism in the municipality.

The successful sustainable tourism development in Botevgrad Municipality in the field of cultural tourism is related to approbation of the proposed methodology for assessment of tourism resources and conducting systematic marketing researches; the approbation of the proposed methodology for analysis and assessment of tourism potential at a local level; building thematic routes and specialized tourist infrastructure; improving the accessibility and quality of tourist sites, diversifying the tourist product, offering additional services, using opportunities for a common regional tourist product for cultural tourism with the neighboring municipalities; creating public-private partnerships and cooperation between stakeholders.

The trends related to user requirements require increased use of the Internet. A key factor is to direct the local government efforts to improve the operation and accessibility of tourist sites, including digitization and active use of online marketing toolkits, organizing tours for tour operators and journalists, good practice seminars aimed at the local businesses to promote entrepreneurship, etc.

It is essential to develop a product policy in the field of cultural tourism in the municipality of Botevgrad, according to the specific features and the tourist potential of the region. The implementation of the Heterotopias Project and the application of the proposed tourist attractions as a result of the research and analysis of the tourist potential of the municipality will provide a real opportunity for its positioning as an attractive and competitive tourist destination, which could attract enough visitors from the capital and the other contiguous tourist markets outlined in the study.

The implementation of these mechanisms will help to recognize Botevgrad as an industrial as well as a tourist destination, and the integration of tourism with the other economic sectors will have an image effect and can be used as a lever for additional stimulus for the prosperity of the municipality. This requires systematic and purposeful local policies in the sector based on adaptation and implementation of well-established methodologies for the sustainable development of a tourist destination as well as a marketing approach addressing the current tourist requirements and trends in tourism consumption.

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KEY TERMS AND DEFINITIONS

Cultural Information Core: A character, which serves to activate functional catalysts and modulators, to make internal and external connections to the system, from the created heterotopias.

Cultural Tourism: A form of specialized cognitive tourism that focuses on tangible or intangible cultural heritage.

Heterotopia: A real place where that, what challenges and overturns the routine, ordinary, domesticated, common-place world of man, happens.

Tourism Potential: The sum of the natural, anthropogenic and material resources and conditions necessary for a destination management.

Tourism Resources: Natural or anthropogenic sites that have the qualities to satisfy the healing, recreational, cognitive, business or leisure needs of tourists.

Tourist Chains: Connected tourist sites, situated around popular tourist attractions (small towns, artificially linked in a closed loop).

Tourist Corridor: A path that connects unique cultural and natural values attractive to tourists.

ENDNOTE

[1] See: http://botevgrad.bg/obshtina/view/targoviya-i-turizam-84

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About the Contributors

Ulas Akkucuk is an Associate Professor of Quantitative Methods at Bogazici University Department of Management, Istanbul, Turkey. Dr. Akkucuk has a BS in Industrial Engineering from Bilkent University (1997), an MBA from Bogazici University (2000), and a PhD in Management Science and Information Systems from Rutgers University (2004). His research interests focus on the methodological development of multivariate techniques such as Clustering and Multidimensional Scaling and novel applications into fields, such as global competitiveness, CRM, technology management, and sustainable development. He has taught Statistics, CRM and Data Mining, and Global Aspects of Management courses, among others, at both graduate and undergraduate levels. He is associate editor and editorial board member of International Journal of Research in Business and Social Science (IJRBS). He is also Assistant Editor for Journal of Global Business Insights responsible for Innovation, IT & E-Business. He has been an ad hoc reviewer for journals such as Journal of Multivariate Analysis, Bogazici Journal, International Journal of Business Economics and Management and Journal of Computational and Graphical Statistics. He is a member of the Classification Society and Society for the Study of Business and Finance. He has edited six books with IGI Global, two indexed by WoS.

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Nida Abdioglu is an Assistant Professor of Finance at Bandirma Onyedi Eylul University, Faculty of Economics and Administrative Sciences. She has a BA in Economics (in English) at Istanbul University (2006). She received MSc Finance and PhD Finance degrees from University of Manchester, Manchester Business School in 2008 and 2012, respectively. Her PhD thesis was about investment preferences of institutional investors. Besides institutional investment, her research interests include corporate finance, corporate governance and financial econometrics. She has taught Corporate Finance, Accounting, Capital Markets and Financial Institutions courses. She has published articles in many international journals such as International Business Review and Journal of international Money and Finance.

