Handbook of Research on

Big Data, Green Growth, and Technology Disruption in Asian Companies and Societies

Patricia Ordóñez de Pablos, Xi Zhang, Mohammad Nabil Almunawar, and Jose Emilio Labra Gayo

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Handbook of Research on Big Data, Green Growth, and Technology Disruption in Asian Companies and Societies

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The phenomenon known as "eSports" has been growing in numbers in terms of revenue, market share, and popularity. This research aims to study this phenomenon in a larger scale which include findings from Southeast Asian countries such as Thailand and Singapore. The structure of the study will compromise of describing the eSports industry which is crucial to understanding the whole ecosystem of eSports, such as the economics behind the industry and the different roles that come under the industry. In order to do that, the application of a decision support systems tool is used to further study the future of eSports.

The digital marketplace is a major competitor now for the conventional marketplace especially in Southeast Asian countries (ASEAN) where digital marketplaces are booming and developing at an aggressive rate. The study also focuses on the challenges of eBay as a leading digital marketplace in battling their privacy and security threat, handling customer complaints about their services, or how government intervention provides an impact to their business, and competing with similar service provides. The other challenges are also associated with geographical distribution for marketing strategic location and why eBay should maintain their business like any other conventional business practices. Finally, the authors explore how concerned they are towards customer service as fundamental for any business.

The purpose of this study is to examine the effect of automation attributes in railway digital ticket payment toward the commuters' satisfaction and retention in railway transportation. Digital payment security is one of the essential qualities which was little discussed in determining public transportation service performance. This study used the partial least square structural equation modeling method study to measure the six effects indicated by the proposed research framework to fill the last research gap. The results showed two automation attributes, reliability and security, significantly influenced commuter satisfaction, supporting the behavioral theory as commuter satisfaction also substantially affected the commuters' retention attitude. This study revealed that the reliability factor was the most significant. The

Preface: Some Lessons to Understand the Transition to Digital and Green Economies in Asia

INTRODUCTION

The transition to digital economies and greener economies, especially in the current pandemic scenario, has unprecedented challenges for companies and governments. But this transition offers huge opportunities too for the development of more resilient and inclusive societies and economies (European Commission 2021, a,b,c; Ordóñez, Zhang and Almunawar, 2021).

This book presents a collection of chapters exploring and discussing the state of the art, emerging topics, challenges and success factors in business, big data, innovation and technology in Asia. The book explores changes for transitioning towards greener and sustainable societies and economies. It provides discussions on how IoT, big data and AI can provide solutions for global challenges and companies during the current global health crisis and in post-covid 19 scenarios. The book emphasizes empirical studies and case studies as well as comparative analysis in the Asian region.

OBJECTIVES

The book aims to be an international platform to bring together academics, researchers, lecturers, decision makers, policy makers, and practitioners to share new theories, research findings, and case studies, to enhance understanding and collaboration in business, digital strategies, disruptive innovation, green growth, and technology in Asia.

CONTENTS OF THE BOOK

The collection of 18 chapters of this book contributes to expand views and insights on how disruptive technologies and green economy shape opportunities and challenges in Asian countries. In particular the book offers analysis of these topics in many Asian countries like Bangladesh, Brunei, Indonesia, Korea, Japan, Malaysia, Thailand.

Chapter 1 titled "**Smart Cities Development in Korea and its Implications of Cooperative Governance"** (by Yeoul Hwangbo) discusses "the characteristics, the governance structure, policy-making process, the main thrusts, and regional governance of Korean smart cities. Korea defined a smart city as a platform to improve the quality of life for citizens, enhance the sustainability of cities, and foster new industries by utilizing innovative technologies of the 4th Industrial Revolution era. The smart city consists of three components including technologies, services, and applications, and legislation. Ministry of Land, Infrastructure and Transport has been in a position to play a leading role in developing smart cities and has accordingly been pushing for deregulation while other ministries have been devoted to the programs under the inter-agency collaboration framework. The Seoul smart city initiatives are reviewed in terms of policy process including policy formulation, policy-making, policy implementation, and policy evaluation. The chapter also suggests ASEAN regional cooperation types in response to the Covid 19 pandemic".

Chapter 2 titled "**Role of Big Data in Education- Challenges & Opportunities for the Digital Revolution in Malaysia"** (by Simin Ghavifekr and Seng Yue Wong) states that "Big Data has the variety of characteristics, such as real-time performance, timeliness short, and data mining analysis of large value generated and so on. Application of big data in education can be reviewed in various aspects such as: i) provide students with appropriate teaching; ii) provide teaching support to teachers, iii) provide information management for the administrations. The implication of this chapter can serve as a guide for the management of higher education institutions to recognize possible challenges in big data analytics and better prepare for them in the future decision making".

Chapter 3 titled "**Big Data, Green Growth and Technology Disruption in Asian Companies and Societies: Application of Fintech in Brunei Darussalam: Embracing E-Wallet in the Retail Sector"** (by Fairul Rashid and Muhammad Zulqarnain Haji Julaihi) affirms that "the rise of digitalization has inevitably impacted the growth of Financial Technology (FinTech) in Brunei Darussalam. The presence of E-Wallet QR code-based payment system, as part of the Fintech development, deems to be the latest payment mode that hits the retail sector of the Sultanate in recent years. Thus, the chapter is aimed to understand the role and impact of E-Wallet application in the retail sector. Despite the positive trending indicators for E-Wallet growth amongst the population, the utilization of E-Wallet in the retail sector is still quite low. Both driving factors and barriers towards E-Wallet utilization in the retail sector are discussed, by taking account the views of both customers and retailers. Recommendation steps are also suggested especially on the roles play by both business and government in empowering this new payment system and to drive the population toward a cashless society and attain a smart nation aspiration".

Chapter 4 titled "**Green Finance and Sustainable Development: A Case of Bangladesh Economy**" (by Md. Bokhtiar Hasan and Md. Naiem Hossain) states that "Green finance is currently gaining importance with the growing global resistance to climate change. However, there is limited empirical evidence supporting green finance and economic development nexus considering environmental issues. Despite the fastest growing economy in Asia, Bangladesh still has ambiguity about the role of green finance on sustainable economic growth, though it is already initiated in Bangladesh. Therefore, applying correlation matrix and granger causality test, this chapter aims to overview the present scenario and identify the role of green finance on sustainable development in Bangladesh from 2014-2019. Hence, it considers GDP growth and CO2 emissions for economic development and climate change issues, respectively, and green finance as the proxy of greening. This study finds that renewable energy consumption and power generation from renewable and waste contribute to green growth. Hence, this study suggests green finance for sustainable development not only in Bangladesh but also in other emerging economies".

Chapter 5 titled "**Indonesia's Inclusive Economic Development Strategy**" (by Tulus Tambunan) observes that "two developments are currently taking place in Indonesia, namely the process towards an inclusive economy and economic digitalisation. The main objective of this chapter is to review the extent to which Indonesia has achieved these two processes. To this end, this descriptive study analyzes secondary data from multiple sources, and the results show that Indonesia has made some progress in achieving both developments. But the results also give an important impression that in the short term, digitalisation of the economy can increase inequality because access to ICT or the internet is not evenly distributed. Therefore, this chapter emphasizes that extra efforts from the government are urgently needed so that the poor can get full access to ICT, including micro and small businesses, of which only a small number of them are implementing e-commerce and the majority of them are located on the island of Java including Jakarta which is the most developed region in Indonesia".

Chapter 6 titled "**E-Sports Industry in Time of Green Digital Ecosystem: Security Decision Support Empowerments"** (by Heru Susanto, Alifya Kayla Susanto and Muhammad Rifa'ie) affirms that "the phenomenon known as "eSports" has been growing in numbers in terms of revenue, market share and popularity. This research aims to study this phenomenon in a larger scale which include findings from Southeast Asian countries such as Thailand and Singapore. The structure of the study will compromise of describing the eSports industry which is crucial to understand the whole ecosystem of eSports, such as the economics behind the industry and the different roles that comes under the industry. In order to do that, the application of a Decision Support Systems tool is used to further study the future of eSports".

Chapter 7 titled "**Digital Marketplace as a New Frontier of Electronic Commerce"** (by Muhammad Anshari, Mohammad Almunawar and Abdullah Al-Mudimigh) addresses the digital marketplaces and consider them as a "major competitor now for the conventional marketplaces especially in Southeast Asian countries (ASEAN) where digital marketplaces is booming and developing at an aggressive rate. The study also focuses on the challenges of eBay as a leading digital marketplace in battling their privacy and security threat, handling customer complaints about their services, or how government intervention provides an impact to their business, and competing with similar service provides. The other challenges are also associated with geographical distribution for marketing strategic location and why eBay should maintain their business like any other conventional business practices. Finally, how concerned are they towards customer service as fundamental for any business.

Chapter 8 titled "**The Digital Payment Service Automation Attributes Model: Empirical Evidence of Railway Public Transport"** (by Hilarius Bambang Winarko and I Putu Giri) studies "the effect of automation attributes in railway digital ticket payment toward the commuters' satisfaction and retention in railway transportation. Digital payment security is one of the essential qualities which was very few discussed in determining public transportation service performance. This study used the partial least square structural equation modeling method study to measure the six effects indicated by the proposed research framework to fill the last research gap. The results showed two automation attributes: reliability and security significantly influenced commuter satisfaction, supporting the behavioral theory as commuter satisfaction also substantially affected the commuters' retention attitude. This study revealed that the reliability factor was the most significant. The findings communicate important insight for local government in improving its railway transportation's quality of service. The study's scope was train commuters who live in Jakarta metropolitan area and use the railway as their public or mass transportation".

Chapter 9 titled "**Evaluation of E-Supply Chain User Experience in the Delivery Service Distribution Area with the Honeycombs UX Approach"** (by Dian Palupi Restuputri, Ilyas Masudin, Dhimas Wicaksono and Mahar Faiqurahman) explores "customer satisfaction in using e-supply chain products using the honeycomb user experience approach. The e-supply chain product tested is a website that provides distribution services for government-owned (public logistic) and private (private logistic) in Indonesia. The purpose of this research is to analyze the value of e-supply chain products and evaluate whether this value has been received by service users through the concept of user experience honeycombs. There are seven aspects assessed, namely useful, usable, desirable, findable, credible, accessible, and valuable. This study shows that the value for the public sector as a whole gets better scores than the private sector. The aspects that need to be improved in the public sector are credible and usable. In contrast, in the private sector, the aspects that need improvement are accessible, desirable, findable, useful, and valuable".

Chapter 10 titled "**Effects of Employee's Performance on the Implementation of Total Quality Management in Perspective of Working Mother's"** (by Nur Aqilah Hj Abd Rahman and Heru Susanto) affirms that "Mother is a person who have many tasks and responsibilities daily. In addition to as a working mother, task and responsibilities are double and triple for instance, task and chores at home and task at the organization. Total Quality Management is practices and procedures that organization use in order to enhance or improve the performance of the employee or the organization. Performance of working mothers is said to be not satisfactory, and their performance may have drop after having babies. Some organization and their colleague didn't seem to be helpful to working mothers after rejoining the workforce right after maternity leave ended. Some organization from other countries provide work-family support policies in order to help these working mothers to balance their lifestyle as mother and as an employee. Some researchers claimed that working mothers tend to have a very happy children whilst under perform in the organization. This paper seeks to investigate the perception of working mothers on their performance after the implementation of total quality management".

Chapter 11 titled "**Factors Affecting Customers' Intentions Toward AI-Made Music: A Study with University Students in Japan"** (by Bình Nghiêm-Phú) aims "to develop and verify a theoretical model to understand the ways that potential customers perceive and act toward AI-made products. The author began the chapter with a review of the existing literature to extract the most fundamental elements, both internal and external to the customers, which can affect their perceptions and behaviours. From there, the author proposed and tested a theoretical model that can explain customer attitudes toward a new type of music: AI-made music. Using data gathered from a young customer sample (n = 219) in Japan, the author found that perceived product/service attributes and customers' personal characteristics had significant impacts on customer purchase intentions, while perceived seller attributes and environment characteristics had not. These findings helped expand the literature on customer attitudes by introducing and investigating an aggregated model on the one hand. They also provided practical support for the commercialization of the AI-made products industry in the future on the other".

Chapter 12 titled "**Study of Impact of Emerging Technologies across Value Chain Function of Educational Technology (Edtech) Firms: Educational Technology (EdTech)"** (by Som Bhattacharyya, Ankita Walke and Yash Shah) remarks that "in the recent narrative technology had been a prominent feature in educational value creation. Rapid penetration of internet, and better digital infrastructure had resulted in adoption of emerging technologies in education sector. As business of EdTech platforms soared up, the purpose of this research was to understand the impact of emerging technologies like Big data analytics, Cloud-based technologies, block chain, machine learning, artificial intelligence, augmented reality, and virtual reality on various stages of EdTech value chain. This involved content creation, content distribution and learning plus management system. A secondary data base case study analysis was carried out of EdTech firms in India. The value factors such as cost, accessibility, ease of use, and updated content came out as main attributes impacting acceptance of EdTech platforms. The mentioned emerging technologies had impacted the content creation, delivery, evaluation, and feedback stages which resulted in improved performance across these value factors with lesser associated total costs".

Chapter 13 titled "**Technology Distruption in Time of The Digital Ecosystem Societies Adoption: Cyber Bullying Phenomenon --the Truth or Hoax?"** (by Desi Setiana, Siti Norsarah, Norainna Besar, Tiro Anna, Marlina Nasution, Heru Susanto) states that "the Internet and technologies are revolving around the world today. Most of the people around this world have accessed to the Internet easily nowadays, it can lead to most common and dangerous problem which is cyber bullying. The cyber bullying is considered as a crime which usually occurs among the young people. Cases from cyberbullying have shown that there is a growing significantly which is becoming a worrying topic for the societies to be aware of. This study revealed cyberbullying teen's actors that involved within area of Jakarta. The result is very interesting. Parents play vital role to the teens as they will become a support for them (actor and victim) and also peer group give the high impact of the actors to conduct cyberbullying to other group. Many cyberbullying happens for the same reasons as any other form of bullying. Generally the cyber bullies act in such manner due to them being insecure, to gain popularity, social pressure and Jealousy as well as personal grudge can also lead to cyberbullying".

Chapter 14 titled "**Challenges of Digital Transformation: Impact on Culture and the Role of HRM"** (by Adilah Hisa, Fadzliwati Mohiddin and Heru Susanto) states that "digital transformation has been gaining attention amongst organizations, especially in keeping up with the demands and changes posed by Covid-19 pandemic. However the pandemic introduced challenges to organizations in the context of digital transformation and caused human resource management (HRM) to deal with such a challenging environment, impacting their practices and the workforce. The chapter intends to uncover the challenges of digital transformation following the Covid-19 crisis which affecting the culture of one's organization. It also aims to provide insights of how HRM can play important role in addressing these challenges. The result is promising. Digital transformation affected to HRM with challenging business processes within the organization. The study will be valuable for organizations to understand the issues surrounding digital transformation in Asia and comprehend the potential means of managing this issue, especially for the HRM as well as contributes to knowledge in the area of digital transformation, information technology and innovation".

Chapter 15 titled "**Crowdfunding for Infrastructure Project Financing: Lessons Learned for Asian Countries"** (by Nika Pranata, Nur Firdaus, Erla Mychelisda and Achsanah Hidayatina) states that "infrastructure plays a pivotal role for national development. However, financing of infrastructure projects becomes a major hurdle as it is often considered unbankable, high risk, and require a long payback period. The use of crowdfunding as an alternative source for infrastructure project financing is flourishing, especially in European and American countries. In contrast, the utilization of crowdfunding for such purpose in Asian countries is very limited. Hence, this study reviews four crowdfunding platforms in Europe and America that have been successful in raising capital for infrastructure projects which are Oneplanetcrowd, Convergence Finance, Citizenergy, and Infrashares. Learning from best practices of those platforms, policies, and regulations, the study proposes four crowdfunding business models to be implemented to Asian countries including (i) Blended Finance, (ii) Cross-border Citizen Funding, (iii) Commercial Infrastructure Financing, and (iv) Within Country Crowdfunding".

Chapter 16 titled "**Influence of Industry 4.0 on Motives and Cultures in the post COVID-19 Era"** (by Xuan Tran) affirms that "as the challenge of big data impacts how we understand cultural differences, a motive-integrated model of culture is becoming an effective strategy to search for convergence by the fourth industrial revolution called "Industry 4.0." This study examines the integration approach of Industry 4.0 in merging motives and cultures to efficiently produce COVID-19 vaccines. Structure Equation Modelling has been conducted on the data in 38 countries during the period of 2006-2021. Findings indicate that Industry 4.0 has merged achievement motive in reactive culture, power motive in multi-linear active culture, and affiliation motive in linear active culture. The three pairs of motive-cultures have enabled people successfully produce COVID-19 vaccines ten times faster than previous approaches for vaccines. To implement Industry 4.0, the reactive countries and multilinear active countries would enhance the achievement and power motives, but the linear active countries would decrease the affiliation motive".

Chapter 17 titled "**Developing an E-Commerce Strategy for Success in Brunei"** (by Nurul Hamizah Md. Saleh and Heru Susanto) affirm that "the people in Brunei are digitally connected everyday. Brunei recorded itself with the highest internet penetration (95%) in Southeast Asia. However, the local e-Commerce industry seems to be still at infancy stage although the idea of e-Commerce is not new here. Bruneians shop at global e-Commerce sites, purchase from local social sellers and commissions online personal shoppers. But why does local e-Commerce brands are struggling although there are also providing similar business? Thus, this paper aims to find out the ways to improve and strive in the Brunei market - What is the problem? What is missing? What can be done? The researcher aims to dissect the root issues and provide recommendations as the "e-Commerce Strategy". The motivation for this research is in the effort to support the government continuous initiatives to curb unemployment issue in this country; e-Commerce industry as the enabler for self-employment, entrepreneurship and job creation while simultaneously contributes in the economic growth".

Finally, the last chapter of the collection, Chapter 18 titled "**Digital Startup Business Model Compliance: Millennia's Acceptance of BookTia Platform"** (by Heru Susanto and Mohamad Nur Wa'ie), shows that "the challenges of millennials' preference and criteria in booking a venue via an online platform. The main target user for this study is the millennials ranging age of 18. The dependent variable for this study is User Acceptance testing on Booktia. The independent variables for this study are content, navigation, multimedia and usefulness. The result is very interesting. The finding concluded that, user acceptance testing shows a positive relation towards the 4 independent variables with coefficient value for multimedia with 0.066, content with 0.055, navigation with 0.055, and usefulness with 0.060. All independent variables show a significant result between 0.000 to 0.005. Thus the result shows the millennials are accepting features and usage of Booktia upon testing it. Implications were drawn in the study, such as the benefits this study will bring to booktia platform".

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Chapter 1
Smart City Development in Korea and Its Implications for Cooperative Governance

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ABSTRACT

This chapter dealt with the characteristics, the governance structure, policy-making process, the main thrusts, and regional governance of Korean smart cities. Korea defined a smart city as a platform to improve the quality of life for citizens, enhance the sustainability of cities, and foster new industries by utilizing innovative technologies of the Fourth Industrial Revolution era. The smart city consists of three components including technologies, services, and applications, and legislation. Ministry of Land, Infrastructure, and Transport has been in a position to play a leading role in developing smart cities and has accordingly been pushing for deregulation while other ministries have been devoted to the programmes under the inter-agency collaboration framework. The Seoul smart city initiatives are reviewed in terms of policy process including policy formulation, policymaking, policy implementation, and policy evaluation. The chapter also suggests ASEAN regional cooperation types in response to the COVID-19 pandemic.

INTRODUCTION

The UN (United Nations, 2018) estimated that the world's population would be on the rise from 5 billion to 9 billion, with the urbanisation rate reaching up to around 70% by 2050. Urban life will become increasingly attractive than has historically been the case. Asia region has been more urbanised than other regions. Korea is confronted with several challenges over rapid urbanisation: while world average urban level is 54%, that of Korea reached 82.5% as of now (Seoul, 2020). City governments increasingly need innovative arrangements to solve a variety of technical, physical, and social problems. Meanwhile, Korea's smart cities have been gradually expanding and evolving to adapt to changes in circumstances. Associated with the innovative arrangement, a smart city is transforming the way to live in urban. Likewise, rapid

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urbanisation continues to cause densely populated cities in city and excessive resources consumption and various social problems such as traffic congestion, water shortage, disaster, and infectious disease, facing up to serious threats to a city sustainability. The continuous increasing of city's population and the complexity of city management drive governments towards the strong use of technologies to support a higher quality of urban spaces and a better offering of public services. Countries around the world are paying attention to their smart cities as new vehicle to solving urban problems, and making efforts to develop smart cities in line with the fourth industrial revolution (the 4th IR).

The chapter is designed for policy-maker, practitioners, industries, scholars, and students to be equipped with relevant knowledge and skills to implement smart cities projects, with particular emphasis on Southeast Asian Nations (hereafter ASEAN) smart cities, with the objectives to identify (i) significant implications by different cases of smart cities in Korea, (ii) core components of a smart city, (iii) challenges posed over smart city initiatives; and (iv) collaborate governance architecture for ASEAN Smart Cities Network (ASEAN, 2018). Though there have been researches and implements of smart cities, these are unlikely to deal with smart cities in terms of (i) holistic policy process comprising policy formulation, policy making, policy implementation, and policy evaluation, and (ii) global governance. Recognising this above research gap, this chapter raises three research questions: (i) what are the characteristics and challenges of Korea's smart cities? (ii) how has smart city policy been mapped out in Korea? and (iii) how will the regional collaboration of ASEAN be constructed in response to infectious diseases such as the Covid19 pandemic? This chapter is mainly based on a qualified research where case study method mainly was conducted in a way to interview with the government officials in charge of the smart city projects and its subject matter experts who have experiences in designing and implementing Korea's smart cities projects. The author participates in monitoring the smart city projects. as a citizen's member of the Seoul smart city.

DEFINITIONS, COMPONENTS, CLASSIFISATION, AND CHALLENGES OF SMART CITY

Smart City Definitions

There have not been developed an internationally-agreed guideline and indicators for a smart city. Likewise, the lack of a shared definition of smart city makes it difficult to understand a smart city in a holistic manner. Different countries and organisations are likely to have different definitions for a smart city: a smart city is defined in various ways to explain the terms reflecting their circumstances, and for the definition of a smart city, countries have a wide spectrum ranging from new city development to urban regeneration.

A common theme to most definitions is the utilization of information and communication technologies (ICT) as an enabler to support city development, enhance urban services, and increase stakeholder access to information. Using this theme as a defining element, a smart city is quickly emerging around the world with city-wide investments in ICT to drive technological innovation, supporting the development of new industries, spurring a stronger economy, to maintain a sustainable environment, and to enhance the quality of life of citizens (Kincho, 2019).

OECD (2018) defined a smart city as an initiative or approach that leverage digitalisation to boost citizen well-being and deliver more efficient, sustainable and inclusive urban services and environments as part of a collaborative multi-stakeholder process. According to OECD (2019), cities collect more data on areas such as transport (64%), policing and law enforcement (57%), land use/zoning (51%), and housing (47%) and less data on areas such as social welfare and inclusion (32%), blight (29%), tourism (29%), and culture (20%). On the other hand, Institute for Management Development (hereafter, IMD) outlined a smart city as an urban setting that applies technologies to enhance the benefits and diminish the shortcomings of urbanisation for citizens.

Association of ASEAN Smart City Network (ASCN) was also described as a platform for cities across ASEAN to work together towards the common goal of smart, and sustainable urbanisation of which primary goal is to improve the lives of ASEAN citizens, using technology as an enabler, with aims to (i) promote cooperation on smart city development among ASEAN cities, (ii) develop commercially viable projects together with private-sector solution providers; and (iii) facilitate the collaboration with ASEAN's external partners, through funding and other avenues of support (ASEAN, 2018).

Korea defined a smart city as a platform to improve the quality of life for citizens, enhance the sustainability of cities, and foster new industries by utilizing innovative technologies of the 4th Industrial Revolution era (Ministry of Land, Infrastructure and Transport, 2020)

Smart City Classifiction

J. Macomber (2016) found that smart cities can be classified into two dimensional categories, with the columns of legacy vs. new cities, and the rows of developed vs. emerging economies, where constitute four types of (i) developed and legacy cities, (ii) emerging economy and legacy cities, (iii) emerging and new city, and (iv) emerging and new cities. Developed and legacy cities: ICT is combined with physical infrastructure put in place. The cases are found in London in the U.K., Detroit in the U.S., Tokyo in Japan, and Singapore

- Emerging economy and legacy cities: Even though physical structures have already been established, cities are going through fast-growing population and severe congestion. In order to develope the smart cities, private finance used to be used to improve infrastructure. There can be founded at Mubai in India, São Paolo in Brazil, and Jakarta in Indonesia.
- Emerging and new city: Satellite cities used to be developed around existing mega-cities due to the fact that mega-cities cannot afford to increase their sizes because of limited capabilities. This case needs to provide high quality of life to residents, while at the same time, reducing costs. The cases are Songdo in Korea, Masdar in UAE, and Hafen in Germany.
- Emerging and new cities: In the case that high economic and high population growth are expected, it is needed to ensure investors' opportunities to generate revenues and to provide infrastructure, that investors might otherwise be reluctant to develop smart cities. This type can be viewed in Suzhou in China, and Astana in Kazakhstan.

Ministry of Land, Infrastructure and Transport (hereafter MOLIT) of Korea sorted out three types of smart cities in accordance with the stages of urban growth. Three types include (i) new cities, (ii) existing cities, and (iii) shrinking cities (MOLIT, 2020). The MOLIT's classification is considered to be simplified to be suitable for implementing the government policy in an efficient manner.

Table 1. Smart city classification (modified from Macomber's classification)

	Developed	Emerging
Legacy	· Existing physical infrastructure · Combining ICT with infrastructure · Cases: London (UK), Detroit (US), Tokyo (Japan), Singapore	· Physical structures already established · Fast-growing population and severe congestion · Private finance to improve infrastructure · Cases: Mumbai (India), São Paolo (Brazil), Jakarta (Indonesia)
New Cities	· Satellite cities around existing mega-cities · Need to reduce costs for companies and to provide high quality of life to residents to compete with neighboring cities · Cases: Songdo (Korea), Masdar (UAE), Hafen (Germany)	· High economic and high population growth · Investors' opportunities to generate revenues and to provide infrastructure · Cases: Suzhou (China), Astana (Kazakhstan)

- New cities have been implemented as large-scale smart city projects to solve urban problems and provide smart city testbeds for an innovative industry ecosystem,
- Aging cities have been developed on selected target areas for the purpose of implementing customised projects, considering existing physical and social infrastructure.
- Shrinking cities are confronted with urban problems. The lack of sufficient funds may cause their vulnerability.

Jaeyong Lee (2019) made analysis on 60 smart cities in Korea, and sorted them as three types: (i) a smart city equipped with advanced infrastructure; (ii) a platform-centred smart city with a smart control centre to integrate data services; and (iii) a smart city for innovation hub to promote industries by commericialising new technologies related to smart city development. Jaeyong Lee found that the platform-centred smart cities account for 31 cities, followed by the smart cities equipped with advanced infrastructure (21 cities), and the smart cities for innovation hub (3 cities) out of 60 smart cities in Korea. The number of platform-centred smart cities are more than half of Korea's smart cities.

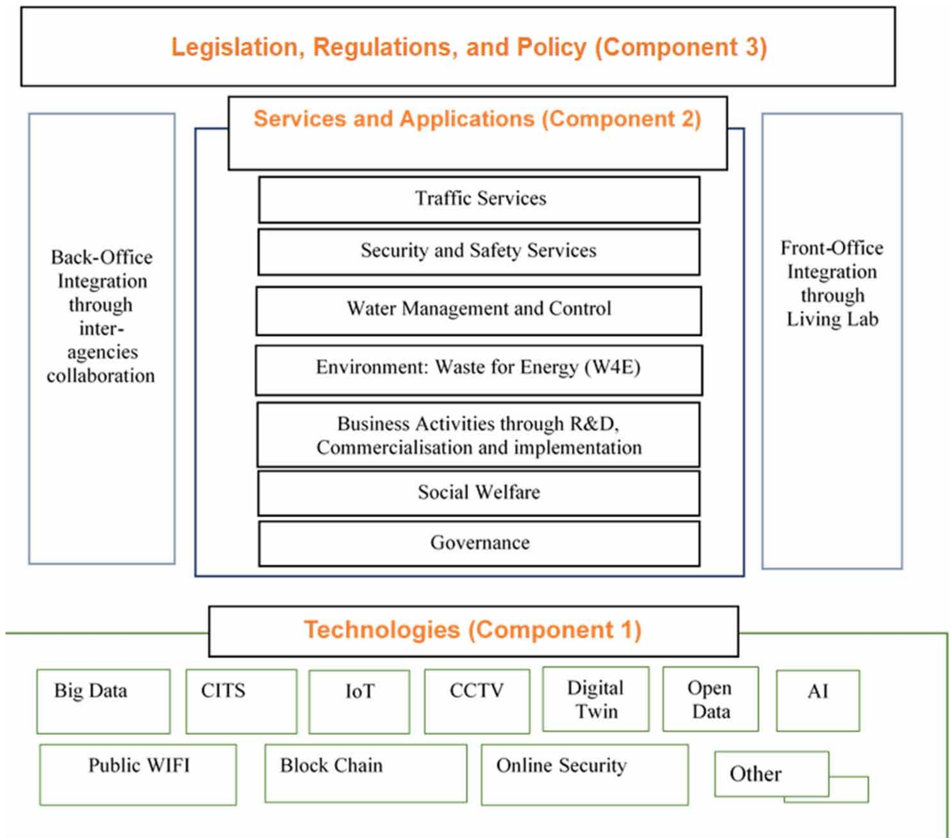
Smart City Components

Smart cities rely on a large number of application areas, technologies, and privacy protection as the governance issue to realize complex interactions between citizens, third parties, and city departments (David, 2018), implying that smart city needs to be explored in an integral context comprising of a set of components. This chapter suggests that the smart city is made up of the following three components in the contextual level (refer to figure 1), including (i) technologies, (ii) services and applications, and (iii) legislation, regulation and policy. These might be able to reconfigure a city life for citizen, because the well-defined components gain a far clearer picture of the smart city.

Tehchnologies (Component 1)

A smart city used to utilise and exploit various technologies including (i) big data, (ii) Cooperative-Intelligent Transport Systems (hereafter CITS), (iii) Internet of Things (hereafter IoT), (iv) advanced CCTV, (v) digital twin and virtual reality, (vi) open data, (vii) public WIFI, (viii) artificial intelligence (hereafter AI), (xi) blockchain, (x) security, and so on (refer to Figure 1). These technologies continued

Figure 1. Smart city components



to be examined, screened and updated under the ever-changing ICT environment. Particularly, IoT and big data technologies have been harnessed to develop and manage smart cities. ICT can speed up structured change to increase the productivity for city management.

Smart city is an application of IoT notion as intensified innovative ways to handle urbanisation with minimal impact on environment, citizen lifestyles, and governance (Bhagya, 2018). As such, IoT is being adopted in different application domains and is recognized as one of the key enablers of the Smart city vision (Alexandr, 2015).

The big data revolution is heralding an era where instrumentation, datafication, and computation are increasingly pervading the very fabric of cities. Big data technologies have become essential to the functioning of cities (Simon, 2020). The technology architecture consists of three tasks: (i) acquire and manage data from heterogeneous sensors; (ii) process data originated from heterogeneous sources (sensors, social data, blogs, news, and so on); and (iii) implement such collection and processing on the cloud (Vladimir 2017).

Despite the befits brought by ICT, many private or public sectors regard the costs of ICT as the biggest challenge facing their ICT operations and are looking to a cloud computing as a way beyond this impasse. In this regard, a digital platform has been continuing trends in position to enable the above-mentioned various technologies to be operable. The digital platform is the environment for hardware, the operating system (OS), and software including a web browser and associated application programming interfaces.

A cloud computing is regarded to be effectively functioned as a platform as a service (PaaS) (National Institute of Standards and Technology, 2011).

In order to reduce Korea's core technology dependence on foreign countries, The Korea has placed a high importance on Research and Development (R&D) activities over 5 years from 2018 to 2022, to build data hubs in two locations in Daegu and Si-Heung, Gyeonggi-do (MOLIT, 2020).

Services and Applications (Component 2)

A multi-level smart city architecture is based on semantic web technologies, smart city infrastructures, and data management with applications including environmental monitoring, healthcare monitoring and transport monitoring (Aditya, 2015). The key idea is to integrate information system services of each domain, such as health, education, transportation, power grid in the city to provide public services to citizens efficiently and ubiquitously (Narmeen et all, 2015). Margarita et al (2018) also identified a total of 32 applications through the Intelligent/Smart Cities Open Source (ICOS) community, a meta-repository for smart cities solutions. Raimundo et al (2017) found eight urban services provided in the city of Santander has been carried out: waste management; water supply; traffic management; street lighting; augmented reality and tourism; incidences management, parks and gardens and citizen participation. Nils (2012) proposes a new business model framework that allows the design and analysis of value networks for mobile services in a public context.

According to MOLIT, an integrated smart city platform project has been advanced from major achievements of the R&D of U-City that have enhanced the efficiency of urban management by linking various information systems such as crime prevention, disaster prevention, and traffic management that have been exploited by local governments. When analysing and compiling current applications, services are comprised of traffic, security, environment, water monitoring system, Research and Business Development (hereafter R&BD) is the expanded terminology that combines R&D with business, which puts emphasis on the commercialisation and industrialisation of R&D outputs or outcomes. With the ever-changing technology advances, the way things that are done is being changed and services are required to be constantly updated. As time changes, services are changed. It is particularly important to identify flagship services to best suit the objectives in a timely manner.

Legislation, Regulations, and Policy (Component 3)

The technological development raises questions as to whether the existing legal mechanisms will be coherent and balanced for the present time and thus the public sector should be creative to address this issue, not only establishing reasonable standards for new technologies and services, but possible solutions for regulation in the context of a smart city (Gustavo et al, 2019). Smart city governance is not a technological issue and is considered as a complex process of institutional change and acknowledge the political nature of appealing visions of socio-technical governance (Albert, 2016). Michael et all (2018) also examine this technical-legal interaction, with particular emphasis on privacy and security in association with IoT in the smart city.

There would be crucial legal or regulation barriers over a smart city initiative. Appliable acts, regulations, and policy should be mapped out to not only lift the barriers hindering smart cities, but also make use of technology enablers and thereby provide the smart city services to be appropriated for citizens.

Challenges Over Smart City

Several challenges are, however, posed by initiating smart cities such as data governance, due to the lack of proper linkage, silo projects and robust methodologies:

- Data Governance: Citizens or stakeholders need to make use of urban data, but are unlikely to exploit a quality of data on a real-time base without difficulties. It may be attributed by the fact that public and private sectors share big data marginally and data industry is still in its infant stage. Public-private partnership (PPP) has not been fully structured in spite of usefulness to produce a qualify of data.
- Lack of Linkage with Innovation Growth: It does not seem that the technologies are fully applied to new opportunities triggered by the 4th Industrial revolution. Creating job opportunities associated with the Seoul smart city are unlikely to be satisfactory. Technology intensive SMEs and start-ups are unlikely to be encouraged to participate into the programmes and projects of smart cities.
- Silo Projects Implemented: Silo projects such as traffic services, security, and environment, have been implemented and these might accordingly cause insufficient connectivity between/among individual services. Common services have not been identified before developing particular projects.
- Lack of Indicators and Methodology of Smart City: The lack of indicators and methodology makes it difficult to make comparison with other cities and thereby evaluate smart city.

KOREA'S SMART CITY INITAITED BY THE CENTRAL GOVERNMENT

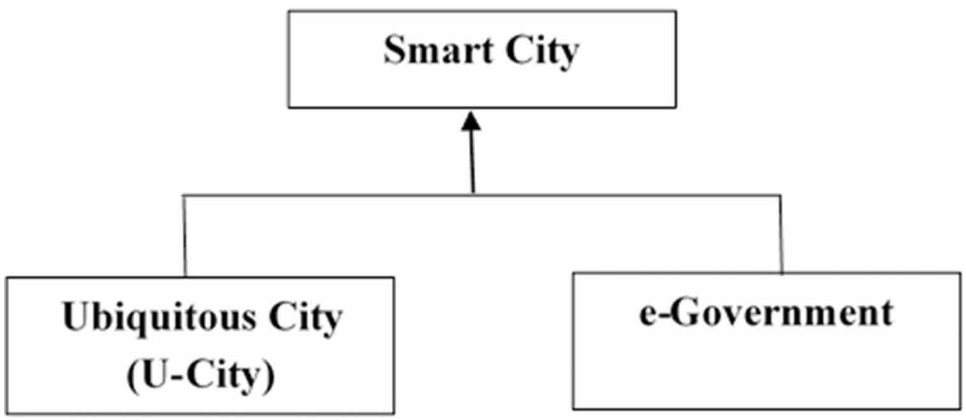
Pre-Initiatives for Smart City

Earlier than the smart city initiative, Korea has been implementing e-Government and ubiquitous city (hereafter U-City), which have laid the foundation for current Korea's smart cities. The flagship applications developed in e-Government and U-City have been applied into the smart city project as well. For example, e-Government programmes have facilitated common services (e.g., online security, e-Payment services, authentication, consolidated data centre, and so on), which have substantially carried out a front-office integration to enhance users' convenience, and a back-office integration to provide integrated services between/among different agencies.

Korea has developed e-Government programmes since 2001. In the beginning, 11 e-Government projects were launched in the areas of Government to Government (G2G), Government to Business (G2B) and Government to Citizen (G2C). The e-Government projects were expanded to 31 projects in 2003 with aims to innovate the way of government works, innovate civil services, innovate resource management, and reform the legal system (Presidential Committee of Government Innovation and Decentralization, 2003). Owing to supports from the high-level politician, Korea's e-Government has been ranked as the 1st country of UN member countries since 2008 according to the UN survey (United Nations, Department of Economic and Social Affairs, 2008-2020). Meanwhile, Korea has been able to learn the lessons and accumulate the experiences enough to implement the government-driven smart city projects during the long journey of e-Government programmes.

On the other hand, the ubiquitous paradigm is likely to become prevailing in the era of post electronic service and U-City was introduced in Korea in 2012. U-City was designed to provide information services anytime, anywhere, and any devices and thereby improve quality of life, enhance security, and generate new business. As such, U-City harnessed integrated-technologies that combine urban services with ICT. The infrastructure consisted of broadband network, sensor technologies and urban integrated operation centre, contributed to establish a technology platform for the smart city in Korea, while the U-City set force on technology infrastructure itself. As such, U-City was the initiative as the pre-step of the smart city in Korea and was implemented with focusing on building the infrastructure in a cost-efficient way. Technology-oriented U-City development was, however, implemented from the perspective of supplier and the lack of citizen's perceived usefulness made it difficult to ensure sustainable innovation through user's feedback. There did not seem to be many inputs and feedback from citizens for the smart city. It is thus required to put an institutional way in place and thereby enhance citizens' engagement into the

Figure 2. U-city and e-government contributing to smart cities in Korea



smart city initiatives so that citizen can play a role in creating innovative idea as a consumer.

Although the smart projects have been implementing with relatively short periods since the smart city act was legislated in 2018, Korea's smart city is regarded to have a long history, given that e-Government and U-City programmes are incorporated into the smart cities' initiatives in Korea.

Justification of Smart City as the National Project

Rapid urbanisation has caused serious urban problems in Korea and most cities are therefore suffering from the lack of resources and energy, aging infrastructure traffic congestion, disaster that are worsened by even resent unusual weather, and expensive housing cost. In the meanwhile, the fierce global competition has influences on slow economic growth and growing uncertainties. Youth unemployment rate has been increased, and thus lowed working-age population together low with birth rate in Korea, resulting in economy downturn. With this backdrop of weakening economic competitiveness, the government decided to restructure existing industry for strengthening an innovation capacity.

To meet challenges ahead, Korea recognised the necessity to create new growth engine for technology innovation by promoting technology-intensive start-ups. In this context, Korea decided to choose a smart city imitative as new innovation pillar, taking into consideration that a smart city could open new era where the 4th industrial innovation has been put in place, and ICT could play a significant role in innovating product and services and create new business model enhancing company value. Along with smart city implementation, small and medium enterprises (SMEs) and start-ups are believed to get more chances to move forward their growth journey.

Smart City in the Level of Ministries

Inter-Agencies Approach

The smart city special committee was formulated and operated under the 4th industrial revolution committee under the presidency on November 2017, and related inter-ministries released its smart city development strategy on January 2018. The smart city initiatives was accordingly identified as one of the thrusts as the national innovation system (NIS) in Korea. The smart city programmes have been designed beyond silo ministry and implemented by the consorted efforts of inter-agencies collaboration.

Ministries involved have played the following roles in developing smart cites under their missions and responsibilities:

- MOLIT, as the champion ministry for the smart city initiatives in Korea, amended the smart city act on February 2018 for reconfiguring existed legislations, and put the integrated platform for city operation/management in place. Particularly, CCTV has been exploited for the integrated management of traffic, security, and disaster that has effectively and efficiently been supporting emergency agencies such as police office and the first aid agency.
- Ministry of Science and ICT (hereafter MSIT) taking the responsibilities of the 4th industrial revolution and promotion of science, technology and ICT, legislated the Fundamental Intelligence Information Act on February 2018 and enhanced national-wide R&D on integrated solutions comprising big data, AI, and IoT, which are dominant technologies in the smart cities.
- Ministry of the Interior and Safety (hereafter MOIS) in charge of Korea's e-Government, enhanced public data and has been providing e-Government services to the public. Resulantly, citizens are ready for embracing the services of the smart city, recongnising the usefulness of the government-initiated e-Government services.
- Ministry of Trade, Industry and Energy (hereafter MOTIE) has been developing energy related technologies such as smart meter (AMI), energy management system (EMS), energy storage system (ESS), which has been vital elements for the smart cities.
- Ministry of Environment (hereafter ME) has been contributing to the smart cities by managing water resource operation and spreading eco-friendly electronic motor vehicles (EMV).

Owing to the above ministries' roles for the smart cities, local governments can get more benefits with less their resources in developing their own smart cities from the programmes of the central government. So far as central governments is concerned, MOLIT and MSIT are prominent to support local governments. For example, MOLIT (i) built the national smart city testbeds in Sejong City and Busan City, (ii) set up two data hubs for R&D, and (iii) four special theme areas, and five smart urban regeneration projects. On the other hand, MSIT provided technologies needed for the smart city as social overhead capital (Oxford University Press, 2021) programmes and promoted the smart leading public service promotion programmes in the areas of intelligence informatisation of traffic, security, industry, environment, and public facilities. These included to establish an open smart city unit in Busan city, formulate a health care platform in Daegu city, and build an integrated IoT testbeds in Goyang city. It is therefore worth noting that MSIT has been providing the relevant technologies, emphasizing R&D output and outcomes to be appropriated to local governments.

Molit Iniatives

MOLIT has been in position to play a leading role in developing smart cities and has accordingly been pushing for deregulation associated with smart cities: the smart city act has been amended twice between 2018 and 2019 to perform smart city projects and roll out its services in existing cities. Furthermore, the ministry introduced 'Smart City Regulatory Sandbox' (MOLIT, 2020) to eliminate regulations constraining the implementation of smart city projects. Likewise, MOLIT has provided active policy support, such as expanding fiscal investment and deregulation, for the successful development and the roll-out of smart cities. As a result, many local governments are promoting the development of smart cities. 78 local governments across the country have formulated dedicated organisations for the smart cities, and a total of 67 local governments are participating in the MOLIT's support programmes as of 2019 (MOLIT, 2021). Local governments are stepping up efforts to develop a smart city that fits its local characteristics.

MOLIT set the following strategies to promote smart city development (MOLIT 2021).

- Screening Pilot Projects: Sejong, Busan, and Sungnam city were selected as national pilot cities with the aims to be a leading model of future smart cities through embracing emerging technologies in the era of the 4th Industrial Revolution.
- Developing Smart City through enhancing R&BD: R&BD activities have been performed to enhance the smart city innovation and growth engine, with particular emphasis on emerging technologies such as AI and big data.
- Operating Smart City Living Lab: The Living Lab methodology adopted within the Smart City initiative facilitated a number of outcomes, including improved collaboration and innovation (Valerie et al, 2020). The Living lab methodology has been adopted in a way that citizens come together to find urban problems and offer a creative idea, given that citizens are not only consumers, but also suppliers.
- Enhancing Cooperative Governance: Silo ministry has difficulty in initiating the smart city projects due to different responsibilities. So, inter-agencies cooperative governance has therefore been required to be established in a way that high level officials coordinated cross-ministries or inter-agencies projects effectively.

The ministry has been developing, implementing, and supporting Korea's smart city project through the close collaboration with the following local governments:

- Busan Metropolitan City: MOLIT has designated the Busan city as the national strategic R&D hub named as the Echo Delta City (EDC), focused on (i) international logistics, (ii) citizen's living, and (iii) natural disaster management such as earthquake and flood between 2018 and 2022. The ministry also established an autonomous driving road to be functioned as the infrastructure for the testbeds of autonomous car parts and road management.

- Sejong Metropolitan Autonomous City: In 2016, MOLIT built K-smart city model to be equipped with city total solutions including (i) a smart public bicycle, (ii) a smart parking information, (iii) 3D visualisation of underground utilities and facilities, and (iv) smart street lamp. The Sejong city has accordingly been designated as the pilot city for national strategic R&D on (i) energy efficient city named as zero energy city, (ii) specialised autonomous driving city, and (iii) AI system for disaster prevention and countermeasure of natural disasters.
- Sungnam City: The Sungnam city has been specialised in commercial, cultural, and tourism site and MOLIT designated the city as the K-Smart City Model in 2016. There were adopted various technologies such as augmented reality (AR), public WIFI, smart parking, and street lamp. The Sungnam city has also been functioned as the autonomous driving city equipped with a control centre, big data analysis platform, and autonomous driving shuttle between 2017 and 2019.

SMART CITY OF THE SEOUL METROPOLITAN CITY

Current Status

Seoul has been the capital city of Korea located in the middle east of Korea's peninsula since 1392. Seoul city with 605.02km^2 size and 9,736,962 populations as of 2020 (Seoul Solution, 2020) can be viewed as a world class mega city. The Seoul city has actually been the Korea's capital city, having influence on politics, economy, and culture for more than 600 hundred years. A smart city can reflect change to digital transformation and the Seoul city has thereby been implementing various city programmes and exploiting and harnessing ICT enablers. The Seoul metropolitan city has been known for one of the well-structured smart cities in the world.

Korea can be viewed as one of ICT friendly countries, highlighting R&D and has been supported by not only big companies such as Samsung and LG, but also technology intensive SMEs. Owing to competitive technologies developed by private sectors, Korea is able to urban development effectively and efficiently and has thereby accumulated knowledge and experiences on the smart city and urban development (e.g., new town) through trials and errors. Particular smart city project has been screened and pinpointed in terms of the enormous economic value it could bring to the Seoul city.

From the perspective of technologies (refer to the technology component 1 in Figure 1), The Seoul city created living labs in 15 regions and provided 65 services by adopting IoT. Seoul city is now operating the Seoul IoT centre to identify and examine enterprise applications, and thereby support to commercialise for tapping into the market. Recognizing the importance of big data management, the Seoul city built a big data infrastructure and thereby provided the public data for citizens as well as improved policy- making using data analysis for decision-supporting information. There were 10,000 places which were equipped with WIFI for the mobile infrastructure, laying the foundation for the cloud centre. Furthermore, Seoul city has applied for emerging technologies such as a block chain and AI. The endeavors make it possible for the Seoul city to have capacity and capability enough to implement and operate the smart city in the level of local government in an efficient and effective manner.

In view of services, seven (7) applications were identified (shown in component 2 of Figure 1). It included traffic services, security and safety services, water management, environment: waste for energy (W4E), economy and business, social welfare, and governance. The Seoul smart city has rolled out services and applications, with particular emphasis on (i) intelligence traffic system and traffic forecasting

Table 2. Seoul smart city timeline

Date	Event	Outputs
15th March 2018	Establishing Seoul smart city Strategic Plan	· Policy direction, · Strategies · Procedure, and · Scope
March and April 2018	Survey on the current status and case study on Korea and overseas countries	· Survey on current tasks of smart city · Case study and benchmarking on other cities in Korea as well as foreign countries · Analysis on technology trends and services provided by the national three (3) major mobile operators in Korea
April and May 2018	Working on the smart city draft in consultation with relevant agencies and experts	· Meeting with related agencies on 6th April, including (i) the Seoul Institute, (ii) Seoul Digital Foundation, and (iii) SH Corporation (https://www.i-sh.co.kr) · Advisory meeting with Information Strategic Committee on 30th April · Forming advisory committees in accordance with specialised fields
	Internal Cooperation Enhancement	· Appointing cooperation officers in four (5) areas
May and June 2018	Identifying strategic projects of smart city in accordance with specialised areas	· Meeting with policy advisory groups, cooperation officers and relevant persons · In-depth discussion with experts on controversial issues · Identifying strategic Seoul smart card projects
July and August 2018	The smart city plan was reviewed by external experts	· Advisory meeting with the information strategic committee on 16th July · Information sharing with the Seoul Institute and Seoul Digital Foundation · In-depth discussions on flagship projects

(ii) disaster countermeasures and the big data management of urban facilities, (iii) water and drainage services, water purity control, and water management, (iv) intelligence electricity meter, and solar energy for environment, (v) Apps and fintech centres called as G-Valley, Samam DMC, and Magok U-City, (vi) women protection services using an advanced CCTV, assistance for the socially vulnerable suffering from Alzheimer and developmental disability, and (vii) citizen's engagement into online forum and e-voting.

For legislation, regulations, and policy (refer to component 3 in Figure 1), smart act was legislated in the level of central government and the Seoul city does not necessarily have its own smart city acts, but has authority to make ordinance and rules for smart city that can be specified in details. The ordinance and rules of the Seoul city are more related to a promotion policy rather than regulations the Seoul smart city.

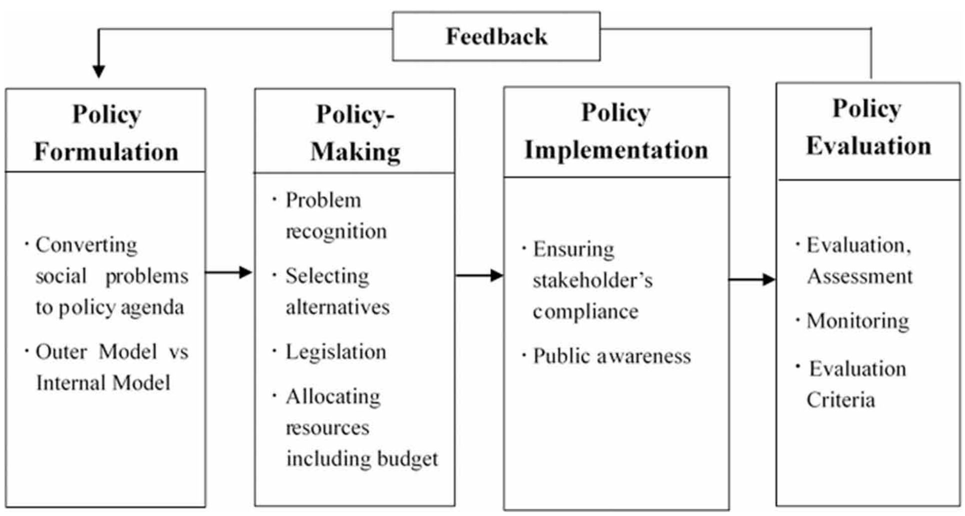
Policy Procedure

Table 2 is the timeline of the Seoul smart city, showing what and how Seoul city has formulated the smart city policy by date. It took 5 months to come up with the Seoul smart city policy that reflected (i) necessary requirements by external stakeholders and internal officers and (ii) smart city expertise from research agencies and specialized corporation including the opinions and feedback from the Seoul Institute, the Seoul Digital Foundation, and SH Corporation: strategic projects as the flagship projects were selected in particular areas on June 2018 and complemented through reviews of external experts.

It is thus worth noting that the Seoul smart city policy has been improved and upgraded by the cooperative governance with the consorted efforts between the Seoul city office and related expertise groups.

Policy stages are theoretically divided as four stages including (i) policy formulation to convert social problems to policy agenda, (ii) policy-making for actual decisions including budget allocation, (iii) policy implementation to ensure stakeholder's compliance, and (iv) policy evaluation for better policy through a feedback process (refer to Figure 3). The Seoul citizens have been engaged into all the policy stages pursuant to a cooperative governance guidance. Seoul city recognized that properly-designed guideline

Figure 3. Government policy cycle



constituted prerequisites for policy maker and practicians to map out the smart city policy. The check points of every stage served as the criteria to select eligible smart city projects through substantial analysis.

Policy Formulation

The policy issues and actual conditions are reviewed for the smart city initiatives. The Seoul city used to make various information and data including (i) the statistics, data, and survey reports, (ii) case studies of other cities' similar policies, and (iii) the trends of foreign countries.

It is of necessity for smart city to reflect opinions of civil society and related experts. The Seoul city conducted policy debates for an idea creation from citizens, and survey on citizens in the policy formulating stage in consultation with experts and advisory groups. Meanwhile, a validity analysis was made to formulate policy prudently.

The policy formulation of smart city consists of two types: one is that the citizens propose the smart city projects covered with more than two districts and electronic voting is used for the project selection, and the other is the projects that are internally initiated by the public servants. Both types are, however, reviewed through citizen's engagement and the involvement of interested groups, civil society and related experts.

Policy-Making

The policy-making stage of smart city are to (i) examine all legislation and regulations related to smart cities so as to abide by all related laws and regulations, administrative rules, and directions for the smart city initiatives, (ii) allocate resources and decide the budget, (iii) perform the policy analysis needed for optimal decision-making.

The policy analysis necessitated by decision-making was performed to assess not only direct effects, but also indirect effects. In this regard, indirect effects are similar to ripple effects including (i) bring the benefits for the socially margialised groups, and (ii) increase job creation comprising direct or indirect recruit by startups and training institute. In addition to these, the Seoul city simultaneously took into consideration on risk factors of security and safety, countermeasures, and risk management.

Policy Implementation

Policy implementation is mainly related with compliance with various stakeholders. Citizens, however, is unlikely to resist the government-driven smart city projects. It is attributed to the fact that the smart city policy would be associated with a promotion rather than regulations.

In the context of a cooperative governance, the Seoul city have established close collaboration with central government agencies to get supports from them. It is of importance to exploit resources including human resources and finance from other central government agencies. Added to the collaboration with the government agencies, private sectors have been engaged in the Seoul smart city, given that private sectors might be able to provide up-front funds and expertise through certain type of public-private partnership (PPP).

The Seoul city has continuously been creating and enhancing the awareness of smart city to get attraction from citizens by a press release, permanent exhibition establishment, and onsite training.

Policy Evaluation and Monitoring

OECD (2020) evaluated Korea's smart city: Korea has championed smart cities by leading large-scale projects in this sector. The Korea's smart city initiative includes four main pillars: (i) conducting research and development, (ii) nurturing smart solution providers, (iii) deregulation, and (iv) initiating the national pilot programmes.

In this chapter, the policy evaluation is conducted by a performance appraisal methodology that is summarised in the table 3. The Seoul smart city policy is evaluated in accordance with the services and applications rendered (refer to the component 2 shown in figure 1). These included (i) the traffic services, (ii) security and safety services, (iii) water management and control, (iv) environmental protection such as waste to energy, (v) Economy and business promotion through R&BD, (vi) welfare, and (vii) governance. It is worth noting that the Seoul city come up with the Key Performance Indicators (KPI) to make an appropriate monitoring and evaluation system that comes up with the future smart city planning using the feedback. There have been two citizen participatory meeting: the first meeting was held between 25th and 27th May and the second meeting was organised between 21st and 23rd Jun in 2021.

Monitoring has been conducting in a cooperative way to encourage citizen's participation. The citizen's smart committee has been not only reviewing the implementing smart city projects, but also proposing new smart city projects from the perspective of citizen.