Aynur Akata was born in Tekirdag - Turkey in 1963. Graduated from Marmara University-Istanbul. Completed MA at Istanbul University. Doctorate studies were completed at Trakya University. Worked as a Faculty Member in Trakya University until 2007. After retirement, worked as a faculty member in Private Foundation Universities of Istanbul at intervals. Research interests are organizational culture, SMEs and change management. Now lives in Istanbul.

Dessislava Alexova was born in Sofia, Bulgaria in 1979. She has graduated in International Tourism in the Bachelor's and Master's degree programs from New Bulgarian University (NBU), Sofia. In 2006 she became a PhD at NBU. In 2019 she earned her second PhD in Economics in the professional field 3.9 Tourism from International Business School (IBS), Botevgrad. She is the author of over 50 scientific publications in the field of sustainable tourism, destination management and protected areas. She also possesses practical experience in the tourist business, NGO sector and project management. She has over 10 years of tutoring experience as a part-time assistant at NBU. Since 2012 she has been a chief assistant at International Business School, Botevgrad and an individual member of Bulgarian Tourist Chamber.

Maja Arnaut is a Reservoir Engineer at Petroleum Engineering dept., researcher at EU CO_2 Capture Utilization and Storage (CCUS) project, with a research focus on the feasibility of enhanced oil recovery as one of the most perspective CCUS methods.

Oguzhan Aygören is an Assistant Professor of Marketing at the Department of International Trade at Bogazici University. In addition, he is the director for the Entrepreneurship Center, a board member in the Innovation Center and a board member in Bogazici Universitesi Teknopark AS. He is also the coordinator of Innovation and Entrepreneurship Certificate Program and International Competition and Trade Graduate Program. He is interested in topics such as value creation at startups, how corporations can become more innovative, digital marketing, consumer choice behavior and voting behavior. Prior to joining Bogazici, he was an Assistant Professor at Istanbul Technical University. Besides he was a visiting research scholar at UC Berkeley during fall 2014 and a visiting researcher at Stanford University during summer 2016 where he works on joint research projects. He has a bachelor's degree in Electrical and Electronics Engineering from Middle East Technical University and an MBA degree from Koc University and London Business School. He has completed his PhD in Marketing at Bogazici University. Before academia, he worked at Procter & Gamble as the head of innovation followed by an entrepreneurship experience where he joined and cofounded three startups in the fields of e-commerce, mobile marketing and social networking.

Dragana Bolesnikov received her MS in Economics - Finance and Accounting from the University of Novi Sad, Faculty of Economics, Subotica, in 2010. In 2016. she was hired as assitant by the Novi Sad School of Business, Novi Sad, Serbia and is currently teaching Principles of Auditing, Banking, Investement Banking and Financial Markets and Institutions in this high school institution. Since 2013, she writes and presents widely on issues of banking, risk management and financial markets and institutions (more than 15 papers). She is a PhD student of Faculty of Economics in Subotica. She is a chair person of the Financial Management and Control Commitee in the school.

Fadime Çınar graduated from Istanbul University, Department of Nursing in 1999. In 2013, she received her PhD in Business Management from Beykent University. During her master's and doctoral studies, she worked as a senior executive in education and research hospitals. His areas of expertise are health management, strategic management, quality management systems and research methods. Dr. Çınar has many international publications in the field of health management. She is a member of Istanbul Sabahattin Zaim University Faculty of Health Sciences. ORCID: 000-0002-9017-4105.

Maja Cukusic is Associate Professor at the University of Split, Faculty of Economics, Business and Tourism, Department of Business Informatics. Currently, she is the manager and the principal investigator of the scientific project HRZZ-UIP-2017-05-7625 (User-oriented process (re)design and information systems modelling – a case of smart city services) leading the group of three PhD students and five international researchers. With regards to relevant project participation, she participated in a number of scientific and development projects (FP6, Erasmus+, bilateral) related to strategic problems and process management in higher education. As an independent reviewer of project proposals and lead expert, she assists the EU and national agencies in the selection and monitoring of different projects and programmes. Before employment at the University of Split, she worked for three years in a Dutch holding company and was involved in the design and implementation of complex ICT solutions for domestic and foreign markets.