Table 3. Evaluation results of the Seoul smart city

Service	Programmes and Projects	Performances
Traffic	· Realtime traffic information and custom-tailored services rendered using bid data · CTS and autonomous driving · Big data analysis of traffic accidents · Big data analysis of public bicycles · IoT parking information detector installed	· Increasing citizen's satisfaction of public transportation · Increasing custom-tailored public services · Seoul as CITS city selected by the central government · Decreased traffic fatalities by 35% · Free public bicycles rented · Real-time parking information provided
Security and Safety	· Smart emergency relief to secure a golden time at disaster site. · Earthquake shelter enlargement · Reduced road cave · CCTV advancement and CCTV services for women · Heavy rain forecasting system development	· 90.3% of fire station's arrival rate to the scene of a fire in 5 minutes · 2,284 for earthquake shelter · Reducing rode cave rate by 67% · Seoul security App developed (2018) · Low quality of CCTV replaced by high quality facilities
Water Management	· Water and Sewage management, water quality management, and automatic water monitoring system · 3D system for water and sewage network and underground facilities	· Enhancement of public quality confidence in tap water, named as ARISSU · 224 water level observation networks (2018) · Maintaining aging pipes of water and sewage
Environment	· Advancement of Atmosphere environment information · Intelligence electricity meter supply · one million solar panel supply · electronic car supply	· Reduced ultra-fine particles · Increasing electric vehicle (EV) · Spreading intelligence electricity meter · Increasing EV charge stations
Business and Economy	· Digital Innovation Park and App business centre at GaePo district · Establishing G valley to enhance the competitiveness of IoT companies · Establishment of Mapo fintech, Sangam DMC, Magok U-city	· Establishing the Seoul Digital Foundation (2016) and the Seoul IoT centre (2017) · Supporting Startups operating in IoT Centre, G valley, and Mapo fintech
Welfare	· Safety services to be rendered for the socially marginalised	· Alzheimer patient services rendered · Secure zone established in most districts
Governance	· Enhancing citizen participatory democracy · Provide data services with citizens	· Average of 1000 citizen's proposals to the Seoul city per day · Cumulative 5 million cases exploiting data · Governance projects proposed by citizens

COLLABORATIVE GOVERNANCE OF SMART CITY WITH ASEAN TO CURB INFECTIOUS DISEASES

Asean Smart City Network (Hereafter ASCN)

Most of cities in ASEAN Member Countries (hereafter AMCs) have a long history with various unique culture and continue to evolve over time through exchanges with other regions. The cities are currently taking on challenges posed by a smart city development in accordance with paradigm shift from off-line economy to online digital economy. A digital transformation is considered to be underway. In the light of the opportunities and challenges posed by rapid urbanisation and digitalization in AMCs, the primary goal of the ASCN is to (i) improve the lives of ASEAN citizens, using technology as an enabler, (ii) adopt an inclusive approach to smart city development, and designate 53 pilot smart cities in the region

(ASEAN, 2018). ASCN contributes to enhancing mutual understanding across cultures with the aim to facilitate cooperation on smart cities development, catalyse bankable projects with the private sector, and secure funding and get the support from ASEAN's external partners (ASEAN, 2018). When breaking down 52 pilot smart cities developed in 26 cities, the reality is that traffic system accounts for 16 projects (30% of all pilot projects), followed by data centre (8 projects, 15%), 7 waste disposal systems (7 projects, 13%), and health and hygiene (1 project, 2%) in 10 AMCs.

Struggling with Infectious Disease

While AMCs suffered from Severe Acute Respiratory Syndrom (SARS) between 2002 and 2003 and are fighting against the Covid 19, one of the virulent and disruptive viruses to have swept the world, AMCs learned the lessons that ASEAN member countries actually have considerable resonance with other countries and global cooperative measures are required beyond individual country. It is because an infectious disease is not a threat that affect individual country alone, but have broad influences on all countries across the world as well as the region. It is worth noting that smart cities should be designed to be equipped with the functions and components to take a measure against infectious diseases. Empirical study in China cities showed that smart city projects have significantly reduced the number of COVID-19 confirmed cases (ShanShan et al, 2021). The smart city solutions are helpful to engage society and decision-makers in order to accelerate the response to emergencies such as the Corvid-19 (Larissa, 2021). Big data and the internet of things in smart cities play an increasingly important role in the health of urban residents by reducing the use of outpatient services and increasing the utilization of inpatient services (Wenqing, et al, 2020). Smart healthcare is one of the advanced smart city's technologies, which is used to take care and treat infected people without any contact (Rahul, 2020). In this regard, Singapore was one of the first to develop a mobile tracing app called TraceTogether during the coronavirus outbreak (Terence Lee et al 2020). Big data, IoT, and AI are utilised at the dominant technologies to curb the infectious disease.

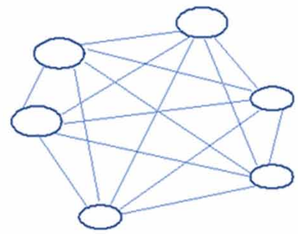
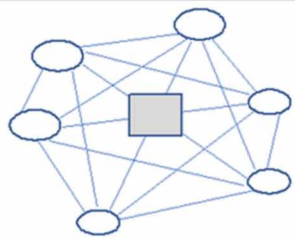
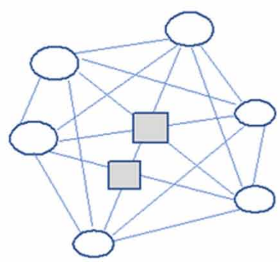
As such, a smart city has been proved to curb an infectious disease, whenever exploiting relevant smart city technologies such as AI and big data to (i) allocate medical and health resources, (ii) trace infected persons, and (iii) screen potentially-infected person. COVID-19 resilient smart bases include agreement on public-facing data, and matching case data with sewer sheds (McKnight, 2020). There is another case requiring an international collaboration needed by ASEAN member countries: Jungle fire caused and might cause a smoke haze which cannot be controlled by individual country, but has to be dealt with in the level of ASEAN regional collaboration. In this context, a cooperative governance should be put in practice, given there is no doubt that an international collaboration or cooperation can provide the solution to tackle these disasters.

Cooperative Governance

Smart city initiatives are compared between ASEAN and Korea in the contextual level (shown in Table 4) and the technology transfer is believed to bridge gap and achieve more benefits with less efforts. ASEAN will also be able to review and make use of the progress that Korea made.

There are identified three cooperative governance types in accordance the levels of infectious disease. It included (i) distributed cooperate governance, (ii) single core-based cooperative governance, and (iii) multi core-based cooperative governance. Leading entities are depicted as rectangular symbol and par-

Figure 4. Cooperative governance types

Types	Networks	Serious Level
Distributed Cooperative Governance		Low
Single Core-based Cooperative Governance		Middle
Multi Core-based Cooperative Governance		High

ticipants are simbolised as circle. The figure 4 gains a far clearer picture of the international collaboration types, ranging from a distributed cooperation to leading countries initiative with a foothold in ASEAN.

Firstly. distributed cooperative governance can be found in cases of current diplomatic relationship with ASEAN member countries. There does not seem to be a leading country for the smart city. In this regard, ASEAN provide a collaborative direction for its member countries as the regional organisation.

Secondly, ‘single core-based cooperative governance’ that a particular country or agency with the knowledge and experiences, can play a pivotal role in the network for the cooperative governance.

Thirdly, ‘multi core-based cooperative governance’ is meant for leading countries or agencies with relevant knowledge and experiences to play the significant role in making preventive measure of infectious disease. This type is asserted to be an effective model in the case of serious level (Patrick, 2019).

Cooperative governance types are thought to be mainly dependent of serious levels. In the case of Covid 19, ‘multi core-based cooperative governance’ type would be more effective, because one country or agency have difficulties in making preventive measures and curb infectious disease and multi-agencies would therefore be preferred to being involved in tackling the pandemic, taking into consideration that AMCs with different levels of science, technology, innovation (STI), health care system, and governance. It can be reasonable to take full advantage of a trusted third-party model to advance forward the common goals for ASEAN, given that it contributes to expanding the collaboration in the region and more beyond silo systems. Associated with this, Korea is currently conducting ASEAN-Korea project named as ‘a cloud based infectious disease response system as the part of the comprehensive strategic alliance with ASEAN.

Table 4. Smart city comparison with ASEAN and Korea

ASEAN	Korea
· Economic Growth · Infrastructure establishment through large scale of capital investment · New cities development	· Enhancing intelligence of city infrastructure using ICT to solve a problem in city · Technology innovation · Encouraging private sectors to develop smart cities · Pilot project using living lab

CONCLUSION

Conclusions are drawn as follows by finding appropriate answers to three research questions that are raised as (i) characteristics of Korea’s smart city, (ii) how to implement the smart city projects, and (iii) ASEAN regional collaboration.

Firstly, the characteristics of the Korea’s smart cities are summarised as (i) initiatives by the government driven policy, (ii) exploiting existing infrastructure established by U-City and e-Government programmes, (iii) promoting new industries through conducting R&BD, and (iv) encouraging citizens’ participation by the living labs and citizens’ monitoring committee.

Secondly, there have been two (2) different approaches in mapping out Korea’s smart city policy: (i) top-down approach by the central government, and (ii) municipal approach by Seoul metropolitan city. For the effective top-down approach, the fourth industrial revolution committee under the presidential committee played a coordinated role in ensuring inter-agencies’ collaboration. In association with this, MOLIT as the champion of Korea’s smart cities initiatives, has been taking the leading role in not only initiating smart city programmes, but also deregulating the existing regulations, while other ministries (e.g., MSIT, MOIS, MOTIE, and ME) have been devoted to the programmes and projects in accordance with their missions clarified by the National Government Organsiation Act. On the other hand, Seoul metropolitan city initiated the Seoul smart city in the municipal level and its smart city policy has been put in practice through required policy process including policy formulation, policy-making, policy implementation, and policy evaluation which encourage citizens to engage in the smart city policy. The Seoul city identified the flagship progammes as the thrusts of the smart city as services for (i) traffic, (ii) security and safety, (iii) water management and control, (iv) environment, (v) industry promotion and R&BD, (vi) social welfare, and (vii) governance.

Thirdly, technologies used in smart cities, has been proved to simultaneously be applied to curb infectious diseases including the Covid 19. Recognising the necessity of global or regional collaboration under the Covid 19 pandemic, the cooperative governance is required to be established beyond a silo individual country. In this context, ‘multi core-based cooperative governance’ type is recommended to enhance the cooperation and bridge smart city gap between ASEAN and Korea.

A follow-up task would be on data governance. Smart cities enable to collect data from various services (OECD, 2019) and data is often cited as one of the most valuable assets in such a way that data is able to provide opportunities for citizens, business, and government associated with smart cities. In spite of this, data industry does not seem to be a fully-fledged business. It is therefore difficult to convert the open public data into decision-supporting information. Another challenge is that public-private partnerships (PPP) to mobilise private sector resources, would be marginal because of immature environment conductive to data science industry. In addition, an integrated information enables to increase a quality of data, but can be constrained by the privacy protection, which might remain as an ongoing and upcoming issue for the smart city initiatives.

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Chapter 2
Role of Big Data in Education:
Challenges and Opportunities for the Digital Revolution in Malaysia

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ABSTRACT

Big data has the variety of characteristics, such as real-time performance, timeliness short, and data mining analysis of large value generated. Application of big data in education can be reviewed in various aspects such as 1) providing students with appropriate teaching, 2) providing teaching support to teachers, and 3) providing information management for the administrations. This chapter can serve as a guide for the management of higher education institutions to recognize possible challenges in big data analytics and better prepare for them in future decision making.

INTRODUCTION

The Internet utilization is growing rapid. Apparently, there were 4.66 billion active internet users from the worldwide, which is accounted 59.5 percent of the global population, as updated since January 2021 (Johnson, 2021). Internet is a core pillar of the modern information society via the connection of billions of people worldwide. Of these internet users, 92.6 percent people accessed internet via mobile devices. Malaysia has a population of 32.57 million in January 2021. Of this total, there were 27.43 million internet users in Malaysia. The number of internet users in Malaysia has increased dramatically by 738,000 between 2020 and 2021. Internet penetration rate in Malaysia was 84.2% in January 2021 (Kemp, 2021). All these people produce tons and tons of data, passing over the information to other internet users, up to the average 2.5 quintillion data daily. Schools, colleges, HEIs and universities students have contributed

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the bigger half of these data via their daily active activities, such as searching for, processing and working with the information online. They left these digital breadcrumbs and become part of the big data. Big data consisted of a great variety of information, more voluminous than conventional data, involving both processed and raw data.

Simultaneously, technology integration and utilization in the current global society, has brought many changes and challenges in our life. The fast-expanding development on technology has affected all aspects of life including education system. In line with this development, the way students are learning and teachers are teaching, have been changed accordingly. The teaching and learning process is now underway by going beyond the physical presence of the teacher and the students, to be more globalized and lifelong teaching and learning. These fundamental changes have affected the way that teachers teach and students learn in many aspects, hence have resulted in developing inherent issues and challenges (Auer & Tsiatsos, 2020). In today's environment, it is virtually impossible to separate the use of modern technology from education. As much as ICT is just a tool to make everyday life easier, the technology is advancing so rapidly that many are wondering if computers will one day take over and replace human roles and ultimately lives. What would future jobs look like? Would manpower existing today be replaced? What would schools look like in the future? With distant education made possible through e-learning and the emergence of Artificial Intelligence (AI) technology in robotics and learning, there is a growing contention of whether physical schools as we know it today would be obsolete (Anealka, 2020). To deal with such a fundamental transformation in education system, application of big data analytics can help educators in decision making to enhance the quality of education in various aspects such as teaching-learning and management.

Big data analytics has great effect on education system because it improves the accuracy of the decision-making process. The development of big data and Fourth Industrial Revolution, give educators the possibility to introduce new ways to enhance the quality of education and teaching–learning processes (Lawrence et al., 2019; Murumba & Micheni, 2017). The year 2020 has caught the global community off-guard with the emergence of the COVID-19 pandemic which affected all aspects of human life, from the decline and shutdown of the biggest industry players to the adaptation of academic structures within all learning institutions around the globe (Favale et al., 2020). The stakeholders and the management of educational institutions were thrust into imminent change and having to navigate the use of e-learning as the sole mode of instruction to ensure continuity of academic activities (Demuyakor, 2020). In this regard, specifically, Higher Education Institutions (HEIs) are now faced with a tremendous challenge, with the COVID-19 crisis and trepidations of a worldwide recession. A large number would suffer from the aftershocks of the pandemic with the decline of student enrollment, especially those with international students. As such, this is the perfect time for HEIs to take charge and ensure a smooth transition. Nonetheless, big data incorporation into education enables the educators to gather information about the teaching and learning process as well as improving students' initial and continuous learning stages. Analyzing the massive data in education can help us to build better connections that lead to make effective decisions for the improvements of teaching and learning. This can portrait the importance of big date application in education (Olszak et al., 2018).

Similarly, in Malaysia the government aspiration is to provide a competitive education system in line with the global needs to be transformed in the line with the development of advanced technologies such as big data analytics, the IR 4.0, robotics, and the Internet of Things (IoT). Big data analytics create various opportunities for teachers and students' engagements in the new teaching and learning technology tools (Lawrence, Lim, & Abdullah, 2019). In the year 2014, Ministry of Education (MoE) has launched the first phase in establishing Big Data Competency Centres across four universities and one polytechnic in the country (Digital News Asia, 2017). This action was in line with the Government's call for the development of more data scientists in Malaysia to spearhead the country's development towards a data-driven economy (Zulkefli, Wan, & Salina, 2018).

There are many reviews regarding the definition of big data. It is a product of the progress of modern scientific knowledge and technical academic, a feedback of the progress of the times, and a necessary and essential component of people's modern life today. The broad definition of big data, is focused in the direction of philosophy - things of the physical world through the digital world collection, analysis and processing, searching its own rules and characteristics in the process, which translates into better quality of decision-making. However, the narrow definition of big data is originated from the technical engineers from the professional, defined big data through the acquisition, storage, analysis, and tap the value of a new technology architecture from bulk data.

However, application of big data analytics in education is rising with development potential, but same time faces many challenges. Big data has distinct characteristics and application of research in the field of education, its development requires great depth of data integration technology and education. In practical terms, there are many problems (Waleed et al., 2019). One of the big challenges is collection of incomplete data. Incomplete data may cause misunderstanding and misdirection which will lead to wrong decision making. The other challenge is data transparency. Transparency regarding personal data processing activities and big data analytics may increase individuals' trust in the processing activities and the technology used. Moreover, the question of trustworthy and ownership over personal data is another challenge that face big data analytics in education sector. In addition, ethical challenges, privacy and data governance. In this regard, any processing of personal data should be based on individuals' consent or on another legal permission.

No doubt that elaborating on the inherent issues and challenges in bag data analytics will help us to prevent its impact on education. Educators required to systematize effective and efficient structure that can design, manage, develop and analyze educational data based on Big Data Analytics technology. Therefore, the main purpose of this chapter is to provide a conceptual overview on the application of big data in education. The use of big data and analytics is relatively is among the key areas in Malaysia. Therefore, the chapter aims to elaborate on the role of big data in education and will use a systematic review to provide an in-depth understanding on the theoretical foundation in regards to issues, challenges and opportunities of big data management in Malaysian education system. Application of big data analytics can specifically help universities and HEIs not only to enhance students' learning experience and improving their performance. More over using big data analytics can be effective in reducing students' dropout rates that can be result in increasing graduation numbers.

Characteristics of Big Data

Big data has the number and variety of characteristics, such as real-time performance, timeliness short, data mining analysis of large value generated and so on. Big data processing is utilized in multiple industries, such as scientific research, clinical medicine, medical research, foreign trading, market analysis, education and teaching, etc. All types of information are complicated, and we need to collect, process, analyze, summarize, and conclude its deep-level laws.

To understand big data, the four main characteristics of big data which start with a V, the special factors about big data (Hurwitz, Nugent, Halper, & Kaufman, 2013; Marr, 2016; Zulkefli et al., 2018), which are different from the regular data, named:

1. Volume – refers to a large amount of data that generated every second; Use a digital method to record and gather numerous data (e.g. global population distribution, global meat market analysis, demographic level of each country).
2. Velocity – refers to the high-speed operation, involved processing high-speed operation and data from different places (e.g. sensors, real-time transmission, Internet and Internet of Things), how fast the new data is generated and data moves around
3. Variety – refers to the different types of data and source range that can now use; use different methods, different syntax modes and data processing (e.g. forms, programming codes, integrated processing of factory data).
4. Veracity – refers to the trustworthiness of the data; how accurate is that data in predicting business value?

Some people have proposed the fifth V: Value, which means that data need to be turned into value and useful (Zulkefli et al., 2018; Marr, 2016); By analysis of the data, dig out valuable data, make decisions based on relevant data (e.g. analysis of consumer preferences; travel trajectory analysis). From the point of view of the definition of big data, large volume, complex relationships, and large value are the most important characteristics of big data.

The Source of Big Data

Indeed, big data can be found everywhere in our daily life. Our basic necessities of daily life, such as food, clothing, housing, and transportation, are inseparable from big data. For example, we can use a variety of mobile phone applications, for online ordering, online shopping, online chatting, and e-learning. If users conduct online shopping via Taobao platform, an interesting phenomenon is occurred There will be a column in the middle position, named “Guess what you like?”. This is due to analysis of big data, via the analysis of forgotten browsing records, purchasing activities and other data to infer and estimate users’ relevant preferences. The analysis of results like merchandise that liked by users then will be recommended for the users, in order to achieve a “precision marketing”.

There are two types of data, which are structured and unstructured (Marr, 2016). Structured data refers to any data or information that located in a defined and fixed file, generally in a database. The examples of this type data are sales and transaction records, customer detail information, financial data and website hits or clicks. Whereas unstructured data means all the data that unfit into the conventional database formats, such as email conversations, social media posts, updates, video content, photos and voice recordings. Semi-structured data refers to the cross between unstructured and structured data. Semi-structured and unstructured data are much more difficult to be stored and analyzed than structured data.

Furthermore, there are some new types of data and digital traces from those internet activities, named activity data, conversation data, photo and video image data, sensor data and the IoT (Marr, 2016). Activity data is the computer data of human online actions or offline activities in the physical world. SMS messages, email, blog, social media posts, audio or voice recording of a mobile phone, teleconference, webinar, online meeting or Skype call are all the conversation data from the recent technology tools.

Smart phones' function in capturing photos and recording videos have resulted in the explosion of photo and video image data via different social media. Sensors are being utilized in the products, like mobile phones, cars, and golf clubs, which are resulting in an extended amount of new data. IoT are referred to all objects being created with integrated sensors and the ability of those objects or products to communicate with each other.

BIG DATA IN EDUCATION

The value of big data relies on the possibility of vast amount of information which had not been considered previously, and now it leads to the uncovering of new knowledge in reflecting decision making, and decreasing of subjectivity in decisions (Ruiz-Palmero, Colomo-Magana, Rios-Ariza, & Gomez-Garcia, 2020). The integration of Information and Communication Technology (ICT) into the education field allows us to gather information about the teaching and learning process. When students did examinations, queries in forum or chat, assignment submissions, access to e-learning platforms, these actions or activities will become information, thus, the virtual platform and technological tools that used for e-learning become the main sources of the information acquisition (Ruiz-Palmero et al., 2020). From the students' click, viewed resources, spending time for reading and studying, these data can be analyzed to predict what will occur and how it can be enhanced and improved for students learning. It will assist to find the trends or patterns of students' learning process and contribute forecasting regarding the future teaching-learning process based on diverse theories (Ruiz-Palmero et al., 2020). Based on the definition of big data and the application of big data, big data is closely related to our lives, a question is appeared: does big data being used in education and integrated in various teaching activities? Of course, it does. The close connection between students, teachers and teaching institutions via big data can be discussed as following sections.

What is big data in education? Variety and multiple data that occurred in people's daily educational activities are collected, sorted, and analyzed to draw relevant conclusions. The mid-term activities mainly involved the executors and the participants of teaching and learning. How to simply understand education through numbers? For instance, a student's academic performance, which shown the last examination scores were 92 and now is 72 marks, then the reason for this performance enhancement can be achieved by analyzing big data. Analyzing and finding out the reasons by recording the webpage's log activities via the student frequently browses during this period and the student's study time, studying habits, and learning styles. At this time, these two students, who scored 92 marks in the test and the another student scored 72 marks in the test. Then, we take into account the relevant factors of this gap, such as the family's financial situation, the parents' education level, the students' own effort, and intelligence. These factors were considered to have associated with the poor performance and this becomes "data".

The difference between big data and traditional data was obtained in the evaluation stage. As in the case of students being informed, the students will pass the exam or scale surveys and other forms and great deal of pressure. The generation of big data is completely processed, and certain observation techniques and equipment-assisted collection are natural and true without students' awareness to know it. For students, these associated data can analyze students' learning methods, make the relevant suggestions to the students, and optimize their learning methods; it can accurately state students' weaknesses in their learning process and provide relevant learning knowledge (such as repeated learning through online teaching methods, or self-learning on new skill). As for teachers, it is possible to find out the problems that existed in the teacher's teaching process via these data analysis, optimize their teaching methods, and improve teaching content; Students also learn to understand the situation better by modified course content, based on the actual student learning, and so as to achieve maximum utilization of educational resources. For educational institutions, educational institutions can be connected to the assessment, and the analysis of the teaching learning situation of students and teachers via large data to achieve optimized education performance and teaching efficiency.

Provide Students with Customized and Personalized Learning Experience

Big data provides more customization and personalization of educational process (Anshari, Alas, Yunus, Sabtu, & Abdul Hamid, 2016; Huda, Haron, Ripin, Hehsan, & Yaacob, 2017). The learning content, learning method, and learning process can be determined according to the student's learning situation, so that each student could absolutely predominate the learning content and achieve the optimization of the learning state. The integration of big data and online learning resources, it offers a wider spectrum of pervasive knowledge acquisition and enrich students' learning experience (Anshari, Alas, & Guan, 2016). Adaptive teaching students need to understand their characters, learning habits, hobbies and learning styles, etc., these elements are combined to conduct a comprehensive analysis. Big data provides the possibility of adaptive teaching that a comprehensive analysis of learning needs of students. Through the big data analysis, students' personality characteristics, study habits, learning weaknesses, and diagnose students' learning conditions can be understood. When students complete the learning tasks, tests or quiz, the students are provided with the answers, feedback (Huda et al., 2017) and links to the resources which are related to the learning concepts or theories (Anshari et al., 2016). These prompt responses are using big data in terms of massive data generation growth to support innovation and instructive learning environment (Huda et al., 2017). According to the relevant data, we can summarize and analyze the learning styles and teaching methods that students like, prefer, and the corresponding learning plans can be designed for students to guide and assist them to learn. This is one of the benefits of integrating big data into online learning which can predict relevant knowledge for each student (Anshari et al., 2016).

In addition, through a comprehensive analysis of the students' studying habits, living habits such as posting descriptions of activities they conduct, events they attend, places they visit, photos they take, and things they enjoy and prefer (Anshari et al., 2016) and other data, it can be concluded whether the students have great learning and cognitive potential for certain courses or certain aspects. By using big data, the students' interest and potential direction can be exploited, in order to develop individualized learning programs, to optimize the educational effectiveness. Understanding and exploring the learning quality by designing the good structure of online courses to determine the cords of the students' learning activities are crucial to them for perform well (Huda et al., 2017).

Provide New Teaching Strategies and Personalized Curriculum for Teachers

The development of big data has changed teaching activities. Teaching methods in the new era have shown diversified development, and the quality of teaching has been improved significantly (Ruiz-Palmero et al., 2020). Big data is not only used in education and teaching, but also greatly contributed in scientific research and teaching. With the help of big data, more teachers can understand the students' learning process, learning habits, learning status specifically. Analyzing and studying the relevant data of students to uncover specific intervention measures and optimize the teaching and learning methods. At the same time, it can reveal relevant student learning rules and educational development. The big data technology also enables to assist teachers to maximize the methods in achieving the learning resources in more flexible way ubiquitously (Huda et al., 2017). By adapting big data approach in the teaching and learning process, accessing information and instructional materials can be easily achieved by the teachers and deliver to the students, which enable students to track their activities simultaneously (Huda et al., 2017).

Big data in education and teaching for teachers aimed to provide a strong support, via behavioral analysis, to understand students' personality and other characteristics. Big data adoption in higher education institutions encourage tutor enquiry, provide prospects to investigate teaching activities data, and examine methods for improve learning contexts and content, present clear and deep perceptions which reflect on teachers' teaching practices, and uncover how it influences the learning outcomes (Mor, Ferguson, & Wasson, 2015). It also helps to increase the students' performance via encouraging more active and engaged learning styles in their instructional process. Ultimately, students' thinking skills have been improved via boosting their confidence in raising their skills of learning enhancement (Huda et al., 2017). The analysis of big data can be used to trace back the reasons on why students' academic performance has been increased or decreased (Anshari et al., 2016). By using big data analysis, even if the student's learning status is accurately assessed, the potential problems of the students are determined, and the relevant guidance and solutions are provided. Simultaneously, it can also predict the students' career development and performance in future, and conduct targeted education based on the relevant data to achieve the learning goals and objectives.

Provide New Digital Learning Structures and Decision-Making Management for the Educational Institutions

The application of big data in education is not only reflected on the students and teachers, but also widely used in school management. It provides a great help for the realization of the campus intelligent management (Ruiz-Palmero et al., 2020; Zulkefli et al., 2018). The statistics of students' attendance, participation in campus activities, and academic papers are collected and analyzed, which can provide students with relevant study advices and career guidance. The analyzing and managing these data is vital since it can provide accountability and transparency in the education sector (Zulkefli et al., 2018). Simultaneously, it provides several advantages to the management of the school and improvement of teaching quality via talent training, employment innovation, scientific research project data analysis, and real-time grasp of student learning status. By systematic analysis of large data, optimize the results, realize campus intelligent management, and help colleges and universities to set up an integral and efficient information management system (Zulkefli et al., 2018).

Big data management application in colleges and universities, will further promote reform and innovation, multi-dimensional change of personnel training, employment and entrepreneurship, research projects, enrollment management, become a new driving force of self-innovation and effective development of colleges and universities. By adoption big data analytics within the e-learning systems, HEI can deliver services, like understand teaching and learning context, predict outcomes, and implement the study plan which able to continue to learn from multiple data that continuously produced and collected (Anshari et al., 2016). The service providers like HEIs, government departments, and policy makers may plan the most appropriate and suitable e-learning courses based on the latest trends and needs, even more personalized individual interests. Policy makers are capable to design, plan and develop their prediction plans via the big data analytics (Anshari et al., 2016). Curriculum design can be prepared based on the analytic data, outcome-based learning also can be achieved based on the forecast analytics by referring to the self-regulated inquiry learning (Huda et al., 2017).

BIG DATA IN MALAYSIA EDUCATION

In the new era of 21st century, worldwide education pattern is influenced by the scientific and technological advancement, big data plays an important role in this digital revolution. Malaysia is still at initial phase in utilizing Big data (Waleed, et al., 2019). There are very limited empirical studies regarding the effectiveness of Big Data, the utilization of Big Data and analytics in HEIs are relatively new and scarce (Zulkefli at al., 2018). The utilization of big data in higher education sectors encourage instructor investigation, provide expectation to empirically investigate teaching activities, and identify methods for describing improved learning context, give understandings which may reflect teachers' teaching practices and their effects on the learning outcomes (Waleed et al., 2019). There is a study that conducted to distinguish the affecting factors on Big data technology by Malaysia universities, such as knowledge management sharing factors with adopting factors (Waleed et al., 2019).