Tamar de Andrade is a Master student in Public Management and Institutional Leadership, University of Vigo, Spain. Master student in International Trade at IMF Business School / UCJC, Spain. Graduated in Business Administration with business qualification, with specialization (lato sensu) in Project Management. Journalist, entrepreneur and founding partner of the Leme Hill Environmental Protection Area, Rio de Janeiro, Brazil. She had professional experience as consultant project manager for the Industrial Development Agency - ABDI, Brazil, going through the Internationalization Program of Brazilian SMEs, Brazil Cooperation and European Union. She is an art teacher and student of cello in Vila Verde, Braga, Portugal, where she organizes art exhibitions.

Hasan Dinçer is an Associate Professor of finance at Istanbul Medipol University, Faculty of Economics and Administrative Sciences, Istanbul-Turkey. Dr. Dinçer has BAs in Financial Markets and Investment Management at Marmara University. He received PhD in Finance and Banking with his thesis entitled "The Effect of Changes on the Competitive Strategies of New Service Development in the Banking Sector". He has work experience in finance sector as portfolio specialist and his major academic studies focusing on financial instruments, performance evaluation, and economics. He is the executive editor of the International Journal of Finance and Banking Studies (IJFBS) and the founder member of the Society for the Study of Business and Finance (SSBF).

Elizabeta Djambaska, Ph.D., has been working in the Institute of Economics - Skopje, University "St. Cyril and Methodius" in Skopje, since September 2002. Her current position is Associate Professor. She actively participates in the implementation of the research program of the Institute of Economics in Skopje, where she is involved in the development of projects, studies and economic analyses, primarily in the area of economic development. She has published more than forty papers, participated in the realization of nearly twenty scientific and applicable projects, as well as on more than thirty scientific meetings, conferences, seminars and congresses in the country and abroad. She is an author of numerous papers published in international journals and editor of the book (The main consideration of the public debt of the Republic of Macedonia, LAPublishing).

Boris Dziura, Ph.D, Faculty of International Relations, University of Economics in Bratislava. Field of research: Environmental economics and innovations, especially focused on Blue economy issues as one of few scientists in Slovakia, he has published more than 25 of articles in domestic as well as inter-

national journals, participated in domestic and international scientific conferences and has published in journals indexed in Scopus and WoS databases.

Michael Fanta graduated from the Faculty of Economics and faculty of Business Administration of the University of Economics in Prague. He continues with academic activities within his doctoral degree program in Economic Policy and Administration at the University of Jan Evangelista Purkyně. He focuses mainly on network industries, research of shadow economy and analysis of unintended impacts of regulation and taxation.

Sanja Franc, Ph.D., is an Assistant professor at the Department of International Economics at the Faculty of Economics and Business, University of Zagreb. She published more than 100 professional and scientific papers, including 14 books in co-authorship. In addition to scientific research, she teaches courses International Economics and Regional Economic Integration in Croatian and English language. She has more than 11 years of experience in the field of international economics and related fields. She is an active member of several working boards at the Faculty of Economics in Zagreb. She is also a member of the editorial board in three international scientific journals and actively carries out the role of a reviewer. Experience in scientific and professional work is the result of her participation in several national strategic projects and various professional projects.

Ali Görener is an Associate Professor of Production and Operations Management at Istanbul Commerce University, Faculty of Management, Istanbul-Turkey. Dr. Görener received a BSc degree in Mechanical Engineering from Kocaeli University, Turkey in 2004. He received MSc degree in Industrial Engineering from Istanbul Commerce University (2006) and second MSc degree in Manufacturing Process from Yıldız Technical University (2007). In December 2011, he completed his PhD studies in Production Management in Istanbul University. Since 2012, he has been working as an Associate Professor in Business Administration Department at Istanbul Commerce University. His research interests include supply chain management, multi criteria decision making, lean production, logistics, quality control and maintenance.