Big data offers the opportunities to the higher education institutions to use their ICT resources strategically to improve educational quality and shepherd students to achieve higher completion rates (Zulkefli et al., 2018). Analyzing and managing data is vital as it can yield responsibility and transparency in the education filed, learners and organizations are assisted to recognize their achievements, performance and factors of weaknesses. Malaysian Ministry of Education has launched the first stage of Big Data competency center across four universities and one polytechnic, which are University Utara Malaysia (UUM), University of Science Malaysia (USM), University Malaysia Terengganu (UMT), University Malaysia Sarawak (UNIMAS), and Polytechnic Sultan Ibrahim at Johor (Digital News Asia, 2014). The HEIs utilized big data into their classroom teaching with the expectation of emphasizing one of the biggest barriers affect student's achievement.

BIG DATA AND FOURTH INDUSTRIAL REVOLUTION

Data processing, networking and internet have a positive impact, which enable information or data can be easily generated and exchanged between people, from people to the machine, as well as machine to machine (Latinovic et al., 2019). When the data capacity of an organization has increased (which involved large number of multiple tools or devices, large data transfer, over 1TB of data, and data transmission in high speed), this is we named it as big data. Big data is a new generation technology which is applied for dataset, involved non-conventional data sources – social media, log data, device data, sensor data, video, graphics, and IoT.

Industry 4.0 or Fourth Industrial Revolution was first introduced by German Federal Government in 2011 when proposed industrial initiatives to foster the industrial sustainability. The implementation of Industry 4.0 is a building block process, which required big data and analytics, robots, simulation, Internet of Things, cybersecurity, cloud computing, augmented reality to make the concept can be realized (Rubmann et al., 2015). Cyber-physical Systems (CPS), machine-to-machine components, autonomous vehicles, nanotechnology, biotechnology, energy storage, are referred as keys to ensure communication and community for Industry 4.0 development. Industry 4.0 products and systems, including machines, warehouse, and operational resources are connected to the worldwide manufacturing networks (Kagermann, Wahlster, & Helbig, 2013).

In Malaysia context, there is a lack of knowledge regarding the real implications and advantages of Industry 4.0 technology to the business and education. Furthermore, shortage of infrastructures and facilities, high-skilled human resources are the challenges and obstacles for implementing Industry 4.0. Hence, Malaysia National Policy on Industry 4.0 has been introduced to push manufacturing industry towards Industry 4.0. With the launching of this policy, there are several ministries, include Ministry of Higher Education, handled the talent and workforce (Yong, Nor, & Lee, 2020).

Industry 4.0 consisted of six design principles, which are interoperability, virtualization, decentralization, real-time ability, service orientation and modularity (Latinovic et al., 2019). There are several software solutions for the implementation big data in Industry 4.0: Cassandra, Hadoop, Accumulo, Hypertables, Amazon SimpleDB, Clouds, Scylla, etc. Generally, Elastic, MongoDB, Cloud Datastore are the examples of software solutions for memory files. Whereas Neo4J, Trinity, Arango DB are the examples of software solutions for graphical bases used (Latinovic et al., 2019). Different big data software solutions have different capabilities and characteristics, such as batch processing or distributed computing, real-time queries, random access, horizontal scaling, strength (from different aspects: data processing, write, read, and full indexing), data model type (file system, column, document, and key-value).

The concept of Industry 4.0 was expected to change production in the near future since it gains popularity in different fields, the characteristics of data to be analyzed has been changed too. Some special features or advanced setting, like high speed data are necessary for some processes, IoT devices and sensors are needed to produce unstandardized and unstructured data (Gokalp et al., 2016). According to these scholars' studies, the latest trend in the big data domain is working nearer in offering a stage of abstraction to use popular data processing platforms. They also suggested a programming model for big data platforms for this usage. Expertise who specialized in data science and IT domain is needed for the adoption or implementation of big data technologies in Industry 4.0 sector. Industry 4.0 has developed various chances to solve temporal and spatial obstacles and new values in website or applications. Big data adoption in Industry 4.0 assists in supporting productivity growth, enhancing marketing strategies, and producing better forecast and real-time decisions (Anshari, 2020).

A survey has been conducted for four hundred graduates at Malaysian universities, reported that 55% of them were considered transformation into Industry 4.0 may rise up the unemployment rate in Malaysia (Idris, 2019). These Malaysian university students are not preparing themselves, lack of technology skills to conform themselves in Industry 4.0. Moreover, the lack of understanding of the requisite ability, skill, knowledge, insufficient qualified trainers and trainees with cutting-edge technology capabilities are the barriers to achieve the ideal Industry 4.0 working environment. In this context, Malaysia merely plays a role as follower in Industry 4.0, but not act as main creators or producers for Industry 4.0 related technology and systems (Yong et al., 2020). Reflect to the changes of Industry 4.0, HEIs need to embrace Education 4.0 strategies which emphasized the role of high soft skills people, and professions that need complex and routine human-to-human interaction (Anshari, 2020). Producing the graduates with complex decision-making skills, creativity, innovation and social skills will not be replaced by the machine and robotic technology.

CHALLENGES IN APPLYING BIG DATA IN MALAYSIAN EDUCATION

Big data has remarkably potent predictive capabilities, and assist in smarter decision making. Big data is not only used to enhance the organization's execution and profit, but also complete a multiple targets of achievements from their analysis. The appearance of big data has drawn interest from the industry teams, faculty members and government, and data is still in progress of developing in the HEIs (Cai & Zhu, 2015). However, there are some issues and challenges in applying big data in Malaysian education sectors due to majority of the data disconnected transversely over desktops, offices, apart from different preparations, and causing them hard to recover and merge (Zulkefli et al., 2018). The necessity key are data management and ethical issues. Data need to be managed, handled in correct way while securing these delicate data, and at the same time, these data are collected from various resources. Ethical issues refer to the students' privacy when their data are being collected, stored, analyzed, and handled. The following part are discussing the challenges of big data implementation in Malaysian education sectors, particularly HEIs.

Acceptance of Big Data Implementation

Big data implementation in education sectors may take time for the users' acceptance since it needs to be developed a better understanding about the new system. Acceptance involves motivation users to acknowledge Big data as a groove for endorsing new process and change management (Zulkefli et al., 2018). Some studies also found that the advisors, organization teams, and some lecturers were not assume that their system can be improved by implementing big data (Ruiz-Palmero et al., 2020). They are facing the realities that many subsidiary subjective perceptions or reviews from different participants. Another study also shown that age diversity, cultural diversity, and motivators affect behavior intention to use big data for sustainability of education (Waleed et al., 2019). In addition, perceived usefulness, perceived ease of use, perceived risk and behavioral intention to use big data have influenced adoption of big data.

Difficulty in Collecting Data

The seigniory of education big data is in the ascendant, which not only has huge development potential, but also faces many challenges. Big data has distinct characteristics and application of research in the field of education, its development requires great depth of data integration technology and education. In practical terms, there are many problems. Data collection is incomplete (Anshari et al, 2016) and not all relevant (Corbeil, Corbeil, & Khan, 2017). In terms of educational applications, a great challenge is the collection of data. In fact, people have not found an effective way to collect relevant data. Education data analysis system has not been formed. No complete data analysis system, mainly due to data collection scattered. There are some difficulties in accessing required data from the database too (Anshari et al., 2016; Corbeil, Corbeil, & Khan, 2017), such as low quality and incorrectly organized data issues from the database system (Zulkefli et al., 2018).

Big data in education has the characteristics of transparency, which is a big challenge to the possibilities of teachers and students (Chweya, Ajibade, Buba, & Samuel, 2020). For example, students interested in hobbies, family background and other relevant data related to student privacy. Some say that curriculum needs of students in each class of record time, the results of the various elements of learning, achievement and so on; For the teacher, the teacher's experience, education, family education can be obtained through big data. some of the data related to privacy cannot be shared, there is no way to ensure that student information security. Security is another issue that concern by students and teachers (Chweya, Ajibade, Buba, & Samuel, 2020), which may involve the accessing procedures, storage, transferring and processing the diverse educational data (Bahmiah, Brohi, & Rad, 2018). Hence, this causes noteworthy issues toward users (Zulkefli et al., 2018). Some studies also found that knowledge management sharing issues, it remains highly ununified (Waleed et al., 2019).

Requirement of Expertise / Specialized Knowledge

Another issue regarding to this technology is the shortage of technology standardization, for new users and developers. Interpreting the interoperability communication processes required the standardization communication, machines and systems (Pedone & Mezgar, 2018). Conventional data analysis which involve structured and unstructured data are failed to handle with the emergence of big data. Expertise and specialized knowledge are needed to ensure the educational system is working properly with big data. Regarding this matter, lack of skills and knowledge on big data is one of the challenge to adopt big data (Anshari et al., 2016; Corbeil, Corbeil, & Kahn, 2017; Bahmiah, Brohi, & Rad, 2018; Zulkefli et al., 2018) in education filed. In fact, there is a challenge for the intelligent and responsible utilization of big data. When big data is applied for educational purposes, there are some questions rise up: How to measure the intangible part of educational process? What occurs if projection-based on previous data brings towards a certain level of training without considering the potential and the development that they can have achieved? (Ruiz-Palmero et al., 2020). The implementation and utilization of big data analysis tools require technical expertise which majority of the organization do not hold yet (Gokalp et al., 2016). The findings of some studies also revealed that managerial and soft skills are of equal or greater importance while technical skills continue to be crucial in the age of big data (Mikalef & Krogstie, 2019). It is necessary to link analytics to the business strategies and developing or executing projects while big data is moving from a solely technical role to whole organization role. Further empirical assessment on the best practices of teaching skills is a must for minimize the growing skill-gap in the age of big data.

Organization Obstacles

In this internet and networking era, in order to better respond to a series of big data challenges facing education, the urgent need for the system and mechanism of multi-party cooperation and their efforts to work together to jointly help. Maximize government departments and educational part of the need to strengthen cooperation in the development of relevant regulations and policies play a big advantage in the case of the data education student privacy is protected. This issue refers to the cooperation between departments in implementing the Big Data and cost of collecting, storing, analyzing and visualizing data (Zulkefli et al., 2018). HEIs also lack of sufficient policies to control and regulate the data accessing and intellectual property (Bahmiah, Brohi, & Rad, 2018). The analyzed data may raise up another ethical issue, and challenge of authenticity of who is the right person to access data and what is it used for (Chweya, Ajibade, Buba, & Samuel, 2020). HEIs need to manage it well so that the links or data can be effectively utilized.

POTENTIALS AND OPPORTUNITIES OF BIG DATA IMPLEMENTATION

Most of the studies have focus on the challenges that connected to the implementation of big data in education. However, some of the big data contributions need to be highlighted and the way to use big data in the educational process.

Personalization Education

As we know, different student has different way for their learning. If lecturers or instructors have those information, like what students ask for, what they are looking for, what problems they have met, the requirements that can be fulfil or not, their delivery mode or format, the way they present, search information, and their learning style when they are working with the audio, video, visual, read-write information, the teaching and learning process can be tailored to the students. As reported by Zapata-Ros's study (2013), personalized learning can be forwarded, depends on students' interest, preferences, results, and knowledge acquisition level, more relevant and efficient learning methods can be applied.

Big Data plays an important role to personalize students' learning process, from the cognitive, social, and motor factors, like students' satisfaction with the learning contents and resources, time slots or time table that fir to their needs and enable them to work at maximum performance, choosing their interested training or study programme, specializing their studies follow their needs (e.g. Massive Open Online Course – MOOC). Furthermore, there are variety of selections for students to choose what they want to learn, which can achieve the required results without missing students' interests.

Enhance Teaching and Learning Process

The learning pattern, repetitive trends of success or failure of studying are obtained from the big data analytics findings, and make the possibility to address students' learning problems. Students' learning can be enhanced and optimized by integrating technological tools, modifying, adding or removing learning resources and ideas, based on the obtained information. Students' learning can be improved by tracking their learning skills and teaching contents, determining those students that need more focus as they face many problems in their learning. Special training and lessons can be provided based on students' learning styles, patterns from the analysis of big data. Big data analytics could improve learning effectiveness via self-assessment of learners and instructors (Zulkefli et al., 2018).

Real-Time Feedback in Teaching and Learning Process

Since students' interaction information within their virtual learning context can be recorded, captured, and analyzed via big data Analysis, the possibility to obtain real-time feedback on the information collected can be happened (Terron, Olivencia, & Caballero, 2020). Students' click information, and reviewing learning materials on the website, participation activities and conversations in chats or forums in their e-learning platform, facial and visual reactions during they were using e-learning platform to study have been recorded. All these data were collected and provide the analysis findings regarding students' learning record, which help to develop the action plan for students.

Increase Employability Rates of Graduates

Analysis of the employability rates of graduates may help to determine which part of the training that need to be enhanced or improved. Hence, big data could make the meta-analysis of graduates' survey easier by provide the patterns of the problems in the labor market and their relationship with the provided training (Ruiz-Palmero et al., 2020). The organization of the curriculum may assist to improve the employability rates of graduates, via improvement on selected parts of the training. Furthermore, by using big data analytics, cost reduction can be occurred via managing the financial performance which could improve the retention rate and graduation rates (Zulkefli et al., 2018).

Increase the Quality of Students' Works

As revealed by the prior studies (Ruiz-Palmero et al., 2020), big data is grounded work for anti-plagiarism programs due to its powerful function that can crosscheck the information between new documents of assignments and previous version of assignment records. Big data offers advantages to HEIs for utilizing ICT resources strategically to improve the quality of teaching and learning contents, assist students to achieve higher completion rates, and compare students' persistence and outcomes (Murumba, & Micheni, 2017). All the written contents by the students have been improved via this information checking via big data analysis, and it becomes a vital tool to verify the authenticity of text contents and ensure ethical issues can be resolved and prevented. Indirectly, the quality of students' works, tasks, and assignment might be increased with the assistance of big data analysis.

CONCLUSION AND IMPLICATIONS

As we all know, big data has brought a disruptive effect on the education industry. In the teaching method, through accurate analysis of students' learning habits and personality, formulate corresponding learning methods; Learning content optimized for different students to acquire knowledge on different points, to provide students with targeted learning content, through data analysis leak filled, completed learning objectives; Enhance the rank and quality of teaching, through big data to continuously improve teaching methods and course content, so that students interested in learning, thereby enhancing the desire and motivation to learn; Promote educational equity and optimize the allocation of educational resources. A variety of online learning development, providing more and more opportunities and platforms, distribution of educational resources through large data also tend to poverty-stricken areas for students in different areas of learning.

Big data is widely used, people's lifestyle, way of working, and learning methods have been gradually transferred and transformed due to this technology revolution in education sector. Moreover, various information systems and large-scale information environments have brought particular implications in various sector, especially in the current education work, big data provides a favorable guarantee for the reform and development of the education system, cloud computing data analysis, and information technology, it can provide more quantitative data for education work, which is useful for improving the quality of education. Therefore, the article mainly analyzes the application and research of big data in education, clarifies the significance and role of big data in education, and improves the quality of current education and teaching, so as cultivate more outstanding for the society.

The implications of big data role in Malaysian education are knowledge management sharing and users' (instructors and students) behavioral intention to utilize big data is truly influence big data implementation in educational institutions, or for sustainability of education. Lecturers and supervisors may manage to offer supports to their students by giving feedbacks to the students' inquiry, knowledge sharing which helps to improve students' academic performance, develop researchers' skills for their research by employing big data for learning. HEIs may encourage students to learn, explore and aware of utilizing big data for learning courses instead of forcing them to do it.

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Chapter 3
Big Data, Green Growth, and Technology Disruption in Asian Companies and Societies:
Application of Fintech in Brunei Darussalam – Embracing E-Wallet in the Retail Sector

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ABSTRACT

The rise of digitalization has inevitably impacted the growth of financial technology (FinTech) in Brunei Darussalam. The presence of e-wallet QR code-based payment system, as part of the Fintech development, deems to be the latest payment mode that hits the retail sector of the Sultanate in recent years. Thus, the chapter is aimed to understand the role and impact of e-wallet application in the retail sector. Despite the positive trending indicators for e-wallet growth amongst the population, the utilization of e-wallet in the retail sector is still quite low. Both driving factors and barriers towards e-wallet utilization in the retail sector are discussed by taking account of the views of both customers and retailers. Recommendation steps are also suggested especially on the roles played by both business and government in empowering this new payment system and to drive the population toward a cashless society and attain a smart nation aspiration.

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INTRODUCTION

Financial Technology or in short Fintech is the innovation of financial services that is driven by the shifts in the expectations of the customers, technology and technological applications so as to digitise the financial segment, which resulted in transparency in the ecosystems and hence bring cost-benefits to the customers (Gregorio, 2017). Fintech is arguably the future global trend of financial services and more so in Asia region. With growing population, increase online business trends, increase customers' consumptions and wealth, and the emergence of innovation in ICT, digital financial solutions offer greater potentials for attaining wider access and usage of financial services. The global application of Fintech has been increasing steadily where the emerging of adoption of Fintech technologies amongst Small and Medium Enterprises (SMEs) have reached the levels that can influence the consumers' expectations and the industrial standards. The emerging trend of Fintech, nonetheless, would not be feasible too without the buy-in from the consumers in adopting the technology.

Fintech is indeed one of the emerging technologies entering Brunei Darussalam, one of the developing countries in Southeast Asia, in recent years. One notable Fintech application trend use among the population is the E-Wallet QR code-based payment system. The introduction of E-Wallet is part of the Fintech development that act as a new, non-conventional concept towards the payment system that hits the retail sector. With the rise of smartphones, E-Wallet utilisation has simply gained momentum globally that seem diluted the physical cash transaction. Thus, this chapter seek to expose the role and impact of E-Wallet application in the business retail sector of Brunei Darussalam. Thus far, not much has been reported openly on the development of E-Wallet application in the nation and from the perspectives of both customers and retailers at the operational retail settings.

LITERATURE REVIEW

Financial Technology (FinTech) is the innovative utilisation of technology to deliver user-friendly financial products and services as a means of financial management which has been diverted from the traditional method (Gregrio, 2017). According to Fauzia (2020), Fintech can be generally divided into three categories:-

1. Fintech payment system **–** This Fintech simply revolutionised a payment system. It simply support both B2B and B2C transactions. It includes mobile E-wallet, digital currency and POS software, and etc. It simply enables users to send money faster, cheaper, safer, and more convenient and that are easily accessible for all.
2. Fintech Peer-to Peer (P2P) Lending **–** The activities under this Fintech simply enable people to borrow money without the needs of going to the bank or other financial institutions. In fact, both creditors and debtors do not have to meet face-to-face to finalise the transactions. Debtors simply can get the loan requested quickly online.
3. Fintech Crowd funding **–** This Fintech provides a platform for collection of individuals to provide fund contributions for companies, new business ventures, and commercial projects or even for charity courses.

Nonetheless, the focus on this chapter is surrounded on the E-Wallet application that is on the domain of Fintech payment system.

Introduction to E-Wallet

In this century, the transition from physical cash transactions to E-Wallet applications has become notably more predominant with the rising number of smartphone users in today's world because of the existence of affordable smartphones' prices in the market. It is noted that around 6.1 billion of the global population owning a smartphone in 2020 (Boxall, 2015).

E-Wallet is commonly known as a digital wallet which involves a software-based system capable in storing customer's bank account information, debit card and credit card details, loyalty card information, digital coupons and password of the consumers for various means of payment, through their smartphones (Ray, 2017 and Kagan, 2020).

In order to initiate E-Wallet payment mode, customers are essentially required to install the respective E-Wallet platform mobile application and then accessing the provided services by scanning the quick response (QR) code accessed via their smartphones (Subaramaniam et.al., 2020). There are basically two different QR code which are widely exist in the marketplace; Dynamic QR code which only required customers to scan the QR code and does not require them to enter the purchased amount due to a fixed transaction amount and the account details are securely embedded in the QR code. Meanwhile, for Static QR code, it required customers to manually enter the purchase amount after scanning the QR code and the account details of the merchants is secured into the QR code.

Some of the known E-Wallet system providers include ApplePay, AliPay, Amazon, Dwolla, Google Wallet, PayPal, Samsung Pay, Venmo and Walmart Pay.

Factors Affecting the Adoption of E-Wallet

Proponents of E-Wallet claimed that this payment mode will eliminate the need of carrying a physical wallet ubiquitously since E-Wallet has the capabilities to store consumers' payment information in a secure manner and allowing them to spend those e-cash in physical store and online (Kagan, 2020). The greater advantage of E-Wallet than the traditional payment mode is that it ensures consumers to conduct transactions at a lower rate, greater convenient and timely (Uddin & Akhi., 2014). Bezhovski (2016) has acknowledged further in his study that convenience is the main factor identified that affect the customers' preferences and willpower to adopt the new evolution in the payment system. Moreover, apart from the buyers, retailers also widely accepting E-Wallet as a payment mode because of its quickest business deal, less labor cost incurred and effective cash handling system (Hayashi & Bradford, 2014). Bezhovski (2016) signified that the presence of advanced technology in e-payment method such as through E-Wallet has becoming more convenience that built a foundation of trust and perceived usefulness to the actors in the marketplace who are utilising it.

The above statement is concurred by the other studies (e.g.: Karim et al., 2020; Vankatesh and Davis, 2020; and etc.). Perceived usefulness is the most significant factor of Using Technology Acceptance Model that has a significant influence on actors' intention when embarking onto new technological innovation (Al-Maroof & Al-Emran 2018 and Davis, Bagozzi & Warshaw, 1989)

In addition, security and privacy concerns is also deemed to be one of the main factors that influence the actors in the marketplace to adopt, or otherwise, digital payments (Karim et al., 2020; Marimuthu

& Roseline, 2020; Milberg, Smith & Bruke, 2000; Sharma & Gutiérrez, 2010). E-wallet application without a secure encrypted QR-code may lead an unauthorised access of personal information and thus open up for cybercriminals to breach the data (Kaur et al., 2018 and Upadhayaya, 2012). Customer with no prior experience in using technology for payment gateway may have concern regarding security and privacy and fear to disclose their financial information (Ahmad et al., 2010; Karim et al., 2020 and Marimuthu & Roseline, 2020). Customer may not trust the provider and they will reluctant in making any transaction through e-payment, per se, unless the privacy and security features are involved (Gitau & Nzuki., 2014). Accordingly, the presence of numerous security layers in accessing E-Wallet such as the use of passwords, fingerprint check two-factor authentication and even face identification etc. are indeed crucial for security assurance amongst the users (Gundaniya, 2020; Sorensen, 2021 and Zoria, 2020).

Global Acceptance of E-Wallet Application

China is currently leading the rate and rapid development of E-Wallet utilisation with 76% of its smartphone users are using E-Wallet in their transactions in contrast to United States with 36% of its population (Groenfeldt, 2017). Other nations inclusive of South Korea, Australia, Canada, France, Germany, Japan, Russia, Sweden and the United Kingdom are among the leading cashless nations. Moreover, Singapore and Malaysia have lead the way in E-Wallet development and utilisation and in embracing a cashless society in Southeast Asia (Jayaseelan, 2017). Malaysia, for instance, has many E-Wallet QR-code based payment system providers such as Boost, GrabPay, Touch'n Go e-Wallet, WeChat Pay, Maybank2u, Razer Pay, Big Pay, AEON Wallet, and AliPay which signified the country's leading position in the utilisation of this unconventional payment in the ASEAN region (Farhan, 2020).

Fintech Development in Brunei

It is fair to infer that Fintech development in Brunei's business sector is still at an early stage yet the potential for universal application of the technology amongst the population is simply greater. Notably, the internet is widely available and access in the country. The social media platforms have been very popular among Bruneians presumably engaging in online business transactions. In fact, Brunei has also been consistently voted in recent years among the top three and top ten in the world for the active usage and access of instagram (60% of total eligible audience above 13 years old) and facebook (89% of total eligible audience above 13 years old) respectively. Thus, the trending statistics are strong indicators of digital readiness among the citizens to be engaged in digital transactions than ever before that business sectors can capitalise from.

The government, like in other nations, feasibility take note the potential growth of Fintech applications. Thus, the government via Ministry of Finance and Economics (MOFE) has established a regulatory Fintech unit under the Autoriti Monetari Brunei Darussalam (AMBD). The unit is essentially responsible for the developmental strategies and the regulatory in the facilitation of financial technology in the financial sector in Brunei Darussalam (Authority Monetary of Brunei Darussalam [AMBD] (2016). Through this unit, the first notable development, in the year 2017, where the first issuance of Fintech Regulatory Sandbox Guidelines that aimed to support the development of Fintech companies in Brunei Darussalam have been issued. Few private companies have been approved by the AMBD in participating in the sandbox opening. This is in tandem with Brunei Darussalam Financial Sector Blueprint (2016-2025) released by AMBD in 2016. One of the enablers of financial growth is through financing latest areas of growth such as Fintech by supporting businesses utilising technology and software to develop financial services ranges from mobile payments to crowdsourcing as there is boundless opportunities for start-ups and entrepreneurs to develop Fintech credentials in the Sultanate (Authority Monetary of Brunei Darussalam [AMBD], 2020).

E-Wallet Development in Brunei

In relation to the above development, there has been a growth in the development of local E-Wallet providers in recent years. As a start in May 2018, Progresif, a telecommunication company, has partnered with Bank Islam Brunei Darussalam (BIBD) to launch the first mobile E-wallet in the Sultanate named Progresif PAY (Progresif, 2018). The Progresif PAY application is powered by the BIBD NexGen infrastructure which enabled companies from different industries, public agencies to offer mobile banking and Fintech related features to their customers by offering value-added services such as paying bills, shopping online, sending money abroad, and providing financial management tools (ibid). The Progresif Pay also can be used by organization to accept payments, pay staffs wages and suppliers.

In August 2018, BIBD itself has successfully launched its own E-Wallet QR code based payment system platform namely BIBD Quickpay which offers the users a convenient, safe measure of doing transactions, creating cost effective and digital savvy business environment and bridging the digital gap between business owners, entrepreneurs and customers (Bank Islam Brunei Darussalam [BIBD], 2018). Currently, BIBD Quickpay has achieved 327 merchants registered as QR code based payment providers and is arguably the most popular E- Wallet in the Sultanate to date (Bank Islam Brunei Darussalam [BIBD], n.d).

In the same year, a local Fintech startup, BruPay has successfully ventured into the Brunei marketplace in November 2018 with the aim of improving Brunei cashless ecosystem through high adoption and acceptance of E-Wallet. The registered users could simply store their cash from their respective bank account into BruPay E-Wallet securely (Hadtiah, 2018). In addition, as a means of attracting more users of BruPay E-Wallet, the company undertook a decision by imposing zero percent fee charge for payment transactions and registration of accounts towards their users (ibid).

In December 2019, another provider called *Pocket* has ventured into the marketplace and to date more than 4,000 residents in the Sultanate have registered with the application (Biz Brunei, 2020). In comparison to the other E-Wallet platform providers in the Sultanate, *Pocket* distinctive features is its capacity of storing and linking numerous bank cards within its application such as storing up to three MasterCard or Visa card of different banks. It can also made bank transfer besides having a same function of initiating payment through QR codes (Biz Brunei, 2020)

Problem Statement

Despite the increase significance of Fintech in global settings, there are still under-developed empirical research areas on the role of E-Wallet application that are yet to be comprehensively investigated. Essentially, one main question that worth attention, which require more empirical evidence is focused on “how much” has the E-wallet application impacted the retailers?

Moreover, this chapter is also driven from the lack of research, thus far carried out on E-Wallet applications in Brunei’s business retail sector. After the establishment of various E-Wallet platforms, another real question now is *‘what is the progress usage of e-Wallet application especially amongst the* *customers?'* Not much has been reported openly on the development of E-Wallet application from these two important stakeholders at the operational retail settings.

Research Objectives

Thus, this chapter seek to understand further the role and impact of E-Wallet application in the business retail sector of Brunei Darussalam, one of the developing countries in Southeast Asia. The chapter intends to specifically answer the following research questions;-

1. What are the driving factors for customers, or otherwise, in utilising E-Wallet?
2. What are the retailer's perspective in the application of E-Wallet?

Answer on these questions would provide insights on the current scenario of, improve understanding on the success e-wallet application and its impact on the retail business environment. Moreover, the answers would also provide valuable information for investors, Fintech companies on the potential of Fintech innovations in the context studied and also for regulators in shaping future strategic policy direction.