Ertem Gulen received his BA in International Entrepreneurship from TOBB University of Economics and Technology in 2014. He completed his MA in International Trade Management in Bogazici University in 2018. He worked in various marketing and sales positions in multinational companies between 2015 and 2019, and currently studies MSc in Digital Marketing Strategy in Trinity College Dublin. Among his interest areas are marketing and consumer behavior.

Mirjana Hladika, Ph.D., is an Assistant Professor at the Department of Accounting, Faculty of Economics and Business, University of Zagreb, Croatia. She received PhD in Accounting at the Faculty of Economics and Business Zagreb. She was also educated at the Bodo Graduate School of Business, Norway, Center of Excellence in Finance, Ljubljana, Slovenia, and IFRS Foundation, London, United Kingdom. She participated in Erasmus Program at Hochschule fur Wirtschaft und Recht in Berlin, Germany. Her main research interests are national and international accounting standards, financial reporting, accounting for financial instruments, management accounting, management control and integrated reporting. So far, she has published numerous scientific and professional papers, and several books and manuals in area of accounting. She participated in many scientific international conferences. .

Biljana Ilic, PhD, was born on 10/01/1970, in Zajecar, Serbia. She graduated on Business Higher School of Belgrade University, in 1996. She continued further education on the Faculty of Management Zajecar, Megatrend University of Belgrade, in 2007. She Graduated on the Faculty of Management in Zajecar, in 2009. She received the degree of Master of Academic Studies in Management on the same faculty, defended master thesis with mark 10.00, and acquired the title of master manager. She defended her doctoral thesis titled "Strategic directions of regional economic and environmental development of the tourist potential of Gamzigrad Spa", in April 2016, mark 10.00. She was elected as assistant professor at the Faculty of Management in Zajecar on July 2016.

Mario Jadrić is Associate Professor at the University of Split, Faculty of Economics, Business and Tourism, Department of Business Informatics. He holds a Ph.D. from the University of Zagreb, Faculty of Organization and Informatics. He is the author and co-author of more than 50 scientific papers on the topic of e-learning, technological innovations, business processes improvement and user perception of new technologies. At the home institution, he teaches E-learning in Business Environments, Business Process Simulation and Business Information Systems at undergraduate and graduate level and Computer Simulation at the PhD level. Also, as an external associate at the Faculty of Philosophy, the University of Split he teaches Introduction to computing. Currently, he is a member of the research team of MIS4SC - User-oriented process (re)design and information systems modelling – a case of smart city services. He participated in several international and national projects and scientific-research projects.

Ivana Jošanov-Vrgović is a lecturer at Novi Sad School of Business. She completed PhD studies in Management at the University of Novi Sad, Association of Centers for Interdisciplinary and Multidisciplinary Studies and Research – ACIMSI. She acquired Master of Science in the areas of Organizational Sciences, Department of Human Resource Management at the Faculty of Organizational Sciences, University of Belgrade. She is the author of the large number of scientific papers and the author of numerous seminars and trainings in the field of communication, human resources management and organizational behavior. Also she is an active participant in numerous domestic and international conferences. In scientific research, she tries to prove the correlation between different aspects of individuals, groups and organizations and organizational performance, as well as the connection between high-quality human resource management practices and organizational performance.

António Jose Palma Esteves Rosinha is a Bachelor of Social and Military Sciences from the Military Academy Bachelor of Psychology / Orientation and professional training in the Faculty of Psychology of the University of Lisbon. Doctorate in Psychology of Human Resources, Labor and Faculty of Organizational Psychology of the University of Lisbon. Researcher of the Psychology Research Center of the Faculty of Psychology of the University of Lisbon (CIPUL) - Research Group in Professional Guidance and Development of Human Resources Effect. Responsible for the Admission and Selection Contest to the Military Academy, Implementation of the Organizational Socialization Program, Implementation of the Competency Development and Promotion Program, Implementation of the Organizational Socialization Program, Implementation of the Counseling and Development Program Career) Professor and Director of Stages and Career Development at ISCEM. Coordinator of the Inovlider (Portugal)

Ana Jovičić Vuković is a lecturer at Novi Sad School of Business. She completed PhD studies in Tourism and Hospitality Management at the University of Novi Sad, Faculty of Sciences. She acquired

a bachelor's and a master's degree at two different faculties in fields of Tourism and Hotel Management and Business Economics. She worked as research associate in projects funded by the Ministry of Education, Science and Technological Development, the Republic of Serbia. As a result of the projects she published more than 50 scientific papers in international journals and conferences in the field of tourism and hotel management. Her research interests are HR management, innovation management and sustainable tourism.

Lucija Jukić is assistant at the petroleum engineering dept., with research focus on reservoir engineering and petroleum economics.

Hermes de Andrade Júnior, PhD. Professor, graduated in international relations, with master's degree in Sociology and PhD in Public Health (ENSP/FIOCRUZ). Member of transdisciplinary professorship, journalist, musician and environmental activist. One of the creators of the society of friends of the environmental protection area of Leme hill, in Rio de Janeiro. (SOAPA-Leme) and the Working Group on Intercultural Communication of the Society of Communication Researchers of Portugal (SOPCOM), Senior Researcher at the Center for Philosophical and Humanistic Studies of the Catholic University (CEFH / FFCS / UC) in Braga, Portugal.

Hakan Kalkavan has been working in the Department of Economics and Finance at Istanbul Medipol University since 2015. He is currently working as an Asst. Prof. in the same university. In 2018, he completed his PhD in Economics at Istanbul Medeniyet University.

Charikleia Karakosta is a Chemical Engineer of the National Technical University of Athens (NTUA). She holds a PhD in Decision Support Systems Promoting the Effective Technology Transfer within the frame of Climate Change from the School of Electrical and Computer Engineering and a MSc in Energy Production and Management from NTUA. Her expertise focuses on energy and environmental multi-criteria decision-making and the design and development of related decision support systems for the assessment of developing countries' energy service needs and priorities, and the assessment of renewable and energy efficiency technologies, in the aim of facilitating robust decision making towards sustainable development and technology transfer. She has participated in several national and EU research and consultancy projects (e.g. H2020, IEE, FP7, FP6 etc.) in the fields of energy-environmental and climate policy, energy planning and management, technology transfer and decision support. She has published more than 145 scientific publications in prestigious international journals, announcements in international conferences and chapters in books (SCOPUS h-index 15, 705 citations). She has also served as guest editor for special issues, such as the Energy & Environment and the International Journal of Energy Sector Management. For her work, she has received ECOPOLIS Award 2016 for young scientist's research, awards by the Alexander S. Onassis Public Benefit Foundation, the State Scholarship Foundation (IKY) and the NTUA.

Daria Karasalihović Sedlar is a full professor at Petroleum engineering department, involved in different project for petroleum and natural gas industry, with research focus on natural gas management and petroleum economics.

Merve Kırmacı, has graduated from Bogazici University sociology department and earned her master's degree from Columbia University, NY in the same field. She continues her studies at the department of Management and Organizations at Bogazici University as a doctoral candidate. She is particularly interested in organizational strategy making techniques such as framing and narration in the digital age.

Malwina Lemkowska is an Assistant Professor in the Department of Insurance at the Poznań University of Economics and Business (PUEB) since 2013. Malwina Lemkowska participated doctoral studies at PUEB (2004-2009), completed with Ph.D. degree in 2009. Her master and Ph.D. dissertations were awarded in the Insurance Ombudsman Competition (2004, 2010) and in the WARTA Insurance Company Competition (2004) for the Best Graduate and Ph.D. Dissertation in Insurance. Between 2009 – 2013 Assistant (2009), and Assistant Professor (2010 – 2013) in the Department of Standardized Management Systems at the Faculty of Commodity Science of PUEB. The participant and co-organizer in numerous national and international conferences. Malwina Lemkowska has authored two research monographs in insurance and many papers published in national and international journals. Since 2017 Principal Investigator in the research project funded by the grant of National Science Centre, Poland (2016/23/D/HS4/02654), titled: Private insurance and environmental management systems complying with ISO 14001 as tools of environmental risk's management – analysis of relations.