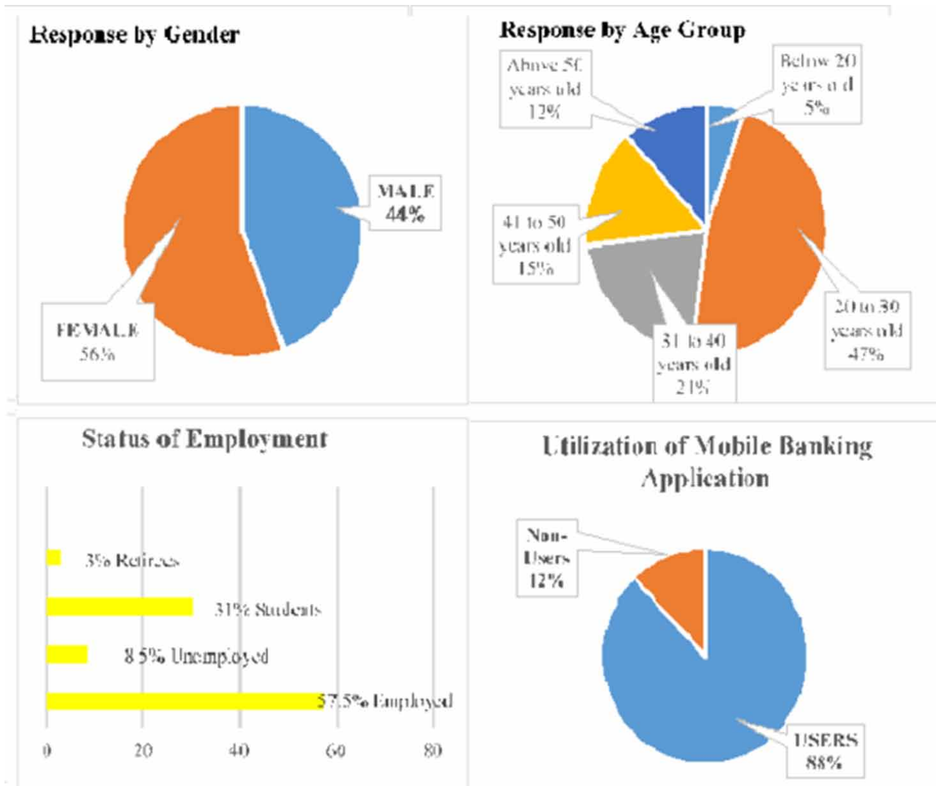
RESEARCH METHODOLOGY

In answering the research objectives above, both methods of qualitative and quantitative approach are being deployed. Specifically, for Research Question 1, quantitative mode of obtaining data is conducted i.e. via online surveys on the retail consumers in Brunei. A total of 200 respondents participated in the online survey, within a timeframe of four weeks, consisting of the citizens of Brunei Darussalam, whom are either users or non-users of E-Wallet QR-code based payment systems. The online survey is made open to the public, in 1 month period, through the online Google Forms platform. The details of the individual respondent participating in the survey will be kept confidential. The characteristics of the respondents are summarised in Figure 1 below.

Figure 1 shown that the respondents consist of 55.5% female and the remaining 44.5 percent were male's respondents. Almost half of the respondents belong to the age group of 20 to 30 years old (47%). This is followed by the age group of 31 to 40 years old (21%); 41 to 50 years old (15%); above 50 years old (12%) and lastly those belong to age group below 20 years old (5%). More than half of the respondents (57.5%) are employed; followed by students (31%) and the rest are unemployed (8.5%) and retirees (3%). It is also interesting to note, while 88% of the respondents are mobile banking applications users, the remaining 12% of respondents have never used mobile banking applications.

Meanwhile, in answering Research questions 2, the target audience is by conducting semi-structure interviews session with the owners, or, otherwise, the managers of retail businesses, whom currently utilising the E-Wallet payment mode. A total of 10 retail businesses are effectively approached ranging from food and beverages, restaurant, car spare part, mobile reseller, electronic reseller, and clothing. The interview session range from 30 to 45 minutes within a time frame of 2 months. The findings arguably can contribute to the literature particularly in exploring meanings among the retailers on the E-Wallet application experience. All interviewees' identity captured during the fieldwork would remain confidential.

Figure 1. Characteristics of the respondents
Source: Survey Results



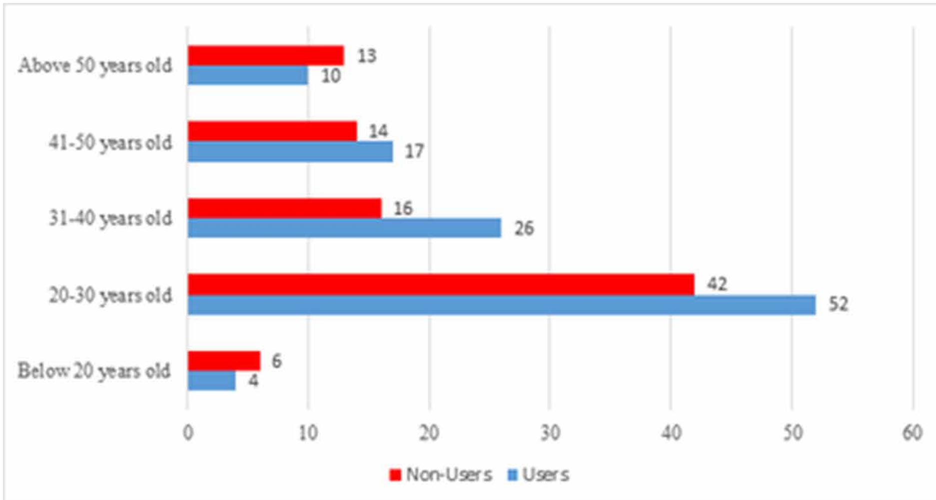
RESULT AND DISCUSSION

Before specifically answering Research question 1 (RQ1), it is interesting to note that only 54.5% of the respondents claimed that they have utilised E-Wallet QR code-based payment system in their retail transactions. And 45.5% of the respondents have not applied any of the E-wallet platforms. This E-wallet application figure is still considered low.

Figure 2 above significantly indicated that the highest users of E-Wallet application are those at the age of 20-30 years old. Even though the numbers of non-users are also higher in this group. The second and third highest age-group utilising this payment system is followed by users in the age group of 31 to 40 years old and 41 to 50 years respectively. These age groups are referred to the Millennial and Generation X (Dimock, 2019). According to Vogels (2019) these generations are open and outstanding in embracing technology and digital life and indeed the rate of technological adoptions among these groups are growing tremendously in recent years.

Figure 3 below shown the frequency of E-wallet platforms utilised by the users. The figure clearly confirmed that BIBD QuickPay is the most popular E-Wallet platform used by the users in the nation. The rank is followed by Progresif Pay, Pocket and Brupay which are all local platform players. Meanwhile, the two least popular E-Wallet QR code-based payment platforms i.e. AliPay and WeChat Pay

Figure 2. Users and non-users of e-wallet QR code-based payment system according to age groups
Source: Survey Results



are originated from the Republic of China which making their presence in the Sultanate particularly to cater for tourists and workers from China.

Ultimately, Figure 4 above has shown the driving factors that prompted the users in applying E- Wallet in their retail payment transaction. As shown in the figure, the ease of use (81.7%) is the prime driving factor, this is followed by other main factors notably on Safe and Secure Payment Mode (56.9%); Incentives of E –Wallet given (47.7%); Technological Adaptability (45.9%) and Perceived Usefulness (44%). The findings of the main 5 factors are aligned with many other studies (e.g.: Bandura, 1997; Bezhovski, 2016; Karim et al., 2020; Liébana-Cabanillas, et al., 2014; Moran, 2020; Phuong et.al, 2020; Seetharaman, et al. 2017; and etc.) which significantly indicating how the users have found it valuable in applying E-Wallet as an alternative mode of payment system in the nation. Having said, it is still imperative

Figure 3. E-wallet platforms utilised by users in Brunei
Source: Survey Results

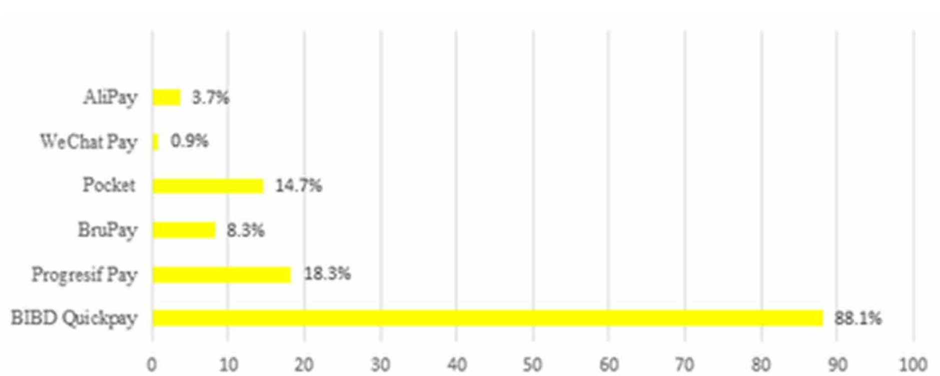
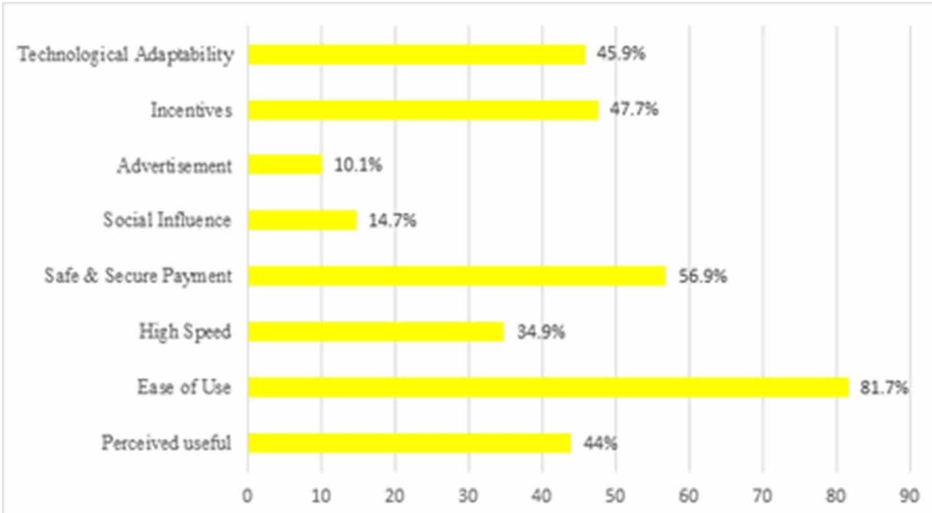
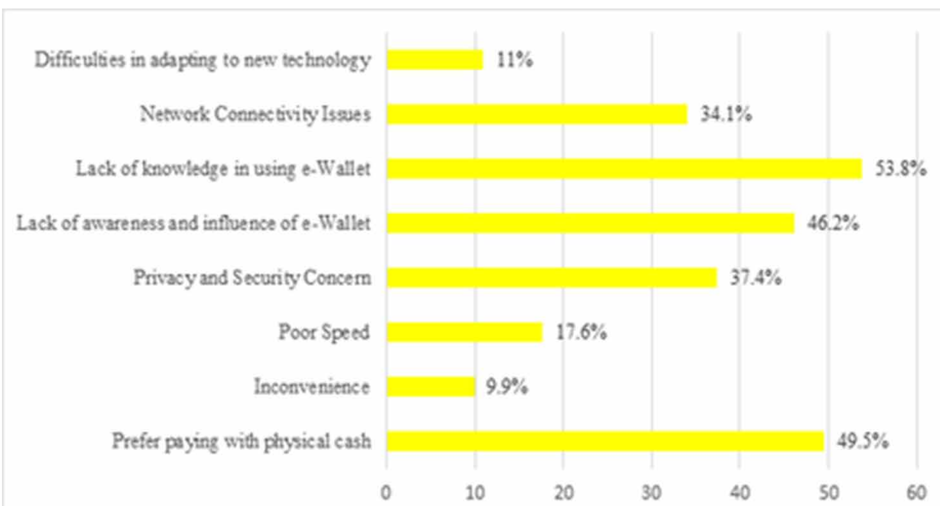


Figure 4. Driving factors influencing users to utilise e-wallet QR code-based payment system
Source: Survey Results



to note barriers that become demotivating factors for non-users to experience E- Wallet application as shown in Figure 5 below.

Figure 5. Demotivating factors for non-users from utilising e-wallet QR code-based payment system
Source: Survey Results



As seen Figure 5 above, the lack of knowledge in using the payment system (53.8%) becomes the prime demotivating factor. Other main factors include cash payment preference (49.5%); lack of awareness of E-Wallet (46.2%); privacy and security concern (37.4%) and network connection issues (34.1%). The abovementioned factors seemed mutual as cited by other studies found in developing countries in

Asia context (e.g.: Al-Somali et al., 2009; Anuar et al., 2020 and Mathiraj et.al., 2019; and etc.). The non-users developing nations in Asia are found to be cautious and slower in embracing innovative mode of payment system despite the higher usage of mobile rates among the population in some nations.

With regards to Research Question 2 i.e. in capturing the retailers' perspectives on the E-wallet application, the findings are expected to complement the findings of Research Question 1. First and foremost, all retailers have concurred that E-Wallet application, as an alternative payment system, has offered them many benefits as followed:-

E-wallet application is a new innovative mode of payment brought by the wave of Industrial Revolution 4.0, thus both the customers and retailers must embrace it especially in this digitized era (Retailer C).

As we are in a modern society, we shall evolve through time by adapting this payment system which benefits the customers and businesses (Retailer A).

As other businesses are embracing this payment, we don't want to be left behind (Retailer D).

Besides, in the midst of COVID-19 pandemic the world is currently faced, E-wallet application is an ideal means to avoid physical contact and thus reducing potential risk of COVID 19 transmission.

"In the light of the COVID-19 pandemic in Brunei in March 2020, it (E-Wallet payment mode) acts as a striking feature for the business including our respective customers in embracing this unconventional payment as a means of reducing physical contact in order to reduce the spread of the disease" (Retailer E).

Moreover, E- Wallet payment mode also provides convenience to their customers as it acts as an alternative of settling transactions through physical cash and making an ease towards cashless customers to settle their payments digitally in a timely manner. This factor, as concurred by other studies (e.g.: Bezhovski, 2016 and Wulantika & Zein, 2020, and etc.) has become one of main factors for customers in embracing E-Wallet. Thus, it is sensible for retailers to provide this facility as part of their service offering to their customers.

"Customers are capable of making digital transaction through the use of their mobile banking application such as BIBD Quickpay without having to withdraw their physical cash from the Automated Teller Machine (ATM). Just by simply scanning the provided QR-code, entering the required amount and completing their payment once meeting the transactional requirements, they have settled everything" (Retailer G).

"In a situation where the customers are not possessing physical cash or left their physical wallet but with the presence of their respective mobile phone at the point of time, it (E-Wallet payment system) provides convenience for the customers to settle their payment effectively" (Retailer B).

"Providing an additional mode of payments to the customers is one of the factors influencing our decision in embracing E-Wallet. In some instances, customers are walking into the stores without possessing any physical cash and credit or debit card in hand, therefore, through providing an additional mode of payment, it offers the customers options and conveniences in settling their transactions in spite of the charges being imposed on our business. Nevertheless, making customers at ease is our main priority and as long as sales are made from our standpoint, it would not cause any drawback for the business" (Retailer J).

Another important factors brought by E-Wallet application mentioned by the interviewees are the Efficient Cash and Account Management. E- Wallet provides an ease and generate saving towards the daily operation of the business with regard to efficient cash flow, effective account's handling, less labour cost and obtaining customers' trends in a timely manner, Abasiama et.al (2018) highlighted that the E-Wallet could act as a solution towards the issues posed by physical cash such as poor record keeping, lack of security and financial losses resulting from the loss of physical cash in the cash register. Hayashi & Bradford, (2014) affirmed that retailers definitely benefited in embracing E-Wallet application in their store because of it quick transaction, no labour cost is required and contribute to overall effective cash handling system.

It provides an ease in managing the business' daily cash register and removing the hassle of returning the customers' cash balance in the transaction process (Retailer A).

Asides from following the emerging trend, the payment system automatically credits the customers' payment to our bank account which promotes effective and efficient ways of managing business' accounts and banking. At the same time, it act as an automated accounting work by aiding the business in acknowledging the daily accumulated sales in a timely manner in contrast to the use of physical cash which requires a manual count of daily sales and the need of transferring physical cash to our bank account on a daily basis (Retailer B).

The existence of automated notifications through mobile text messages or email by the bank as the customers are making successful digital transactions through BIBD Quickpay provides an assurance to the business. This provides an ease towards our accounting task by keeping track of the business' cash flows easily and obtaining trends of the customers (Retailer E).

The added security and safety feature of E-Wallet also highlighted by most interviewees in embracing this new payment mode.

It [E-Wallet] provides a safer way of managing and keeping cash as it reduces the risk of being robbed or scam as the cash is digitally stored in our bank account (Retailer C).

As the cash is digitally stored without the presence of substantial amounts of physical cash being kept in store, it provides security assurance for the business and our customers (Retailer J).

As a matter of fact, the safe and secure payment mode brought by E –Wallet simply increase the readiness for both adopted customers and retailers to embrace it (Karim et al., 2020; Marimuthu & Roseline, 2020 and Upadhayaya, 2012). Without the presence of security assurance, it will generate trust issues in the marketplace as trust is a significant essence to ensure the users and potential users of this payment system embracing the new payment mode with confidence, comfort and satisfaction (Gitau & David., 2014 and Hassan et.al, 2020). On top of this, E-wallet application without a secure encrypted QR-code may also lead to any sort of cybercriminals (Upadhayaya, 2012 and Kaur et al., 2018). Hence, the different layers of security access toward E-Wallet portal are indeed paramount so as to enhance assurance and trust among users in using E-Wallet in their retail transactions (Gundaniya, 2020; Sorensen, 2021 and Zoria, 2020).

Lastly, another factors that worth mentioning, raised by many interviewees are capitalizing E-Wallet as a branding tool that could boost the business' market standing and customers coverage as the population continued embracing this new mode of payment. This supports the statement of Dexatel (2019) who claimed that E-Wallet could contribute in enhancing a business' brand values through increasing customer spending, prompting more customers to visit the physical stores, creating a providing more incentives for customer through loyalty program. Hence, this could lead to numerous unexploited opportunities which benefits both the business and customers (Piplani, 2020).

The usage of BIBD Quickpay creates a proper standing point for the business as it makes the business more prominent and established as the usage of BIBD Quickpay could act as a branding tool for the business which we believes would expand the business customer coverage as the population of customers utilising this payment is rising over times (Retailer B).

Nonetheless, despite the values generated and effort made by the retailers, it can be concurred that, as confirmed further by most retailers interviewed, the wide acceptance of E-Wallet application among the customers in retail sector environment is still rather low.

There is an infrequency among the customers in utilising this payment due to the lack of awareness and getting confused regarding the operation of this payment system. It seemed most of our customers still prefer cash payment (Retailer A).

It is quite satisfactory to observe the customers are not bringing any physical cash in store with the existence of e-Wallet. However only around twenty per cent of the customers among the age group of 23 to 40 years old are using this payment system, while the remaining of the customers prefers to opt for cash, credit or debit card transactions. We believe that this slow progress is a matter of lacking awareness among the customers (Retailer C).

Only a minority of our customers are utilising this payment with only around one to two per cent are utilising it as the majority of our customers preferred to pay through physical cash, credit or debit card and online bank transfers (Retailer D).

Having said that there are still more room for improvement to prompt customers, in particular, in embracing E-Wallet in the retail sector

We have been using BIBD Quickpay as one of the payment modes for the customers and our choice of e-Wallet QR-code based payment system after we successfully created business account under BIBD at the end of 2020 as ninety percent of our customers are BIBD customers. In the future, as the business grows further, we plan to venture into adding more local e-Wallet QR-code based payment systems for our valued customers. Currently, more than fifty percent of our customers are utilising this payment system with a majority of the customers are within the age group of 20-30 years old which positively indicates that the provided platform is being utilised effectively by the customers (Retailer E).

We have been utilising BIBD Quickpay as our choice of e-Wallet QR-code based payment system and received an overwhelming usage from our customers with around fifty per cent are utilising the provided platform to date in spite of having card payment terminals from the local banks as a means of allowing customers to utilise credit or debit card transactions. In the light of the COVID-19 pandemic in Brunei *in March 2020, it acts as a striking feature for the business including our respective customers in embracing this unconventional payment as a means of reducing physical contact in order to reduce the spread of the disease. With our strong collaborations with BIBD through BIBD pop-up events such as the BIBD Home showcase in August 2019 and MSME showcase in November 2020, it further progresses the usage of BIBD Quickpay among our customers, providing more exposure for our business and plays a significant role in promoting this payment system in the country (Retailer B).*

Furthermore, according to AITI (2019), 95% of individuals are utilising the internet in the Sultanate with mobile phone deems to be an emerging device with around 88% of households owning it (AITI, 2019). World Bank (2019) also pointed out that the Sultanate has 132% of mobile phone cellular subscriptions per hundred people which proves that majority of its population are possessing mobile phone. Brunei is also consistently voted as among the top global users of social media platforms via mobile phones and has a high rate of digital inclusivity where it was ranked the third-highest ranked nation in the Southeast Asia region in the digital inclusiveness index after Singapore and Malaysia (Othman, 2021). All these trending indicators pointed out the greater opportunity for E-Wallet growth amongst the population than ever before that business sectors can capitalise from.

Our business does not seem to pursue in providing credit or debit card payment terminal due to a higher rate of charges by the bank to the business and a majority of the customers are possessing a mobile phone and bringing it out in the marketplace most of the time, E-Wallet QR-code based payment system remains to be the major option for our business (Retailer E).

Figure 6 above essentially shown the key enabling factors from both the customers and retailers, resulted from the analytical findings of the chapter, that lead to the adoption of E-Wallet payment in the retail sector in Brunei Darussalam. The inclusion of the retailers' view certain add values to the literature and to the context of the chapter for the purpose of improvement for E-Wallet ecosystem.

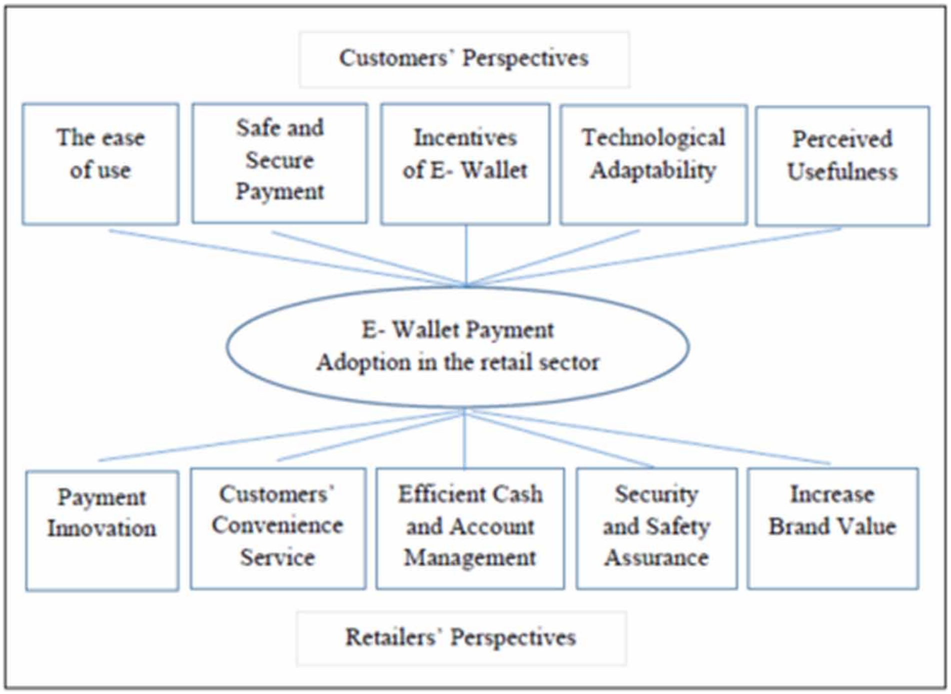
In lieu to the above, it is wise to take note the demotivating factors found in this study above that act like barriers for non-users to embrace E-Wallet application and then to prompt the population toward a cashless society. This is indeed in tandem with the nation's aspiration of becoming a 'Smart Nation' generated by a digital economy in which digital payment is one of the main priorities (AMBD, 2020). Accordingly, the key role and greater collaborative efforts exerted by business sector and government, as the key enabling players are indeed paramount to attain this strategic outcome.

RECOMMENDATIONS

Some of initiatives that could be taken by the government to foster the growth of E-Wallet ecosystem in the nation are as followed:-

The government could offer a competitive grants or interest-free loan for start-ups to build-up and offer Fintech related services including E-Wallet platforms. This initiative could increase more start-ups to venture into the industry, increase competition and hence increase innovation in term of Fintech related product offerings. This could, at the same time, lower the transaction fees related to E-Wallet application and hence increase the participation of retail merchants to offer E-Wallet payment mode to their customers. Many Middle East nations also have seen Fintech's growth, notably derived from strong

Figure 6. E- wallet payment adoption in the retail sector



government's support through funding Fintech related programmes, giving grants and also financial services from local financial institutions that greatly support the early stage of startups.

In addition, Government could also emulate initiative of 'e-Tunai Rakyat' programme from Malaysia Government which contributes RM30 through all E-Wallet platforms in the country to the eligible individuals comprising of B40 (Below 40%) and M40 (Middle 40%) income groups. This is simply a direct effort undertaken by the government in ensuring inclusivity for the people to embrace and familiarise the population with this new unconventional payment mode and hence act as a great initiative in developing a cashless society. Government could also subsidise self- checkout machines for retail stores that enabled E-Wallet payment mode.

In lieu to the above, continuous awareness and knowledge campaigns also need to be carried out by the Fintech Unit at Authority Monetary Brunei Darussalam to enhance greater understanding of E-Wallet payment system such as its key features, benefits its generated to the market players and tackling any privacy and security concerns associated and raise by non-users. This initiative is very important so as to gain buying-in among the population since the main barriers associated with non-users of E-Wallet in the nation as shown on Figure 4 are associated with lack of knowledge and awareness about E-Wallet and lack of readiness to embrace this new payment mode.

Above and beyond, it is ideal for the government agencies to 'walk the talk' too by started to embrace E-Wallet application itself in dealing with bill payments made by the public..

The business sector especially the retailers could also play a more proactive role in order to really induce their customer to use E-Wallet application and support the government aspiration of becoming a Smart Nation.

For instance, the retailers can give promotional incentives like discounts for customers who use E-wallet in paying their transaction. This effort, at the same time, also act like a promotional tool for the business as their customers utilising this payment is rising over times. The retailers can extend further the incentives by working together with other retail merchants even E-Wallet platform providers by offering their same customers extra values when using E-Wallet application in their respective retail stores or in business events. For instance, through the use of BIBD Quickpay, users could simply redeem their reward points, which was an accumulated bonus point from their credit or debit card usage. This enables the users to secure their full payment when making purchases without significantly impact their cash balance in their respective bank account. In another instance, the users can also combine their reward points with their available cash balance, thus, would result in increasing customer's motivation in utilising this payment system. So, there are many collaborations that business players could foster to come up with attractive and innovative features on their product offerings that could benefited their respective customers and hence boost up their respective revenues.

FUTURE RESEARCH DIRECTIONS

This chapter is arguably one of the earlier study on Fintech development in Burnei Darussalam. Therefore, for future studies, it would be beneficial to get the perspectives of E-Wallet application and ease of doing business from the platform providers themselves who conducted their businesses in the nation. Besides, another potential work can be done by capturing the views of officials from government agency within the Authority Monetary Brunei Darussalam under the Ministry of Finance and Economics who are in charge on Fintech development of the nation. The target audience might be able to provide greater understanding on the extant and future policies, practices and initiatives undertaken by the government toward Fintech development and hence to attain smart nation's strategic goal. Above all, it would be interesting and add more values if a comprehensive study to be carried out by taking the view of different keys stakeholders in the industry, with perhaps more retailers can be included via survey, in order to capture holistic views of current Fintech ecosystem in general and its prospect to move forward in Brunei's context. These multi-level perspectives from different key stakeholders has not been fully explored too in the literature.

CONCLUSION

It can be concluded that Fintech development in Brunei's business sector is still at an early stage. In relation to the Fintech development, there has been a growth in the development of local E-Wallet providers since 2018. As a result, both costumers and retailers, in over times, have able to generate greater values from this new way of payment mode in the retail sector experience. However, it seemed the utilisation of E-Wallet among the customers, found in this chapter, is quite low even though there is still room for improvement for E-Wallet to become a major mode of payment in the Sultanate. In consequence, both business and government could play an even greater roles in fostering growth of E-Wallet ecosystem and in driving the population toward a cashless society and attain a smart nation aspiration.