Aleksandra Lozanoska, Ph.D., is an associate professor at the Institute of Economics – Skopje, Ss. Cyril and Methodius University in Skopje. Her main field of interest is the interaction between demographic, economic and social processes. In her scientific work Lozanoska is author/coauthor and/or editor of several books/monographies (Internal Migration in the Republic of Macedonia, Demographic Terminological Glossary, Scientific Diaspora from the Republic of Macedonia, Features of the active and inactive younger population in the Republic of Macedonia – current conditions and challenges etc.). She has published more than forty papers, participated in the realization of nearly twenty scientific and applicable projects, as well as on more than thirty scientific meetings, conferences, seminars and congresses in the country and abroad. Since 2017 she is member of DemoBalk, the association of researchers on demographic topics in the Balkan countries and a member of the Global Labour Organization (GLO).

Mariana Mourgova is an Associate Professor in Statistics and Demography at the University of National and World Economy (UNWE), Sofia, Bulgaria. She has a Master's degree in Statistics and Econometrics from UNWE in 1997 and PhD degree from UNWE in 2005. Her scientific interest are in the field of statistics and demography. She is teaching courses in Statistics, Econometrics, Regional Statistics and Demography at UNWE. She is a member of the International Union for the Scientific Study of Population (IUSSP), the European Association of Population Studies (EAPS), the Union of the Scientists in Bulgaria, and of the Eastern-European Ageing Societies in Transition (EAST) Research Network, Oxford Institute of Ageing, Oxford University.

Hanan Naser is an associate professor of business studies and economics at the American University of Bahrain (AUBH), Bahrain. Dr. Naser received her PhD in economics from the University of Sheffield, UK, in 2014. She was a teaching assistant of economics at University of Sheffield, and later joined Sheffield Hallam University as an associate lecturer in the Department of Economics. Dr. Naser completed a Master in Business Administration at New York Institute of Technology, NY, USA and undergraduate studies at the University of Bahrain, where she received a Bachelor of Science (BSc) in

Chemical Engineering. Before joining AUBH, Dr. Naser taught at the Arab Open University (AOU), Bahrain as an assistant professor of business studies and economics. She also served as the university's Head of Research Council and assists other administrative tasks and chaired many university academic committees such as the Quality Assurance Committee and the Students Appeal Committee.

Katarzyna Nowicka is an Assistant Professor of Supply Chain Management at SGH Warsaw School of Economics. She earned her M.A. in Management and Marketing and a Ph.D. in Economics at the SGH Warsaw School of Economics. Teaching-wise, she specializes in supply chain and logistics management, as well as the influence of digital technology on supply chain competitiveness and outsourcing management. Previously, she held a position of Supply Chain Manager in global innovative pharmaceutical corporation. Aside from her academic engagement, Katarzyna cooperates with European Commission as an Expert of H2020 projects' evaluation. She is also a Project Manager leading international ChemMultimodal Project that is developed under Interreg Central Europe Programme between 2016 and 2019. 25 years of Katarzyna's practical experience and professional background making enable her to share applied expertise in supply chain and logistics management as an expert - to pursue industry-relevant research projects and with students. Her scientific research encompasses e-business supply chain management (eSCM) and logistics management. Katarzyna has published several journal articles, book chapters and a books ("Outsourcing in Enterprise Resource Management", Difin 2016 and "Digital technologies as a determinant for supply chain transformation" SGH Publishing House, 2019).

Esin Okay is a Professor in the Department of Banking and Finance at Istanbul Commerce University (ICU) since 2002. She is currently the Head of Department and serves on the board of Finance Institute. Okay was recently the director of the Center for Applied Research of International Creative Economy, Creative Industries and Creative Cities and the Center for Applied Research of Economics and Finance respectively at ICU. She received her BA in Business Administration and completed her PhD at the Institute of Banking and Insurance, respectively from the Marmara University. Prior to commencing her PhD thesis, she worked for Global Securities Inc. in Istanbul for 5 years, as a dealer and lastly the founding Deputy of Institutional Investment Department. Okay teaches undergradute and graduate programs in the areas of finance, majorly risk management. Esin Okay has refereed papers, books and a book chapter in a widely recognized "World ESCO Outlook". In recent years, she has focused on energy finance as her papers appeared in journals of Social Science Index and received citations. Okay is a member of Professional Risk Managers' International Association (PRMIA). She also participates in sports, creative endavours and projects at ICU.

Aikaterini Papapostolou is an Electrical and Computer Engineer of the National Technical University of Athens. She is currently a PhD candidate in the Management & Decision Support Systems Laboratory of School of Electrical and Computer Engineering in the NTUA. Her scientific interests fall into the areas of energy - environmental policy and planning and decision support systems. Her research focuses on the assessment of Renewable Energy Sources (RES) Cooperation between Europe and its neighboring countries, as well as policy scenarios analysis for achieving renewable energy targets using multiple criteria decision support methods (UTASTAR, AHP, PROMETHEE, Fuzzy TOPSIS). Ms. Papapostolou has been involved in a number of research and consultancy projects at EU (FP7, IEE, Horizon2020) and National level related to climate change, energy efficiency, renewables and sustainable development, in which she also obtained great communication and dissemination experience.

Nataša Papić-Blagojević is employed at Novi Sad School of Business, Serbia since 2005 and after she got PhD diploma in Economics on Faculty of Economics, University of Niš in 2015 she was elected for a professor of applied business studies. In 2016 she was pronounced for a deputy director for education and she is in charge for organizing and monitoring the implementation of all academic activities, managing student affairs and monitoring the implementation of quality standards in the teaching process.Her occupational field is economic statistics and the application of statistical methods in economic research.Her research experience is presented through writing scientific papers in the fields of statistics and higher education that are published in journals, monographs and conference proceedings. She is a manager of NSSB team in the Erasmus+ KA2 project and she participated as a researcher in the Tempus project from 2013 until 2014.

Vladimir Petkovski was born in Skopje in 1986. In 2009, he graduated from the Faculty of Economics, University "Ss. Cyril and Methodius", the Department of Financial Management with the thesis "Portfolio Analysis of shares of official and unofficial market". In 2011, he obtained master's degree from the Institute of Economics - Skopje at the Department Financial Management, upon the public defense of the master thesis "Estimated value of the company in relation to its stock value". In 2013, he obtained Ph.D. in Economics from the Institute of Economics - Skopje upon public defense of the doctoral dissertation "The financial capacity of municipalities in Macedonia opportunities, practices and solutions for improvement". In 2015, he was appointed Assistant Professor in Economic Development. Since 2011, he has designed and managed projects by UNDP, OSCE, Erasmus Plus, several Ministries and the Government of the Republic of Macedonia, as well as international projects. He has participated in numerous research conferences and trainings in the area of Financial Management and Development Economics and has published several research papers in the country and abroad on the same topics.

Leonid Raneta, PhD, works in the sphere of academics since 2010 on the Faculty of International Relations, University of Economics in Bratislava. In that time has published 68 scientific papers in the field of international economic relations. Papers where published in journals indexed in the SCOPUS and WoS databases. The author participated in the world conferences (ISA, AAG), where he presented research about water resources and environmental problems of EEC.

Burcu Sakiz received her BS in Computer Science Engineering from the Dokuz Eylul University of Izmir in 2000. In 2001 she was hired as the Systems Programmer by the Information Technology Department at Turkish Airlines, Inc. and is currently one of the Project Managers of Infrascture Team Istanbul. She got her PhD from Istanbul Aydin University Business Administration Department in 2018. Her main interests are IT Architecture, Blockchain, Finance, Software Development and AI.

Bülent Sezen is a Professor of Operations Management at Gebze Technical University. He graduated from Department of Industrial Engineering in İstanbul Technical University. He received his MSc degree from Industrial Engineering Department in Virginia Tech/USA. His PhD is from Gebze Institute of Technology in Department of Business Administration. His research areas include Operations Management, Logistics and Supply Chain Management.