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KEY TERMS AND DEFINITIONS

Driving Factors: The impetus, motivator, or energy that force someone to perform certain act.

E-Wallet: A software programme that enable users to make payment through their smartphones. It is one of the domains of Fintech payment system.

Financial Technology (Fintech): An advanced technology that offers financial products and services. It means to be faster, safer and more convenience than traditional mode of payment system.

Information Privacy: The process where the users are able to keep their self- pertinent information from public domain.

Information Security: The process where the users can protect their private information from un-authorised access.

Perceived Ease of Use: The range of how easy it is to use one particular approach, tool, or system.

Perceived Usefulness: The range in which the users feel that the application of one particular approach, tool, or system can actually boost his or her performance.

Chapter 4
Green Finance and Sustainable Development:
A Case of the Bangladesh Economy

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ABSTRACT

Green finance is currently gaining importance with the growing global resistance to climate change. However, there is limited empirical evidence supporting green finance and economic development nexus considering environmental issues. Despite the fastest growing economy in Asia, Bangladesh still has ambiguity about the role of green finance on sustainable economic growth, though it is already initiated in Bangladesh. Therefore, applying correlation matrix and Granger causality test, this chapter aims to overview the present scenario and identify the role of green finance on sustainable development in Bangladesh from 2014-2019. Hence, it considers GDP growth and CO2 emissions for economic development and climate change issues, respectively, and green finance as the proxy of greening. This study finds that renewable energy consumption and power generation from renewable and waste contribute to green growth. Hence, this study suggests green finance for sustainable development not only in Bangladesh but also in other emerging economies.

INTRODUCTION

The world has undergone an intense rein in natural disasters such as winds, floods, droughts, salinity, cyclones, sea-level rises, and global warming, owing to the accelerated breakdown of glacier ice caused by atmospheric depletion. Environmental degradation creates an ecological imbalance, energy resource deficiency, soil erosion, and ecological contamination that threaten social and economic development and human survival (Darko and Chan, 2016; Liu, Liu, Xia, Ren, Liang, 2020). Therefore, the burning

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question is about the culprits behind these environmental issues. In this case, Hanif (2018) indicts high CO_2 and other greenhouse gas emissions discharged from non-renewable energy uses. Therefore, green finance could be a possible solution through financing in renewable energy sources.

Meanwhile, the United Nations (UN) has introduced 17 Sustainable Development Goals (SDGs) and 169 targets to localize in the countries, based on their economic conditions, detailed in the 2030 Agenda for Sustainable Development focused on sustainable finance for a sustainable economy (United Nations, 2015). As a part of the next eleven emerging countries (N-11),[1] Bangladesh should maintain these SDGs with special care to ensure sustainable development (Nawaz, Seshadri, Kumar, Aqdas, Patwary, and Riaz, 2020). Because of some issues, i.e., the non-renewable energy consumption, dense population, ancient technology uses, and no carbon restriction escalate global warming. Moreover, Bangladesh's geographical position, climate vulnerability, dense population, and riverine landscape contribute to a compelling case for green investments to support the country's sustainable development (Hossain, 2018).

Hence, introducing an efficient green economy via green finance represents an effective alternative and a route for economic growth in developing countries (Lewis, 2012; Liu et al., 2020). Green finance can be a channel to deal with the climate change issue, which is crucial for developing countries like Bangladesh. As the next emerging country, Bangladesh has achieved noteworthy progress in poverty reduction, supported by sustainable economic growth (World Bank, 2021). Besides, it is the fastest-growing country and can become a significant economy in the twenty-first century. Therefore, Bangladesh struggles to cope with the challenges by addressing different policies and strategies to adopt climate change threats and environmental risks (Hossain, 2019). Consistently, Haque and Murtaz (2018) denote that green finance is the major instrument for sustainable economic growth in a country like Bangladesh. Thus, the role of green finance is crucial to managing the climate change facts. Moreover, to achieve SDGs in any country, the economy should be green.

However, many developing countries have tried to access this financial support. Still, due to the lack of proper research and projection in a green economy, they have been facing various problems such as fund scarcity, lack of well-planned projects, lack of knowledge, lack of waste management technology, lack of evidence about the role, and so on (Liu et al., 2020). As a result, there is still ambiguity about the role of green finance in achieving long-term economic growth, even though sustainable finance policies have already been implemented in Bangladesh and other developing countries.

Therefore, to settle these issues with empirical investigation, this chapter aims to

- Overview the present status of green finance (GF) in Bangladesh as a next emerging economy;
- How the government, banks, and non-bank financial institutions (NBFIs), and foreign direct investment (FDI) can motivate green finance for sustainable economic development;
- Identify the empirical evidence of the contributions of GF on Bangladesh's economic development with the least possible environmental degradation;
- Address the strategies to attract green projection, the challenges that the emerging or developing countries like Bangladesh are facing or might face;
- Recommend some policy insights to cope with the present crisis in green finance as well as to well-establish green growth.

The remaining chapter is designed as follows: Section 2 describes the background of green finance and sustainable economic development, reviews the earlier relevant literature, and narrates the emergence of green finance in Bangladesh. Section 3 addresses the primary purposes of this chapter, namely key issues, materials, and methodology used for this study. Concise overviews of the present scenario of green finance in Bangladesh, the analysis and interpretations of the results, and the future challenges are presented in Section 4. Section 5 identifies adaption strategies and recommendations to face those challenges to motivate green finance, and future research directions are mentioned in Section 6. Finally, this chapter concludes with the authors' judgments on the outcomes of the analysis and the potential implications of the results.

BACKGROUND

As a result of the detrimental impacts of economic growth on climate change with the worldwide recession, the global community is looking for ways to warrant a sustainable economy and society (Ciocoiu, 2011). In this case, Zhang, Maleki, Rosen, and Liu (2018) reveal that economic growth negatively affects the environment owing to non-renewable energy consumption. Similarly, Dong, Dong, and Dong (2019) find a significant direct impact of economic growth, non-renewable energy, and energy intensity on regional and global carbon emissions. Therefore, rather than economic growth, sustainable economic growth and finance are needed to respond to recent global warming and other environmental deterioration (Wang, Tsai, Du, and Bi, 2019). Assessing the economic and ecological factors for achieving the standard of SDGs, investment and lending policies are captured in green finance (Volz, 2018).

The emerging ideas of green finance, also known as green investment, are widely used and have various meanings (Dörry and Schulz, 2018) with no systematic and global definition (Rawat and Anu, 2020). According to Wang and Zhi (2016), green finance incorporates financial actions with environmental obligations to achieve the best possible outcomes. Conversely, Wang et al. (2019) argue that green finance is a combination of financing and sustainable development. Therefore, green finance is the best option for investing in eco-friendly schemes that yield positive and efficient environmental outcomes (Zheng, Siddik, Masukujjaman, Fatema, and Alam, 2021).

International Trade Centre,(What is Green Finance, n.d.) "Green Finance encompasses all the initiatives taken by private and public agents (e.g., businesses, banks, governments, international organizations, etc.) in developing, promoting, implementing, and supporting projects with sustainable impacts through financial instruments." Moreover, United Nations Environment Programme (UNEP) (2016) defines as "Green finance is a strategy for the financial sector and broader sustainable development that is relevant around the world. But the context differs considerably for different countries." According to the G20 Green Finance Study Group, green finance is the "financing of investments that provide environmental benefits in the broader context of environmentally sustainable development."

Besides, Jeucken and Bouma (1999) address green finance as a modern idea that combines environmental conservation with greening the financial sector and developing innovative sustainable business practices. As a result, green finance can balance the relationship amid the advancement of economic events, environmental and ecological fortification, and the achievement of SDGs. Labatt and White (2003) opine that green finance is impeccable to improve the environment and reduce risk aversion by inventing various advanced financial instruments. Similarly, there is an agreement that the balance of ecology and economic growth can be endorsed by green finance (Zhou and Li, 2019).

In the case of green economy, the (UNEP) (2011) elucidates the green economy as "the process of reconfiguring businesses and infrastructure to deliver better returns on natural, human, and economic capital investments, while at the same time reducing greenhouse gas emissions, extracting and using less natural resources, creating less waste and reducing social disparities." Moreover, the sustainable economy is resilient and delivers a standard life quality for every human being to help to keep global warming below 2°C thresholds (Sustainable economies, n.d.).

Soon, however, all funds will turn green because it has to do so to make the world livable. Therefore, investing in a project, small or large, that does not emit harmful gases into the environment or helps reduce environmental pollution without disrupting ongoing production is called green financing.

Based on the above discussion, green finance is

- A sustainable investment,
- An eco-friendly financial projection and policies,
- A modern idea, and
- The pathway to the green economy.

Literature Review

Financial greening is the mandatory tool to sustain economic development in any country (Zhang, Zhang, and Managi, 2019) by settling the economic-environmental conflict (Mohd and Kaushal, 2018). Thus, according to Haque and Murtaz (2018), green banking and finance are critical factors in a sustainable economy in developing countries, e.g., Bangladesh. On the other hand, Zheng et al. (2021) reveal that the green economic performance of Bangladesh is average in south Asia. Moreover, Sica (2018) has empirically studied eco-innovative businesses' financial pressures and concluded that they are somewhat less likely to partake in investment ventures due to the financial criticalities of green firms. That is why a growing body of literature (Buchner, 2012; Nakhooda, Norman, Barnard, Watson, Greenhill, Caravani, Trujillo, and Banton, 2014) aims to evaluate the efficiency of the GF by exploring how smaller sums of funding can be used for the transition to sustainable development. In this context, Chaum, Faris, Wagner, Buchner, Falconer, Trabacchi, Brown, and Sierra (2011) propose that GF efficiency depends on various factors, including green project efficiency, the feasibility of the expenditure financed, and the reliability of decision-making.

Since banks are the central players in the financial system and play an essential role in the global economy (Jayawardhena and Foley, 2000; Wang, 2016), they have a profound economic, societal, and sustainable development effect (Mezher et al., 2002; Scholtens, 2009; Helleiner and Pagliari, 2011; Weber, Diaz, and Schwegler, 2014; Hasan, 2020). Although banks have relatively minor direct environmental impacts compared to other industries, they have a significant indirect impact on sustainability through loans and acquisitions that promote the expansion of polluting practices (Scholtens, 2009; Meena, 2013; Wendt, 2015; Pintér, Deutsch, and Ottmár, 2020).

Ren, Shao, and Zhong (2020) investigate the relationship between green finance, carbon intensity, and non-fossil energy use in China. They find that the green finance field has seen rapid progress with non-fossil fuel sources' growing use, resulting in decreased carbon intensity. Similarly, the growth and usage of non-fossil fuels have been slowed by increased energy demand, sustainability of infrastructure investment, and GF has decreased as a result. They add that GF has mainly influenced China for non-fossil energy consumption. Consistently, Nawaz et al. (2021) examine the relationship between GF and climate change mitigation in the next-11 emerging and BRICS countries and suggest that the necessary green finance policies must be formulated to address the structural risks and vulnerabilities raised by environmental issues. Liu et al. (2020) argue that GF has emerged as a significant growth point and driver for promoting green economic growth, with social responsibility and environmental conservation concerns at the heart of sustainable development.

Zheng et al. (2021) investigate the current scenario of green finance in Bangladesh's banks and NBFIs from 2014-2019 and report that the private commercial banks perform a more significant role to encourage green finance to achieve SDGs. However, in the case of sector-wise fund allocation, solid and liquid waste management get the highest. Consistently, Khairunnessa, Vazquez-Brust, and Yakovleva (2021) report that Bangladesh Bank's 3-phase implementation of the green banking regulations and the establishment, in 2017, of the Environmental and Social Risk Management Guidance (ESRM) bring about a positive shift for banks and financial institutions in Bangladesh.

Previous studies on the role of different banks and financial institutions in motivating green finance are mainly conducted using a theoretical approach, with little focus on empirical analysis. However, the empirical investigation on the liaison between green finance and sustainable development considering the climate change risk is very scant in Bangladesh. In contrast, the role of green finance is still unclear whether it appreciates sustainable economic growth (GDP) by conserving environmental protection. Although the activities of green finance have already started in Bangladesh, lack of proper knowledge and confidence, lack of evidence about its roles, internal problems, and some geographical risks and uncertainties are hindering the progress of green finance. Thus, the current study aspires to meet the literature gap by examining the role of green finance in achieving sustainable development with no or the least possible carbon discharge.

Emergence of Green Finance in Bangladesh

Bangladesh's economy has grown at an unprecedented rate of more than 6% in recent years, calling it the next "Asian Tiger" (Hasan, Wahid, Amin, and Hossain, 2021)." Consequently, Bangladesh has achieved a lower-middle-income grade in 2015 and is on course to graduate from the UN's list of Least Developed Countries (LDCs) in 2026 (World Bank, 2021). The per capita income has more than tripled in US$ and doubled in the purchasing power parity (PPP) from 2000 to 2017 (Khairunnessa et al., 2021). Moreover, Bangladesh is identified as the "frontier five" economy globally by JP Morgan (Bangladesh Embassy Denmark, n.d.), attracting FDI from various nations, including India, China, Japan, and Turkey.

However, this economic expansion has resulted in accelerated industrialization and the start of many megaprojects, many of which experienced environmental depletion (Khairunnessa et al., 2021). Total CO_2 emissions of Bangladesh grew to 106.5 million tons (0.65 tons per capita) in 2019. Still, Bangladesh's CO_2 emissions per capita are less than one-sixth of the world average (4.45 tons CO_2 emissions per capita) (BP-Statistical Review of World Energy, 2020).[2] Rahman and Lateh (2017) reveal that the country's average temperature increases by 0.2°C every decade. For a heavily populated nation of over 166 million with a population density of 1265 per square kilometer,(Bangladesh population [live], n.d.) the negative impact of climate change results will be immense, even though Bangladesh is not still a major emitter of carbon and other greenhouse gases. A report by United Nations Framework Convention on Climate Change (UNFCCC) forecasts that the country may experience a significant loss of 2% and 9.4% annually of total GDP by 2050 and 2100, respectively, if the circumstances persist (Bhuiyan, Hassan, Darda, Habib, Hossain, 2020). On the other hand, World Bank (2018) depicts that around 5.3 million people will be defenseless because of the effects of climate change in 2050. Hence, Bangladesh needs to be aware of the uphill climate change risk for adopting sustainable development.

To address the risks, Bangladesh has adopted the Sustainable Development Goals (SDGs) by introducing the National Sustainable Development Strategy (NSDS 2010-2021). In this case, banks and NBFIs are playing a pivotal role in economic development through green financing. To illustrate, in 2019, domestic credit to the private sector reached 45 percent of GDP, and the overall green finance is 111206 million (BDT) in FY20 (see Table 2). Moreover, the Bangladesh Bank initiates some adoptive policies and monetizes the green finance projects efficaciously. To promote the green finance and policy initiatives, it extended the refinancing schemes from 6 to 55 in several green products, amounting to 613.09 million (BDT) in 2020 (see Table 4).

Sustainability has taken an extraordinary step on the planet, and green finance is an imperative instrument to accomplish it. Bangladesh has also entered the race, owing to the frontline of climate change risk. Thus, the country needs concerted efforts on all fronts to minimize this unforeseeable risk. It is evident that green finance plays a significant role in sustainable growth. Therefore, Bangladesh has already taken several initiatives under the sustainable finance department of Bangladesh Bank for greening the financial institutions and investments, and categorized broadly into the following four aspects, i.e., (a) policy initiatives, (b) green banking activities of banks and NBFIs, (c) refinance support from BB in diverse green products/sectors, and (d) BB's initiatives for in-house environmental management.

MAIN FOCUS OF THIS CHAPTER

Key Issues

Maintaining economic growth is vital for a developing country like Bangladesh, but controlling carbon emissions is even more critical. Sustainable economic growth can only be achieved if economic development is made sustainable by adapting to climate change. The policies and initiatives adopted by Bangladesh Bank have positively affected greening the bank and non-bank financial institutions (Khairunnessa et al., 2021; Zheng et al., 2021). However, with the increase of investment in banks and NBFIs in green finance, it is necessary to examine whether this green finance leads the country's economy toward sustainable progress because there is a trade-off between green finance and economic growth and CO_2 emissions. As mentioned earlier, the previous researches were mainly descriptive by outlining a brief scenario of green finance development in Bangladesh. Also, no study has empirically looked into green finance's contribution to sustainable economic development in Bangladesh. As a result, to date, the question remains whether these green finance or green finance activities of banks and NBFIs make significant contributions to economic growth and CO_2 reduction.

To address the existing literature gap, this study develops the following research questions:

- Do these green investments positively impact sustainable economic growth in Bangladesh?
- Is there a negative relationship between CO_2 emissions and green finance?
- What policies can be suggested to enhance green finance for sustainable development in Bangladesh?

This chapter endeavors to answer these questions through empirical analysis.

Table 1. Details of the variables used in this study

Variables	Abbr.	Measurement	Sources
GDP growth rate	GDPGR	The annual growth rate of gross domestic product (%).	WDI of World Bank
CO_2 emission	CO_2	Carbon-dioxide emissions (tons/pc).	IEA
BB's refinancing	BBR	Disbursement of Bangladesh Bank's refinancing schemes in green products/ projects (million BDT).	Bangladesh Bank
Green Finance to GDP	GF (%GDP)	The portion of total green finance to GDP (%).	Authors' calculation
Foreign Direct Investment	FDI (%GDP)	The contribution of FDI to GDP.	CEIC data
Green Finance by banks	GFBAN	Total green finance annually by 55 banks.	Bangladesh Bank
Green Finance by NBFIs	GFNBFIs	Total green finance annually by 33 NBFIs.	Bangladesh Bank
Renewable energy consumption	REC	% of renewable energy consumption to total energy consumption.	WDI and IEA
Power generation from renewable and waste	PGRW	Only the power generation from renewable and waste consumption.	IEA

Materials and Methodology

Data and Variables

This study mainly investigates the contribution of green finance in achieving sustainable economic development in Bangladesh. The data sample includes 55 banks and 33 NBFIs, contributing almost 100% of total green finance in Bangladesh. The data frequency is annual, covering the period 2014-2019. The data used in this study are mainly secondary, extracted from the quarterly and annual reports of the Bangladesh Bank, World Bank, International Energy Administrations (IEA), and CEIC data. However, the sample size and period are determined by the availability of data. The gross domestic product (GDP) growth rate (GDPGR) and CO_2 are the proxy of economic growth and climate change, respectively. Similarly, BB's refinancing (BBR), Green Finance to GDP (GF) (%GDP), Green Finance by banks (GFBAN), Green Finance by NBFIs (GFNBFIs), Renewable energy consumption (REC), and Power generation from renewable and waste (PGRW) are considered green finance indicators. The variables definitions are delineated in Table 1:

Methodology

This chapter aims to determine the role of green finance on sustainable economic growth while taking environmental concerns into account. It is crucial to identify how green indicators relate to sustainability, as the world is concerned about sustainable development. The methodology used in the analysis of this chapter consists primarily of descriptive statistics, correlation, and Granger causality. The study cannot employ the advanced method because the sample size is small. Hence, this study makes decisions based on the directive relationships between the indicators. Therefore, firstly, this chapter performs descriptive statistics to understand the characteristics of the data sample with the help of average and volatility. Secondly, this study estimates the Pearson correlation coefficient matrix (Pearson, 1895) among the green finance determinants, economic growth, and CO_2 emission to perceive the interrelationship. Lastly, to determine the empirical role of GF on economic growth, the Granger causality test (Granger, 1969) is employed, which identifies the causal directions between a pair of variables. All the calculations are performed using EViews 10 software.

- **The correlation coefficient matrix** is a degree of linear correlation between a pair of data. It is calculated by the element of their standard deviations to the covariance of two respective variables. The correlation always has a value between −1 and +1. This paper examines the correlation matrix, applying the following correlation coefficient equation.

$$\rho_{X,Y} = \frac{\operatorname{cov}(X,Y)}{\sigma_X \sigma_Y} ., \tag{1}$$

where
cov(X, Y) is the covariance between X and Y.
σX is the standard deviation of X.
σY is the standard deviation of Y.

- **Granger causality** is usually tested in the perspective of linear regression approaches. To illustrate, this study considers a bivariate linear autoregressive model of a pair of variables, X_t and Y_t as follows

$$X_t = \sum_{j=1}^{p} \beta_{11,j} X_{i,t-j} + \sum_{j=1}^{p} \beta_{12,ij} Y_{i,t-j} + \in_{1,t} ., \tag{2}$$

$$Y_t = \sum_{j=1}^{p} \beta_{21,j} X_{i,t-j} + \sum_{j=1}^{p} \beta_{22,ij} Y_{i,t-j} + \in_{2,t} ., \tag{3}$$

where p is the lag length comprised in the approach (the model order), t is time, β represents the coefficients of the expected values of Xt and Yt and ∈t is the standard errors for each time series. If the variance of ∈1$_{,t}$ (or ∈2$_{,t)}$ is diminished by the addition of the Yt (or Xt terms in Equations (1) or (2), then it is supposed that Yt (or Xt granger causes Xt (or Yt In other words, Yt Granger causes Xt if the coefficients β12 $_{a}$re jointly significantly different from zero. An F-test of the null hypothesis can be used to verify this, where, β12=$_0$, given the assumptions of covariance stationarity on Xt a_nd Yt. $_B$ased on Akaike Information Criterion (AIC) (Akaike, 1974), this chapter selects the p v$a$lue (lag length).

Table 2. Total green finance by banks and NBFIs from 2014-2020 (In million BDT)

Institutions	2014	2015	2016	2017	2018	2019	2020	Total GF	Share
SCBs(9)	1700	3067.70	2013.70	2884.40	1815.20	1219.44	1908.91	14609.35	3%
PCBs(40)	23300	20098.60	24597.40	30578.50	65,904.30	78316.90	69668.75	312464.45	71%
FCBs(6)	9800	3273.60	768.80	551.30	192.60	19213.20	34332.69	68132.19	16%
GF-banks(55)	34800	26439.90	27379.90	34014.20	67912.10	98749.54	105910.40	395205.99	90%
GF-NBFIs(33)	9200	8320.70	5948.20	4632.60	3389.60	6499.87	5295.20	43286.17	10%
Total GF	44000	34760.10	33328.10	38646.80	71301.70	105249	111206	438491.65	100%

Notes: SCBs, PCBs, FCBs, GF-banks, GF-NBFIs, and total GF refers to state-owned commercial banks, private commercial banks, foreign commercial banks, green finance by banks, green finance by non-bank financial institutions, and total green finance, respectively. 1 BDT = USD 0.012 as on 20 January 2021.

Source: Sustainable finance department, Bangladesh Bank.

RESULTS ANALYSIS AND DISCUSSION

Scenarios of Green Financing Activities in Bangladesh

This section explores the green finance trends by banks and NBFIs from 2014-2020 in different sectors and perspectives. Also, this section exhibits the sector-wise percentage of total green finance and its contributions to GDP growth in recent years, as well as Bangladesh Bank's refinance disbursements in green schemes. Table 2 shows the total green finance of BDT 438491.65 million from 2014-2020; of them, BDT 395205.99 and 43286.17 million were disbursed directly by banks and NBFIs, respectively. Figure 1 indicates the snapshot of total green finance, representing an upward trend after 2017. Therefore, the practice of green financing is growing, and it has sustained its ongoing rise over the past three years.

Table 3 exhibits the sector-wise green finance by banks and NBFIs in Fiscal Year (FY) 20. Moreover, it presents the sector-wise contributions to total green finance and the share in GDP growth in 2020, summarized in Figure 2. The green finance in green establishment holds more than a half (60%) of total green financing in FY20 and contributes 0.0022% to GDP, while alternative energy has no financing.

Figure 1. Total green finance by banks and NBFIs

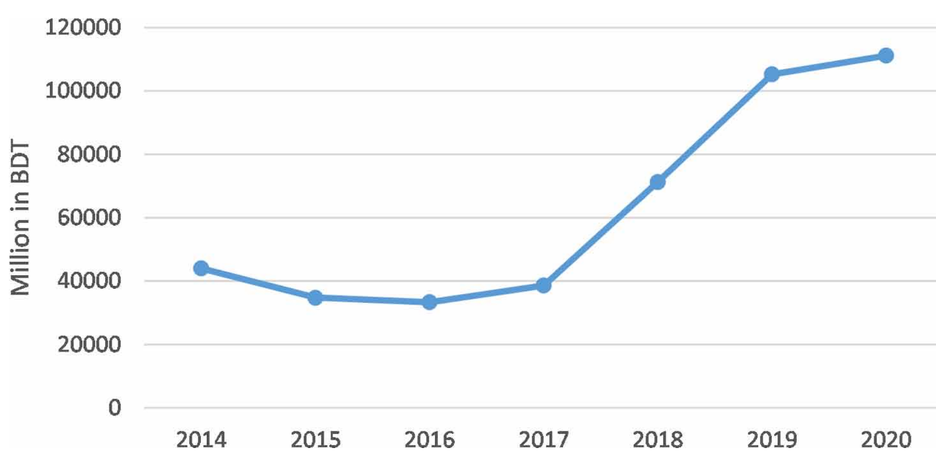


Table 3. Sector-wise green finance in FY20 by banks and NBFIs (In million BDT)

Sectors	SCBs	PCBs	FCBs	GF-Banks	Gf-NBFIs	Total GF	% of total GF	Contribution to GDP %
renewable energy	7.48	1979.41	608.60	2595.49	942.36	3537.85	3.18	0.0001
Energy efficiency	0.00	6398.37	327.70	6726.07	2819.00	9545.07	8.58	0.0003
Alternative energy	0.00	10.08	0.00	10.08	6.00	16.08	0.01	0.0000
Waste management	660.05	8878.87	283.80	9822.72	240.00	10062.72	9.05	0.0003
Recycling and recyclable product	290.85	8298.55	4.60	8594.00	272.69	8866.69	7.97	0.0003
Green brick manufacturing	363.25	8402.90	0.00	8766.15	432.13	9198.28	8.27	0.0003
Green establishment	579.85	32737.93	33072.40	66390.18	350.00	66740.18	60.02	0.0022
others	7.43	2962.65	35.59	3005.67	233.00	3238.67	2.91	0.0001
Total	1908.91	69668.76	34332.69	105910.36	5295.18	111206.00	100	0.0036

Note: Sector-wise contribution is calculated as the percentage of the total contribution of green finance to GDP.
Source: Sustainable finance department, Bangladesh Bank (2020) and authors' calculation.

Though the contribution of the green finance of each sector to GDP is close to zero and insignificant, it shows an upward trend. Moreover, the sector-wise green finance by banks is almost the total green finance in Bangladesh in the last fiscal year. However, the overall contribution of green finance to GDP is still insignificant but shows a growing trend from 2014 to 2019, as presented in Figure 3(vi). Table 4 displays the disbursement of total refinancing schemes for green projects or products, and the disbursement trend is shown in Figure 3 (iii).

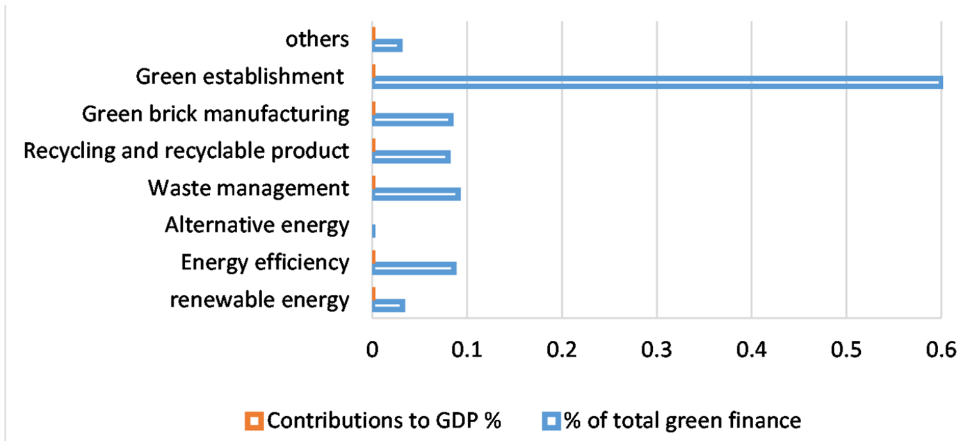
Results Analysis

The results of descriptive statistics for economic growth and GF indicators are reported in Table 5. The mean gross domestic product (GDP) growth rates for the last six years are positive (7.2%), with low volatility (0.78%). The average carbon emission per capita is 0.53 tons. However, carbon emissions follow a slow growth but upper trend (see Figure 3 (ii)).