Radek Soběhart focuses on political and economic analyses (voting systems, financing of political parties, evaluating the impacts of economic regulations) and on project management. He studied politi-

cal studies and history and in his doctoral studies, his specialized on general history at the Faculty of Arts at the Charles University. As part of his studies, he spent one and then several semesters at German universities (Berlin, Heidelberg, Bayreuth). As an scientific assistant, he worked at the Faculty of Economics at the University of Economics, Prague and at the Metropolitan University Prague. Currently, he teaches at the Faculty of Social and Economic Studies UJEP in Ústí nad Labem.

Ante Strize is an information technology consultant working in one of the world's leading consulting and auditing companies, PricewaterhouseCoopers in Zagreb, Croatia. He graduated from the Faculty of Economics, Business and Tourism, the University of Split with study orientation in IT management. During his studies, he gained extensive knowledge in the area of information systems management, business processes, e-learning and adoption of modern technologies. He gained practical skills in the field of programming and project management, working part-time for many years in various IT companies. He has participated in projects related to process automation, digital transformation, information system controls, e-commerce and attended various congresses and symposiums. His main research interest as of lately is smart city solutions development.

Seda Süer is an assistant professor in finance at Tourism Faculty, Izmir Katip Celebi University in Izmir, Turkey. She obtained her Ph.D. in 2014 from Dokuz Eylul University in Izmir and her primary research areas are financial management, portfolio management, corporate finance, and working capital management. She graduated from Dokuz Eylul University with a master's degree in Business Administration. She is a full-time academic and education instructor at Izmir Katip Celebi Universıty in Izmir, Turkey.

Marta Sugareva is Doctor of Sociological sciences since 2000. Pensioner since July, 1, 2019. Dr. (Statistics, Economics) – 1978. Dr. of Sociological sciences - 2000. (Higher Attestation Commission). Research fellow in the Institute of Sociology and in the Institute of Demography (now - Institute for Population and Human Studies) at the Bulgarian Academy of sciences since 1980. Senior Research follow – 1990. Teaching courses of:"Statistics", "Demography", and "Family Sociology" in Sofia university "St. Kliment Ohridski" (Department of Sociology) (1980 – 2009). Full professor of "Statistics and Demography" in Plovdiv university "Paisii Hilendarski" (2010-2019). Author of numerous scientific publications in Bulgarian, English and French, on various subjects.

Ewa Szymanik has a Ph.D. from Cracow University of Economics, Department of Microeconomics.

Kerem Toker graduated from Trakya University, Department of Business Administration. He received PhD degree from Istanbul University, Faculty of Business Administration. He has been conducting research on business management, logistics management, organizational behavior and sustainability since 2010. He is a faculty member of Bezmialem Vakif University Faculty of Health Sciences, İstanbul, Turkey. ORCID: 0000-0002-1904-1406

Marta Vovk, PhD, Faculty of National Economy, University of Economics in Bratislava. Field of research: Environmental economics, she has published 41 of articles in domestic as well as international journals, participated in domestic and international scientific conferences and has published in journals indexed in Scopus and WoS databases.

Domagoj Vulin is Reservoir Engineer at Petroleum Engineering dept. involved in several EU and domestic CO_2 storage and CO_2 utilization and storage projects with research focus on fluid flow, fluid thermodynamics, hydrocarbon reservoir characterization, on possibilities for feasible CO_2 storage accompanied with enhanced hydrocarbon (EOR) or enhanced geothermal energy production, and also on underground energy storage.

Sibel Yildiz Çankaya is assistant professor in the Department of Business Administration at Abant Izzet Baysal University. She graduated from the Department of Business Administration and also has an MBA degree from Bolu Abant Izzet Baysal University. She earned her Ph.D. degree from the Gebze Technical University. Her research interests focus on supply chain management.

Serhat Yüksel is Associate Professor of finance in İstanbul Medipol University. Before this position, he worked as a senior internal auditor for seven years in Finansbank, Istanbul-Turkey and 1 year in Konya Food and Agriculture University as an assistant professor. Dr. Yüksel has a BS in Business Administration (in English) from Yeditepe University (2006) with full scholarship. He got his master degree from the economics in Boğaziçi University (2008). He also has a PhD in Banking from Marmara University (2015). His research interests lie in banking, finance and financial crisis. He has more than 140 publications (books, book chapters, scientific articles, etc.).

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