The contribution of GF to GDP is meager due to the low average renewable energy consumption and power generation from renewable and waste utilization. Furthermore, the deficient disbursement of Bangladesh Banks' refinance schemes is the probable reason for GF's low performance.

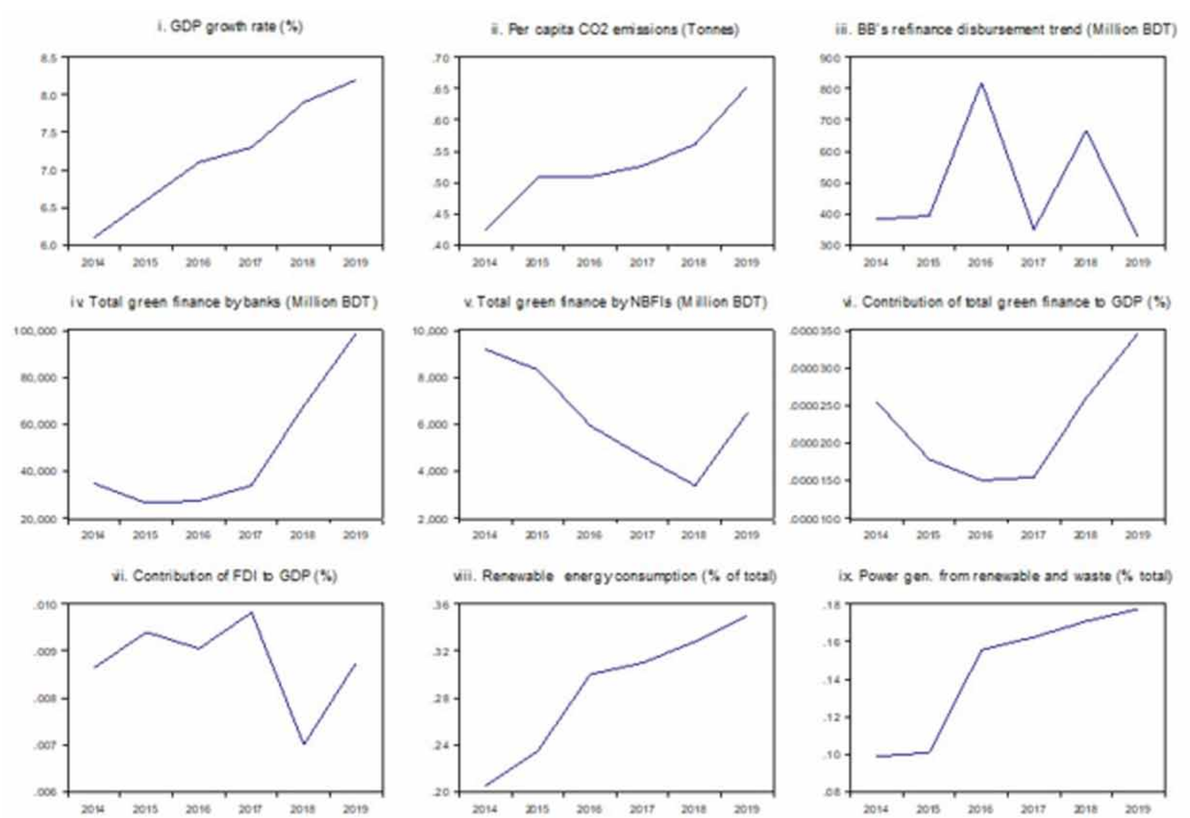
Table 6 represents the correlation matrix. It shows how the variables are correlated to each other. In this case, GDPGR has a significant positive association with CO_2, REC, and PGRW at a 1% significance level, meaning that GDP growth and those variables are positively directed to each other. Among them, the affiliation between carbon emission and GDP growth is the most significant. As production increases, so does the use of non-renewable energy, which in turn increases CO_2 emissions (Zhang et al., 2018; Dong et al., 2019; Muhammad and Khan, 2019; Khan, Peng, and Li, 2019). Precisely, GDPGR is positively correlated to REC and PGRW; in contrast, CO_2 is negatively correlated with REC and PGRW, resulting in the duel contribution of renewable energy consumption to GDP enhancer and carbon deflator. Thus, it can conclude that the GDP and CO_2 can be led by REC and PGRW efficaciously, which are

Figure 2. Sector-wise green finance in FY20



also supported by Muhammad and Khan (2019), Khan et al. (2019), Mensah et al. (2019), and Rahman and Velayutham (2020).

Figure 3. Trend analysis of the variables used in this study



Source: Authors' compilation from different secondary sources

Table 4. Disbursement of Bangladesh Bank (BB)'s refinance schemes for green product/initiatives from 2012-2020 (million BDT)

Category of Green Products	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Total %
Biogas	133.20	113.60	212.80	83.30	84.80	46.60	10.50	4.60	1.24	690.64	15.25%
Solar irrigation pump	8.40	0.00	17.90	26.50	0.60	0.00	0.00	0.00	0.00	53.40	1.18%
Solar mini-grid	0.00	0.00	0.00	0.00	10.00	0.00	0.00	0.00	0.00	10.00	0.22%
Solar home system (SHS)	10.50	40.20	32.20	87.50	14.70	35.30	0.00	0.20	45.00	265.60	5.87%
Solar assembly plant	248.80	122.70	49.60	148.10	16.30	0.00	0.00	0.00	0.00	585.50	12.93%
Effluent treatment plant	22.20	57.40	10.00	0.00	58.00	179.60	60.00	108.40	132.50	628.10	13.87%
Green industry	0.00	0.00	0.00	0.00	400.00	0.00	500.00	152.30	198.70	1251.00	27.63%
Organic manure from slurry	0.00	0.00	0.00	0.00	0.20	0.10	0.00	0.00	0.00	0.30	0.01%
Vermi-compost	0.00	0.00	0.00	1.10	1.60	1.30	0.00	0.80	1.26	6.06	0.13%
Paper waste recycling	0.00	0.00	0.00	0.00	20.00	20.00	0.00	0.00	0.00	40.00	0.88%
Safe working environment	0.00	0.00	0.00	0.00	35.70	55.30	82.00	40.00	88.10	301.10	6.65%
Energy efficient tech	0.00	0.00	0.00	0.00	0.00	0.60	13.00	10.00	46.29	69.89	1.54%
HHK technology in brick kiln	55.00	172.20	59.00	47.00	177.80	10.00	0.00	5.00	100.00	626.00	13.83%
Total	478.10	506.10	381.50	393.50	819.70	348.80	665.50	321.30	613.09	4527.59	100%

Source: Sustainable finance department, Bangladesh Bank.

Again, the GDPGR is positively correlated with GFBAN but negatively with GFNBFIs at 5% and 10% significant levels, respectively, while, interestingly, the CO_2 has a significant positive correlation with GFBAN. Notably, GF (%GDP) is significantly correlated with GFBAN at a 5% level, indicating the positive contribution of banks' green investment in GDP growth. On the other hand, GFNBFIs have negatively correlated with REC and PGRW at 10% and 5% levels of significance, respectively.

Table 7 presents the granger causality results among the variables used in this study. Based on AIC, the maximum lag length is 1. It unearths that the unidirectional causality running from GDPGR to GF (%GDP) and CO_2 is found at a 10% significance level, meaning that the ratio of green finance to GDP

Table 5. Descriptive statistics

	GDPGR	CO_2	GF(%GDP)	FDI(%GDP)	BBR	GFBAN	GFNBFIs	REC	PGRW
Mean	7.200	0.530	0.002	0.009	488.383	48215.941	6331.828	0.288	0.144
Median	7.200	0.518	0.002	0.009	387.500	34407.102	6224.035	0.305	0.159
Max.	8.200	0.653	0.004	0.010	819.700	98749.541	9200.000	0.350	0.177
Min.	6.100	0.424	0.002	0.007	321.300	26439.900	3389.600	0.205	0.099
Std. Dev.	0.785	0.075	0.008	0.001	204.435	29091.573	2186.390	0.056	0.035

Notes: GDPGR, CO_2, GF(%GDP), FDI(%GDP), BBR, GFBAN, GFNBFIs, REC, and PGRW represent GDP growth rate, carbon emissions, green finance's share in GDP, foreign direct investment's share in GDP, Bangladesh bank's disbursements in refinancing schemes, green financing by the banks, green financing by non-bank financial institutions, renewable energy consumptions and power generations from renewable and wastes, respectively. Similarly, max, min, and Std. Dev. represent maximum, minimum, and standard deviations, respectively.

Table 6. Correlation matrix results

Variables	GDPGR	CO_2	GF(%GDP)	FDI(%GDP)	BBR	GFBAN	GFNBFIs	REC	PGRW
GDPGR	1.000								
CO_2	0.934*	1.000							
GF(%GDP)	0.473	0.547	1.000						
FDI (%GDP)	0.371	-0.179	-0.513	1.000					
BBR	0.105	-0.109	-0.353	-0.412	1.000				
GFBAN	0.813**	0.841**	0.896**	-0.485	-0.214	1.000			
GFNBFIs	-0.743***	-0.488	0.067	0.394	-0.418	-0.312	1.000		
REC	0.971*	-0.873**	0.305	-0.250	0.201	0.689	-0.803***	1.000	
PGRW	0.929*	-0.778***	0.263	-0.274	0.259	0.636	-0.842**	0.983*	1.000

Notes: Gross domestic products growth rate, carbon emissions, green finance to GDP growth ratio, foreign direct investment to GDP growth ratio, Bangladesh bank's refinance schemes, green finance by banks, green finance by non-bank financial institutions, renewable energy consumptions, and power generations from renewable and wastes are represented by GDPGR, CO_2, GF(%GDP), FDI(%GDP), BBR, GFBAN, GFNBFIs, REC, and PGRW, respectively. '*,' '**,' and '***' represent the significance levels at 1%, 5%, and 10%, respectively.

growth and carbon emissions change as the GDP growth rate changes. In contrast, BBR and REC granger cause GDPGR, anticipating the usefulness of the disbursement of BB's refinancing schemes for green projects and renewable energy consumption to GDP growth rate. Consistently, a unidirectional causal link exists from GF (%GDP) to $CO_{2,}$ and GFBAN to CO_2, GF (%GDP), and FDI (%GDP), meaning that the GF to GDP growth ratio and GF by banks have the adaptability to control carbon emissions (Meo and Karim, 2021).

Similarly, REC to GF (%GDP), PGRW to GF (%GDP), FDI (%GDP) to GFNBFIs also disclose a unidirectional relationship, implying that renewable energy consumption and power generation from renewable and waste Granger cause the GF to GDP growth ratio. At the same time, GF by NBFIs can be directed by FDI to GDP growth ratio. But surprisingly, a unidirectional causality has been found from CO_2 to REC and PGRW. Therefore, the upper trend of carbon emissions (Figure 3, (ii)) suggests increasing renewable energy consumption and power generation from waste utilization as a green investment.

Furthermore, a bidirectional causality is identified between GFNBFIs and GF (%GDP), GFNBFIs and GFBAN, and PGRW and REC at a 5% significance level. It means that these variables are helpful to forecast each other. Importantly, GFNBFIs lead GF (%GDP), and vice-versa, suggests focusing green investment by NBFIs and total green finance. Precisely, the bidirectional causality running from GFNBFIs to GFBAN encourages them to finance green projects and finds a base to enhance green loan sanctioning competitively in Bangladesh. Likewise, the bidirectional link is revealed between PGRW and REC, indicating that both interact as an important GF source.

However, the overall findings conclude that the green finance indicators like REC and BBR Granger cause the GDPGR unidirectionally. Though GF (%GDP) does not Granger cause GDPGR, it is unidirectionally Granger cause to CO_2. The possible reasons for no causality between GF (%GDP) to GDPGR might be staying in the initial stage and relatively low investment in green projects, which is easily predictable by the investment performance of one-third of the total least loan disbursement regulation.

Table 7. Pairwise Granger causality test results

Variables			X to Y		Y to X		Causality direction
X	and	Y	F-Statistic	Prob.	F-Statistic	Prob.	
GF(%GDP)	and	GDPGR	0.010	0.929	10.421***	0.084	⟵
CO_2	and	GDPGR	0.101	0.781	10.423***	0.086	⟵
FDI(%GDP)	and	GDPGR	0.444	0.574	1.220	0.384	
BBR	and	GDPGR	74.071**	0.013	0.028	0.883	⟶
GFBAN	and	GDPGR	0.001	0.991	4.777	0.160	
GFNBFIs	and	GDPGR	0.348	0.615	0.147	0.738	
REC	and	GDPGR	13.028***	0.083	1.197	0.388	⟶
PGRW	and	GDPGR	0.032	0.875	1.729	0.319	
GF(%GDP)	and	CO_2	7.548***	0.071	4.878	0.158	⟶
FDI(%GDP)	and	CO_2	5.030	0.154	0.743	0.480	
BBR	and	CO_2	0.014	0.917	0.607	0.517	
GFBAN	and	CO_2	42.159**	0.023	2.632	0.246	⟶
GFNBFIs	and	CO_2	1.608	0.333	0.155	0.732	
REC	and	CO_2	0.296	0.641	172.093*	0.006	⟵
PGRW	and	CO_2	0.441	0.575	16.013***	0.057	⟵
FDI(%GDP)	and	GF(%GDP)	0.822	0.460	0.001	0.984	
BBR	and	GF(%GDP)	0.042	0.857	2.401	0.261	
GFBAN	and	GF(%GDP)	14.264***	0.063	6.767	0.121	⟶
GFNBFIs	and	GF(%GDP)	19.454**	0.048	47.090**	0.021	⟷
REC	and	GF(%GDP)	9.568***	0.091	0.019	0.903	⟶
PGRW	and	GF(%GDP)	7.276***	0.065	0.505	0.551	⟶
BBR	and	FDI(%GDP)	0.582	0.525	1.022	0.419	
GFBAN	and	FDI(%GDP)	152.553*	0.007	6.830	0.120	⟶
GFNBFIs	and	FDI(%GDP)	1.725	0.320	34.015**	0.028	⟵
REC	and	FDI(%GDP)	0.811	0.462	0.001	0.974	
PGRW	and	FDI(%GDP)	0.824	0.459	0.110	0.771	
GFBAN	and	BBR	0.579	0.526	0.007	0.941	
GFNBFIs	and	BBR	0.008	0.993	0.045	0.852	
REC	and	BBR	0.045	0.851	0.203	0.696	
PGRW	and	BBR	0.003	0.960	0.006	0.947	
GFNBFIs	and	GFBAN	19.171**	0.0339	39.209**	0.025	⟷
REC	and	GFBAN	4.796	0.160	0.012	0.924	
PGRW	and	GFBAN	3.898	0.187	0.045	0.853	
REC	and	GFNBFIs	1.884	0.303	0.017	0.909	
PGRW	and	GFNBFIs	0.383	0.599	0.713	0.487	
PGRW	and	REC	23.291**	0.040	55.395**	0.018	⟷

Notes: The table shows the relationship between the variables exemplified by X and Y. '*,' '**,' and '***' denote 1%, 5%, and 10% levels of significance, respectively. The casualty direction ↔ and →or ← signify the bidirectional and unidirectional causal link, respectively. The definitions of the variables are the same as in Table 4.

Discussion

The above analysis suggests an upward trend in Bangladesh for the last few years regarding GDP growth rate and green financing by banks and non-bank financial institutions. Moreover, the contribution of green finance and foreign direct investment to GDP is increasing, though it is minimal in percentage (see Figure 3 (vi & vii)). In sector-wise green financing, the green establishment sector shows the highest financing in FY20 by banks and NBFIs. The policy accomplishments and the disbursement of Bangladesh Bank's refinancing schemes in green projects and credit provisions for the financial organizations and greening the banking sector also indicate the appreciation of green financing. Also, the NBFIs like Infrastructure Development Company Limited (IDCOL) integrate concessional refinancing with infrastructure evaluations, quality assurance, supervision, and other welfare services for microfinance organizations (Kunhibava, Ling, Rahman, and Ruslan, 2019; The Business Standard, 2020).

Meanwhile, Bangladesh has gained international recognition for championing central banks' development role in promoting financial inclusion and green finance by taking discreet initiatives. Of them, the least loan disbursement at 5% set by 2014 and 2020 of banks' and NBFIs' total loan is most significant, though the total green financing is less than a third yet (Khairunnessa et al., 2021). This study has found that the banks' contribution to total green financing is 90%, meaning that Bangladesh is developing green banking, while NBFIs contribute by 10%. Moreover, the green finance by banks and NBFIs has a significant link with the contribution of green finance to GDP growth. Similarly, REC and PGRW contribute a significant portion of green finance to GDP growth. Therefore, it appears that the inclusion of green financing in both the two major financial institutions in Bangladesh plays a significant role for the last few years. The introduction of various supporting policies by the central bank and the government to inspire financial institutions and citizens to participate in green projects is increasingly growing the green practices. As a result, Bangladesh has been praised by the World Bank's International Financial Corporation (IFC) for doing better performance than others in the growth of green finance in emerging countries (Khairunnessa et al., 2021). According to a recent study on green banking in emerging markets, Bangladesh has made significant strides and created a benchmark for emerging markets after greening its banking regulation (Kludovacz, 2018).

Furthermore, the sustainable finance department of Bangladesh Bank has already taken different eco-friendly steps, i.e., green banking, climate finance, carbon finance, green bond, and sustainable finance. Bangladesh's perspective plan 2010-2021, national sustainable development policy, Intended Nationally Determined Contributions (INDCs), Bangladesh Delta Plan 2100, and Sustainable Development Goals (SDGs) have all been established following the activities of international organizations such as the EU, UNEP, and the International Finance Corporation (IFC). Therefore, to implement those, Bangladesh bank introduces a "Sustainable Finance Policy" for the financial institutions. Some of these projects are already initiated, or some are on the way to implementation, which has started giving feedback.

Nevertheless, climatic concerns are increasing with industrialization, especially in developing countries like Bangladesh (next emerging country). The findings reveal that the annual GDP growth in Bangladesh is rising rapidly and lead the carbon emission proportionately. However, sustainable development refers to how well it has maintained GDP growth by taking environmental problems into account. In this case, greening the economy is the best way to adopt climate change as green energy consumption has no toxic discharges. The findings of this study also display that green finance has unidirectional causality to carbon emission, meaning that it can handle carbon emissions. As a result, green finance is the best financial instrument for reducing carbon emissions (Meo and Karim, 2021) since it does not require sacrificing GDP growth, which is the basis of sustainable economic development.

Due to its role as a fundamental component in the manufacturing industry's production, energy consumption is the primary and most important indicator of economic growth (Halicioglu, 2009). On the other hand, non-renewable energy is the primary source of carbon emissions in developing countries. (Hassan, Zaman, and Gul, 2015; Zhang et al., 2018; Dong et al., 2019). That is why this chapter's findings suggest using renewable energy and utilizing the wastes by recycling, as it reduces carbon emissions without undermining economic growth (Charfeddine and Kahia, 2019).

Challenges to Implement Green Finance in Bangladesh

Green finance in Bangladesh is mainly dependent on banks and NBFIs. They invest a certain amount of their total investment portfolio in green projects, albeit the amount is still insufficient. Bangladesh's green projects have recently attracted equity investments from both domestic and international investors. Conversely, some problems are slowing the green growth. Despite green finance or banking policy frameworks, the inadequate managing capacity of financial institutions and failure to attract green projections hinder green finance's promotion. The 55 green sectors identified by the Bangladesh Bank need direct green finance, but most do not contain a well-establish funding demand. Likewise, ancient technologies often produce less and emit massive carbon, which also plays a role against the sustainable economy.

Moreover, proving creditworthiness is also a great difficulty in most cases to the local green entrepreneurs. Due to inadequate knowledge and entrepreneurial interest, banks and financial institutions receive very few green project financing applications each year. Besides, most of these projects are not correctly projected. Other critical issues are high transaction costs (Khan, Arastoo, Khan, Bushra, Uddin, Nasir, Azim, Galib, and Islam, 2017; Zheng et al., 2021), and heavy default culture (Zheng et al., 2021), hampering the opportunities of green schemes. Thus, banks and financial institutions often claim that although there is a policy directive to provide at least 5% of the entire loan portfolio for green projects, they do not receive sufficient applications for green projects from entrepreneurs (Hossain, 2018).

Similarly, the underdeveloped green products market increases the risk. Likewise, green bond markets and agricultural investment in Bangladesh are still underdeveloped though there is a possibility to develop. After all, some other international criticalities face the countries like the less fiduciary and supremacy track and poor quality of project design, application and monitoring, lack of the capacity to utilize granted funds within the postulated timeframe, and lack of confidence in financing agencies about the transparency.

In addition to the barriers mentioned above, some country-specific problems, including political instability, corruption, high unemployment rate, high interest and inflation rate, low living standards, etc., are hindering the implementation of green finance and sustainable development in Bangladesh.

SOLUTIONS AND RECOMMENDATIONS

The findings of this chapter unveil the role of financial institutions to promote green finance, the contributions of green investment in renewable energy consumption, and power generation from renewable energy and waste management to economic growth. Therefore, this chapter recommends allocating more funds, practicing sector-specific green projects, allocating credit allocation quotas for separate categories and financial institutions. Moreover, the central bank is suggested to make the policy more flexible and create new initiatives in favor of green investments as well as grant incentives for greening the economy. Aside from the policy recommendation, the central bank has to monetize the policy compliance strictly, assure adequate accountability and disclosure of the annual green practices report of financial institutions. Then, the central bank has to scrutinize the benefits or loopholes of those initiatives and incentives based on the review report. Finally, the regulations should be adopted to the actual scenario of implementation.

Complying with the evidence of role-playing green finance to sustainable economic growth, the policymakers of banks and NBFIs should set the policies which can motivate green projects. Remarkably, more financing of NBFIs is recommended to increase renewable energy consumption and power generation from renewable and wastes as they are negatively correlated with the NBFIS in this study period. It also urges Bangladesh Securities and Exchange Commission (BSEC) to come forward to introduce green bonds and other green equity finance. Finally, it is high time to increase awareness among the stakeholders about the advantages of green finance and sustainable development.

Therefore, aside from the policy insights reported in conclusion, this chapter provides the abovementioned recommendations as the possible solutions for the challenges prescribed above.

FUTURE RESEARCH INSTRUCTIONS

The primary limitation of this study is that it is based on a relatively small sample due, although the authors have nothing to do due to data scarcity. Moreover, it considers only CO_2 emissions as the proxy of climate change issues and only those variables instituted and practiced as the indicator of green finance in Bangladesh. Therefore, further research is suggested to address those limitations. Besides, this chapter recommends more factors like greenhouse gas emissions with CO_2 as the climate change issue. Moreover, future research should scrutinize the enactment of green finance by collecting and examining qualitative and quantitative data on the separate banks, industries, manufacturing companies' performances, and financing instruments. Policy insights for green financing and guidelines specified in this chapter are comparatively recent. Thus, it is essential to reexamine those findings to ascertain the usefulness and implication of these guidelines. Future studies may be directed to confirm how much these regulatory initiatives can mitigate environmentally harmful activities and the overall environmental risk. The role of government and social organizations in green finance could also be investigated in the future for emerging countries.

CONCLUSION

This study primarily overviews the present scenario of green finance activities, economic growth, and carbon emissions as they are most relevant to green growth. Secondly, this study has attempted to find some particular green indicators in this segment that minimize carbon emissions without hindering economic growth.

The findings demonstrate that the role of green finance is crucial in sustainable economic development. It unveils that the environmental issues are considered by greening the financing system, which is the fundamental concept of sustainable economic growth. Likewise, the central bank of Bangladesh has specifically played a significant role in the green financing system by several incentives. Consistently, this study depicts the major part of green finance and green investment by financial institutions in economic growth. Moreover, the environmental deterioration is dismissed by green finance, namely, consuming renewable energy, green establishment, and power generation from renewable and waste recycling. However, the contribution of total green finance to economic growth is very slight, although showing an upward trend.

However, for attaining the sustainable development goals (SDGs), the findings of this study have several implications for the governance, policymakers, financial institutions, investors, climatologists, and so on in the emerging economies, especially in Bangladesh, to promote green finance. First, the empirical evidence of the role of green finance can motivate the investors to take green projects in hand and the financial institutions for sanctioning loans in different green projects. Second, the banking sector is the main contributor to direct green financing in Bangladesh. Therefore, this study suggests maintaining and supporting the appreciation of green investment in several eco-friendly projects. Third, since Bangladesh is growing, this study suggests raising awareness, convictions, and comprehension of the principal dimensions and the aspects of green finance. Also, this study recommends utilizing the sources of green financing and green energy properly to execute sustainable finance and the accomplishment of sustainable economic development. Fourth, the empirical result of the FDI inputs suggests that a protected green finance market should be ensured to attract foreign investors by the government. In this case, the Bangladesh Bank can play a crucial role in planning, stimulating, boosting, and tracking green activities. Fifth, under the "Sustainable Finance Policy," subsidies may be provided as needed to encourage the installation of waste recycling technologies to facilitate the adoption of waste recycling projects at each level. Lastly, this study suggests using renewable energy and waste management projects to lessen carbon emissions. In this way, it can be possible to maintain the improvement of the environment without hindering economic development, which is the central vision of today's world.

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KEY TERMS AND DEFINITIONS

Climate Change: Climate change is the world's average long-term change of weather or weather pattern that combines a broad range of warming temperatures and changes in precipitation. The range is generally more than 30-40 years.

Economic Development: It is defined as moving from a basic, low-income, and high unemployment national economies to a modern industrialized economy while preserving qualitative and quantitative economic progress.

Emerging Economy: The emerging economy is a developing nation with some developed economic' characteristics and is becoming more involved in the global economy—for example, China, India, Mexico, Russia, Pakistan, Saudi Arabia, and Brazil.

Green Banking: Green banking is nothing but green financing activities. When a bank is concerned about environmental betterment and invests or disburses the loan to the eco-friendly projects, the bank's activities are turned into green banking.

Green Economy: When a country's economic activities are focused on environmental protection without jeopardizing the country's production is called the green economy.

Green Finance: Green finance is an investment in eco-friendly projects that is beneficial to the environment and economic growth at the same time.

Green Projection: It refers to those designed based on an environmental ecosystem or do not emit harmful gases or help to keep balance the ecology.

Non-Renewable Energy: It is the natural source that will eventually run out due to scarcity. The primary sources of non-renewable energy are fossil fuels.

Renewable Energy: The energy which is generated from inexhaustible sources is known as renewable energy. Uses of solar, wind, tide, nuclear, waste recycling and so on are the example of renewable energy sources.

Sustainable Development: Sustainable development is an ecosystem for long-term human development in which the natural environment can adapt to possible uncertainties at the same time.

ENDNOTES

1 Goldman Sachs identified "Next 11" (N-11) emerging countries (including Bangladesh) that have the potential to become major economies.

2 https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-co2-emissions.pdf

Chapter 5
Indonesia's Inclusive Economic Development Strategy

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ABSTRACT

Two developments are currently taking place in Indonesia, namely the process towards an inclusive economy and economic digitalisation. The main objective of this chapter is to review the extent to which Indonesia has achieved these two processes. To this end, this descriptive study analyzes secondary data from multiple sources, and the results show that Indonesia has made some progress in achieving both developments. But the results also give an important impression that in the short term, digitalisation of the economy can increase inequality because access to ICT or the internet is not evenly distributed. Therefore, this chapter emphasizes that extra efforts from the government are urgently needed so that the poor can get full access to ICT, including micro and small businesses, of which only a small number of them are implementing e-commerce, and the majority of them are located on the island of Java including Jakarta, which is the most developed region in Indonesia.

INTRODUCTION

From 1997 to 1998, Indonesia was badly affected by the Asian financial crisis. It was the most severe economic crisis to occur in Indonesia since the country's independence in 1945. It led to an economic recession in 1998, with a growth rate of –13%. The crisis was followed by social and political disturbances and conflicts which led to the fall of Soeharto's New Order regime in May 1998. Following Indonesia's recovery from the recession, the country has undergone a profound transformation. It has embarked upon far-reaching institutional changes and has become one of the region's most vibrant democracies. The political system has been fundamentally transformed by the implementation of democracy and decentralization, and by the amendment of the 1945 Constitution. Society has drastically changed and some of the previous public institutions are no longer functional. Although the government during the New Order era seriously tried to address poverty issues and initiated many pro-poor programs, poverty was still a serious problem and the gap between the rich and poor did not decline significantly. In fact, during

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this era, the adopted development strategy was more exclusive rather than inclusive, as many regulations, policies, and facilities favoured certain business groups, mainly big companies (or conglomerates), at the cost of micro, small and medium enterprises (MSMEs).

In 1999, Indonesian economy began to recover and continued to improve gradually. In its efforts to improve social welfare, especially to reduce the number of poor people and improve income distribution, Indonesia has made quite a lot of progress since then. Wide reforms were carried out in all areas of governance, including in the financial, education, and social sectors. Other than that, a new development strategy was introduced by President Susilo Bambang Yudhoyono (SBY) for "inclusive" economic development.

The emergence of digital technology has created a drastic change in business practices. It presents a serious challenge for the success of the implementation of the inclusive development strategy in Indonesia. Because digital technology has given birth to new business models encouraging higher economic growth and increase in per capita income more rapidly, it is then believed that the digital economy or more concretely the existence of information and communication technology (ICT) will provide wider opportunities for all levels of society to actively participate in economic development, which is the goal of inclusive development. But the question now is, do all levels of society, especially the poor have full access to ICT?

By analysing secondary data, the main objective of this chapter is to examine the Indonesia's achievements towards inclusive development and a digital economy. More specifically, the aim of this chapter is to answer the following three questions:

1. How is Indonesia's achievement in inclusive economic development?
2. How is Indonesia's achievements in the digital economy?
3. Is the Digital Economy Important to achieve an inclusive economy?

To answer those three questions, this chapter has three main related subchapters which starts with inclusive economic development showing Indonesia's achievements so far. The second subchapter discusses Indonesia's achievements in the digital economy, and the third then tries to answer question no 3.

INCLUSIVE ECONOMIC DEVELOPMENT: CONCEPTUAL DISCUSSION

Inclusive economic development 'was used in the academic literature for the first time in 1998 but became an integral part of the literature only starting in 2008. According to Ali and Zhuang (2007), Ali and Son (2007), and Rauniyar and Kanbur (2009, 2010a, b), the term "inclusive economic development" has no widely accepted definition. The concept clearly encompasses inclusion and economic development and views inclusion as a process as well as a goal. As Sen (1999), Sachs (2004), Ali and Son (2007), Rauniyar and Kanbur (2009, 2010a, b), and McKinley (2010) stress that inclusive economic development is economic growth coupled with equal economic opportunities. It focuses on creating economic opportunities and making them accessible to everyone in society at all levels, not just the poor (Tambunan, 2012, 2015).

In the literature, there are two understandings often used in the discussions of inclusive economic development, namely' inclusive economic growth 'and' inclusive economic development '. Significantly, more articles use 'inclusive economic growth' rather than 'inclusive economic development'. However, there are also many publications that use the two terms interchangeably. According to many articles, these two terms differ in their structure and components. In Ali and Son (2007), inclusive economic growth is defined as growth which not only creates new economic opportunities but also ensures equal access to opportunities for all segments of society, in particular for the poor. In this definition, inclusive economic growth focuses on increasing per capita income through economic growth and greater access to non-income aspects of welfare with proactive policy making, and contributions from other economic actors (Chatterjee, 2005). Whereas Ali and Zhuang (2007) state that the anchors are: (i) high and sustainable economic growth to create productive and decent work opportunities, and (ii) social inclusion to ensure equal access to opportunities by all.

Inclusive economic development is about things as opposed to exclusivity. Inclusive economic development or growth implies the avoidance of exclusive economic growth, which often leads to a concentration of wealth and/or a concentration of sector specific salary increases. So, inclusive economic development is a development that increases the level of public participation; and reduces gaps in knowledge, capacity, and income, with a focus on specific marginalized and excluded communities from access to social facilities and opportunities (Chatterjee, 2005; Rauniyar and Kanbur, 2010 a, b).

The distinction between inclusive and exclusive economic development is based on their respective focuses. Exclusive development places an emphasis on economic flows and gross national product (GNP) as the main indicator rather than on economic, ecological, and social stocks, or pays more attention to growth than welfare. Inclusive development argues that such emphasis can lead to the exclusion of some people from existing job or business opportunities, the concentration of wealth, and a segmented labour market. Sachs (2004) said that instead of focusing on economic growth, it is preferable to carry out direct democracy (exercising civil and political rights) and distribution of facilities (e.g., health, education, infrastructure) with a view to enabling participation by all in facilities.

Several reasons to encourage inclusive economic development have been identified in the literature, including normative, legal, economic, security, and political considerations (Gupta 2014). Moral principles justify normative reasoning that focus on reducing humiliation and strengthening the disadvantaged (Sachs 2004). Legal reasons focus on institutionalizing specific social norms and promoting minimum acceptance of conditions for all elements in society (i.e, a human rights perspective). Meanwhile, economic reasons, according to Pouw and McGregor (2014), focus on increasing the prospects for economic growth by increasing public participation in production and consumption activities, and on improving people's material, relational and subjective well-being.

It may be claimed that inclusive economic growth, with its emphasis on economic aspects, represents a rather minimalist approach, whereas inclusive economic development emphasizes aspects of wellbeing, and inclusive wealth which, in addition, includes natural capital (such as ecosystem services, but not the annual flows) have broader scopes (e.g. Rodríguez-Pose and Tijmstra, 2007; Lawson 2010; Borel-Saladin and Turok, 2013).

In practice, inclusive economic development has several important elements, which includes:

1. poverty reduction,
2. employment generation,
3. improvement in quality of employment,
4. agriculture development,
5. industrial development,
6. social sector development,

7. reduction in regional disparities,
8. environment protection, and
9. equal distribution of income.

Among these elements, poverty reduction, employment creation and equal distribution of income have received the most attention in empirical studies of, explicitly or implicitly, inclusive economic growth (e.g., Alesina and Rodrik, 1994; Barro, 2000; Bourguignon, 2003; Commission on Growth and Development, 2008; OECD, 2008; World Bank, 2008; Prabandari, 2018).

EVIDENCE FROM INDONESIAN

Inclusive Development Policies

The question now is how to achieve an inclusive development or economic growth because this cannot be left to the market mechanism. In discussing policies that support 'inclusive' economic development, Ali (2007) distinguishes three types or pillars of policy interventions needed to achieve economic development that provides welfare for all members of society. The first pillar focuses on promoting economic growth through the creation of productive employment in the rural and urban sectors, development of supporting infrastructure such as roads and facilities, and effective industrial policies. According to ADB (2012) there are several indicators that can be used in assessing whether an 'inclusive' development policy is effective. These indicators include the amount of electricity consumption per capita, the number (km) of paved roads, the number of telephone subscribers, and the number of residents who have bank accounts.

The second pillar focuses on access to economic opportunities for all members of society. It describes the economic opportunity that everyone has. This is done through enhancing capabilities using some indicators such as school life expectancy, student-teacher ratios, the percentage of the population that has access to electricity and the percentage of parliamentary seats held by woman. The third pillar focuses on welfare, social security and social safety nets that enable everyone to engage in risky endeavors. This pillar has several indicators such as life expectancy, school enrollment, health indicators, government spending on health, access to basic infrastructure such as water and sanitation, and gender-related factors.

Indonesia has implemented numerous reforms in the new age that followed the Asian financial crisis, known as the era of reform (or *Reformasi*). The administration has begun institutional restructuring, transforming the country into one of the most lively democracies in the area. Indonesia has made significant progress in the areas of social, economic, and political development. In all areas of the economy, extensive reforms have been implemented including in the financial sector. Also, "inclusive" economic development and growth, has been adopted as a new national strategy. It exactly took place in 2009 when Susilo Bambang Yudhoyono, then President of the Republic of Indonesia, addressed on national development in regional perspective. He stated that the paradigm of development for all in the context of Indonesia can only be carried out by adopting six fundamental development strategies (Sekretariat Negara Republik Indonesia 2011).

The first strategy is inclusive development that ensures equity and justice and respects and maintains the diversity of the Indonesian people. To reach this goal, the central and regional governments formed a consensus on Indonesia's development. This consensus is guided by Indonesia's medium and long-term visions and missions. In this inclusive development, the Indonesian government has adopted a tripletracked strategy, i.e., "pro-growth," "pro-job," and "pro-poor." With respect to pro-poor strategies, the government has various programs to alleviate poverty directly or indirectly. The implementation of these programs complements economic growth as the main engine to eliminate poverty, rather than being a substitute for it. The most popular program is the National Self-Reliant Community Empowerment Program (*Program Nasional Pemberdayaan Masyarakat Mandiri*). It empowers people directly at the level of subdistrict and village enabling them to decide on the development priorities of their respective regions. The speech was presented before the special plenary session of the House of Regional Representatives of the Republic of Indonesia in Jakarta, August 2009. Indonesia's long-term direction for 2005–2025 is stated in Law No. 17/2007, National Long-Term Development Plan, 2005–2025, and the country's medium-term direction is given in each of the five-year stages of the Medium-Term Plans (RPJMs). Each of the stages has a scale of priorities and development strategies that constitute a continuity of priorities and development strategies from preceding periods. (Tambunan, 2012, 2015).

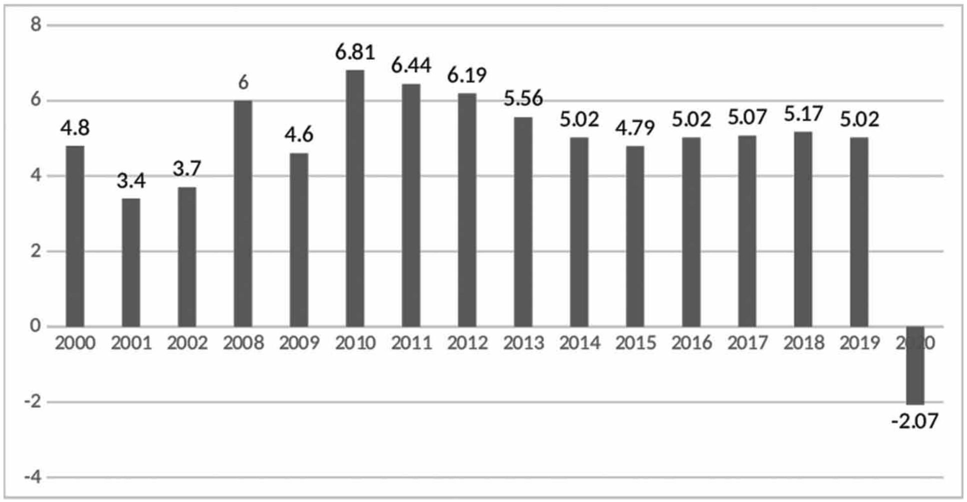
One important element of "inclusive" development is financial inclusion, which means broad access to financial services. This implies an absence of price and non-price barriers that might deter people from obtaining financial services. Nowadays, more institutions are paying attention to the issue of financial inclusion. At the G20 Toronto Summit June 2010, global leaders pledged to support financial inclusion to empower about one-third of the world's population who are still living in poverty. Financial inclusion has also been integrated into the 2015 Association of Southeast Asian Nations (ASEAN) Economic Community Blueprint. In Indonesia too, financial inclusion is linked to poverty alleviation and financial stability (Tambunan, 2015). The Government of Indonesia strongly believes that improving access to finance and improving the use of financial services will raise people's welfare. One concrete course of action taken was the launch of the National Strategy of Financial Inclusion by the Indonesian central bank (BI) in December 2010. Since then, the government and monetary authorities, such as BI and the Indonesia Financial Services Authority (OJK), have had many high-level discussions on financial inclusion, which have focused on how to provide better access to banking services. They recognize that a major issue is asymmetric information between the supply (banks) and the demand (especially for the poor) of information on financial inclusion (Hadad 2010).

Other pro-poor programs include:

1. Unconditional Direct Cash Assistance (*Bantuan Langsung Tunai*),
2. Public Health Insurance (Jamkesmas),
3. School Operational Support,
4. the provision of subsidies (e.g., rice, fertilizers, and program credits), and
5. the Family Hope Program (*Program Keluarga Harapan*).

The Family Hope Program is earmarked for poor and near-poor families all over the archipelago. It is implemented to meet the basic needs of households that are unable to meet them in any other way. Probably the most important element of this program is the Mandiri Community Empowerment National Program (*Program Nasional Pemberdayaan Masyarakat Mandiri*). It is in the form of the "fishing rod" to empower people and communities through the provision of funds up to Rp 3 billion per subdistrict per year. The use of money received is determined by the people themselves at the village level. In addition, the government also allocates a budget for micro, small and medium enterprises (MSMEs) in the form of subsidized credit, and the banking sector has been requested to channel a certain portion of

Figure 1. Annual growth of Indonesian real gross domestic product (GDP), 2000-2021 (percentage)
Source: BPS (https://www.bps.go.id/)



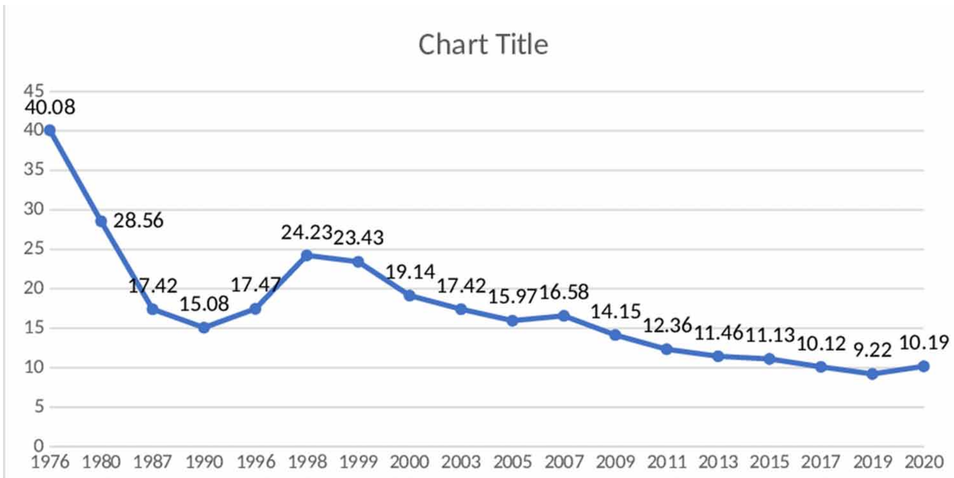
their funds as credit for MSMEs. This MSME credit policy is a key element of Indonesia's policies for financial inclusion (Tambunan, 2015).

Economic Growth, Unemployment, Poverty and Inequality

Since the end of the Asian financial crisis 1997-98, which caused Indonesia's economy to drop by 13 percent, Indonesia's economic growth has remained positive until 2019. In 2020, as a direct consequence of the COVID-19 pandemic, the country's economy slumped to minus 2.07 percent (Figure 1). Business fields that experienced the deepest growth contraction included transportation and warehousing with minus 15.04 percent; provision of accommodation and food and drink with minus 10.22 percent; company services that fell by 5.44 percent; other services dropped by 4.10 percent; and large trade and retail; car and motorcycle repair grew minus 3.72 percent. But there are also some sectors that are still experiencing positive growth, including health services and social activities 11.60 percent; information and communication 10.58 percent; procurement water, waste management, waste and recycling by 4.94 percent; real estate of 2.32 percent; and agriculture, forestry and fisheries 1.75 percent.

In Indonesia, high and sustained economic growth, during the New Order era (1966-1998), made a major contribution to poverty reduction (as measured by the number of people living below the poverty line as a percentage of total population). As shown in Figure 2, the percentage of poverty at the national level declined significantly from about 40 percent in 1976 to almost 17.5 percent in 1996. The largest decrease occurred during the 1970s to early 1980s with 13 percentage points, whereas during the 1981-93 period, the rate of decline was only about 16 percentage points. However, the 1997/98 Asian financial crisis has caused the number of poor people to increase again, as many workers were forced to lay off in companies severely affected by the crisis. In 1999 the country's economy begun to recover and the poverty rate started to decline again. Unluckily in 2020, the percentage of poor people increased slightly caused by the Covid-19 pandemic crisis.

Figure 2. Poverty rate in Indonesia, 1976-2020 (percentage)
Source: BPS (http://www.bps.go.id)



Next, Table 1 shows the percentage and number of poor people by island in 2020. The highest percentage of poor people is found in Maluku and Papua, amounted to 20.65 percent. Meanwhile, the lowest percentage is found in Kalimantan with 6.16 percent. Most of the poor people in the country live in Java (i.e., 14.75 million people), while the least number of poor people is found in Kalimantan (1.02 million people). Since the end of the 1998-1999 Asian financial crisis up to the Jokowi era, there were several provinces where the poverty level had decreased, while in other provinces the poverty remained worse or even got worse. This variation in poverty changes between provinces or islands is caused by differences between provinces/islands in many ways, including:

1. economic growth (low vs. high) and its nature (labour intensive that generates many job opportunities vs. capital intensive that has less positive effect on employment),
2. economic structure (e.g., agrarian economy vs. industrial based economy),
3. the condition of infrastructure (well vs less developed),
4. human resource (low vs highly educated community/labour force), and
5. seriousness of local government in fighting poverty, especially during times of crisis.

Identifying the main causes of poverty for a person or a group of community or a village is not easy, because there is a significant difference between direct and indirect causes, as well as between visible or observable and invisible factors. There are two direct causes of poverty, namely (i) lack of job opportunities, and (ii) low real wage/income. The first factor causes a person to have no source of income, whereas the second factor causes a worker to have an income but not meet his/her minimum daily needs, or the wage per day is lower than the prevailing poverty line.

Furthermore, the difficulty of someone getting a job is caused by many factors. It could be due to lack of skills or being dismissed because the company is no longer operating or due to technological advances so that manpower for certain types of work is no longer needed, physical limitations of the job seeker (health problems), or it could be due to discriminatory practices according to several aspects such as gender, ethnicity, religion, region, alumni, and others. These factors are considered as direct

Table 1. Percentage and number of poor population by island in Indonesia, September 2020

Percentage of Poor People (%)				Number of Poor People (000 men)		
	Urban	Rural	Total	Urban	Rural	Total
Sumatera	8.80	11.34	10.22	2 306.81	3 759.37	6 066.18
Java	8.03	13.03	9.71	8 105.76	6 646.27	14 752.03
Bali & Nusa Tenggara	8.99	18.18	13.92	633.96	1 482.53	2 116.49
Kalimantan	4.72	7.51	6.16	375.55	640.56	1 016.11
Sulawesi	5.95	13.45	10.41	477.07	1 584.44	2 061.51
Maluku & Papua	5.49	28.51	20.65	139.34	1 398.02	1 537.36
Indonesia	7.88	13.20	10.19	12 038.50	15 511.19	27 549.69

Source: BPS (http://www.bps.go.id).

causes of unemployment and poverty (assuming, of course, that the job seekers have no valuable assets such as land, buildings or gold).

The indirect causes of someone falling into poverty include, for example, a sluggish economy, which results in low growth of new businesses or even causes many existing businesses to close, resulting in mass layoffs of workers; a lack of infrastructure or energy supply, which reduces economic activity; and massive agricultural land shifting, which reduces the amount of land available for agriculture, which in turn results in a decrease in agricultural activities and an increase in unemployment in the sector, or lack of opportunity for job seekers to get good education or skills needed by the market (either because they come from poor families, or because in their area there is no university or polytechnic or courses needed).

There could be two probable direct causes for a low real pay or income. First, since the price of essential goods has risen (inflation), while the nominal wage has remained constant. Second, due to declining revenues, the company had to reduce wages in order to maintain its workforce. Alternatively, the employer may not have to reduce compensation but may reduce employee working hours. This second possibility is in accordance with the principle of determining wages based on productivity: the more goods a worker produces per day the greater his nominal wage per day becomes. So, this is a case of the real value of income decreasing not because of an increase in price but because of a decrease in its nominal value.

Other factors that cause low real wages/income indirectly include, for example, extreme weather (long rain/dry season) or pest attack, which results in crop failure and, as a result, increases the price of basic foodstuffs, or an expansionary monetary policy that causes interest rates to fall and, as a result, increases the inflation rate, or prices of raw materials increase sharply forcing companies to reduce their production, and many others.

The history of the Indonesian economy shows that the New Order government (1966-1998) not only succeeded in reducing poverty, but also succeeded significantly in keeping the level of inequality in the income distribution from increasing when the economy experienced rapid growth, which usually occurred at the beginning of the development period. During 1965-70, the average growth rate of gross domestic product (GDP) in Indonesia was still very low, around 2.7 percent, and the average Gini coefficient per year was 0.35. During 1971 the GDP growth rate was much higher, averaging 6 percent per year with the average Gini coefficient per year just over 0.4. This means that during that period, growth was indeed very good, but the income gap as measured by the distribution of consumption expenditures worsened. Meanwhile, during 1981 GDP growth was 5.4 percent per year and the average Gini coefficient per year was slightly over 0.3. Although there were variations between certain years, the change in the Gini coefficient indicates that, compared to the 1960s to the 1970s, the level of inequality in the distribution of income in Indonesia during the 80s shows a decline. As with other East and Southeast Asian countries, the Gini coefficient in Indonesia also increased during the early 1990s, but then decreased sharply again to 0.32 in 1998, and increased slightly to 0.33 in 1999 and was relatively stable until the beginning 2000s.

By region, in the 1960s the level of consumption expenditure inequality in rural areas was larger than that in urban areas. Only since the 1970s, there have been improvements: the annual Gini rate in rural areas was lower than that in urban areas. During 1980-1999 the value of the Gini ratio in rural areas ranged between 0.26 (lowest) and 0.31 (highest), while in urban areas the average was 0.33. In 2004, the rural Gini index was recorded at around 0.27 and in the city 0.35 and relatively the same in 2009. If the change in the Gini value does give a true picture, it is said that there is an improvement in income distribution in rural areas.

However, in the years leading up to the end of the SBY era, inequality in income distribution in Indonesia tended to worsen. In 2004 when President SBY just came to power, the Gini ratio was recorded at around 0.32, and deteriorated to 0.41 in 2012. However, since 2015 the Gini coefficient has begun to show a downward trend, which in 2016 was recorded at 0.397. There is a general unwritten agreement that a Gini coefficient value below 0.4 means that the level of inequality is low; between 0.4 and 0.5 moderate inequality; and above 0.5 large inequality.

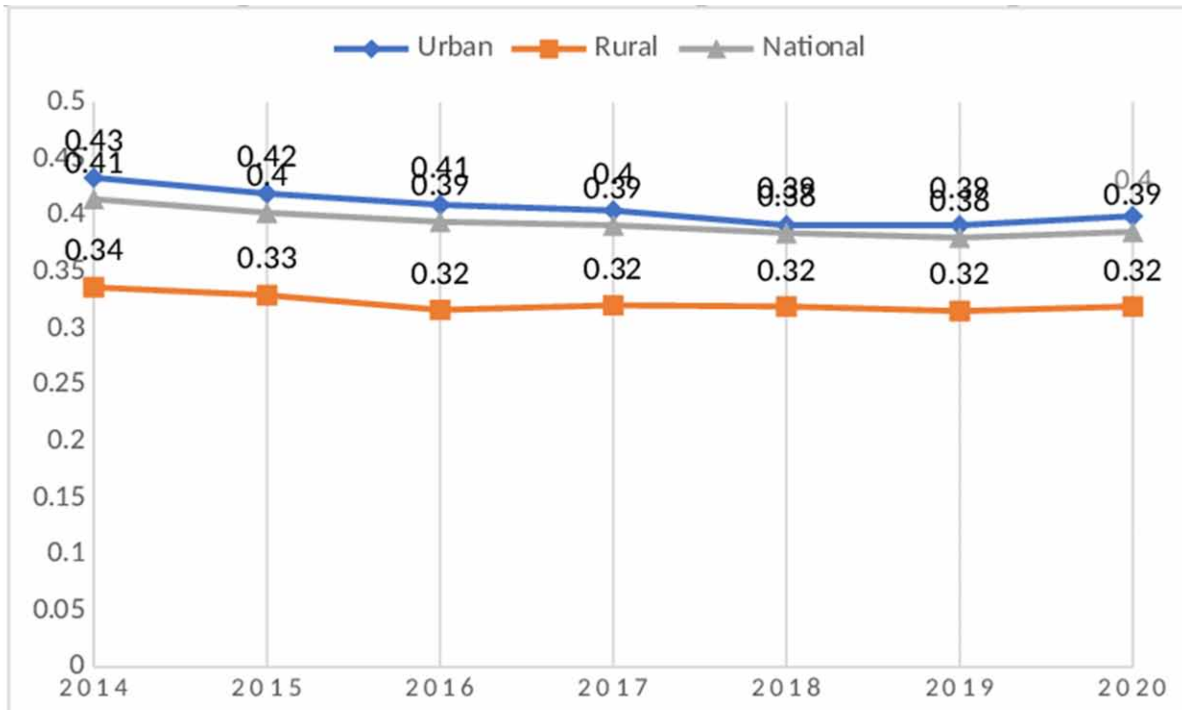
Recently, at the national level, since September 2014 the Gini Ratio figure has decreased up to September 2019. This condition indicates that during that period there was an improvement in equity expenditure in Indonesia. However, due to the Covid-19 pandemic, the Gini Ratio value returned experienced an increase in March 2020 and September 2020 (Figure 3). Based on the area of residence, the urban Gini Ratio in September 2020 is 0.399. This shows an increase of 0.006 points compared to March 2020 which amounted to 0.393 and increased 0.008 points compared to September 2019 which amounted to 0.391. For rural areas, the Gini Ratio is in September 2020 was recorded at 0.319, an increase of 0.002 points compared to the conditions in March 2020 and an increase of 0.004 points. Compared to conditions in September 2019. Rural Gini Ratio in March 2020 and September 2019 recorded 0.317 and 0.315, respectively.

Theoretically, the income gap, or the difference in income between two people or two groups of people, is influenced by differences in, for instance, job opportunities; salaries/wages received; subsidies received; access to finance, education, health, information, and technology; taxes paid; and the type of work being done. In addition, discriminatory practices related to gender, age, ethnicity, religion, and alumni also cause income disparities.

As described above, the income gap cannot be separated from economic policies, particularly fiscal policies (taxation and subsidy systems), monetary or banking policies, labour policies (including wage policies), and social policies, particularly education and health policy.

In addition, inequality in income distribution can also be caused by economic disparities or differences in levels of development or economic growth rates between regions. The hypothesis is that in areas with rapid economic development, job opportunities are more widely open than in regions with stagnant economies. In Indonesia, the difference in income distribution patterns between urban and rural areas, or the lower disparity in rural areas compared to cities, is caused by several factors. First, due to the

Figure 3. Development of the Gini ratio, September 2014 – September 2020
Source: BPS (http://www.bps.go.id)



flow of population/labour from rural areas to urban areas. According to the theory of A. Lewis (1954), the movement of people from rural areas to urban areas has a positive impact on the rural economy: productive employment opportunities, productivity levels and the average income of people in rural areas increase. Meanwhile, the urban economy eventually became unable to accommodate the increased supply of labour each year, the majority of whom were migrants from rural areas, resulting in an increase in unemployment on the one hand and a decline in wage/salary growth on the other.

Second, the market structure and the amount of distortion are different in rural areas and in urban areas. In rural areas, the number of sectors is relatively smaller than that in urban areas, and the sectors in rural areas are smaller (seen from the number of business units in and the output produced by the sector) compared to similar sectors in urban areas. This difference coupled with a lower level of income per capita in rural areas than in urban areas makes the market structure in rural areas much simpler than that in urban areas. This simple market structure makes market distortions relatively smaller (more business opportunities for individuals) in rural areas than in urban areas.

Three, the positive impact of the national economic development process. This impact can take various forms, including: (a) more and more rural economic activities outside the agricultural sector, such as the manufacturing industry (mostly on a small scale, or home industry, trade, workshops, and other services, and building). The diversification of the rural economy will certainly increase the number of job opportunities in rural areas and also increase farmers' income; (b) the level of productivity and real income of labour in the agricultural sector increases, not only due to the flow of people from that sector to other sectors in urban areas (as in A. Lewis's theory), but also due to the application/use of new technology and the use of improved inputs, such as manufactured fertilizers, and increased domestic and export market demand for agricultural commodities; plus (c) potential natural resources in rural areas are better utilized by villagers (more optimal use).

In addition to income disparities, inequality in economic development between regions, for example, between provinces, or between districts within a province also occurs in Indonesia. The process of economic transition to a modern or urban economy makes the productive sectors increasingly dominate the national economy. But the activities in these sectors are increasingly concentrated in certain regions because the conditions of these regions are most favourable (e.g. the availability of infrastructure, human resource, sources of capital, and other major supporting infrastructure), on the other hand. This creates economic disparities between regions/provinces in Indonesia. When the Dutch left Indonesia, the island of Java was the most advanced Indonesian territory in many ways, including infrastructure and human resource development, as well as government administration. Apart from that, the Indonesian government also continued the tradition of colonialism which made Jakarta the centre of government, trade, and finance. World history shows that the areas that were the centre of government, trade, and finance were completed.

Development of MSMEs

What constitutes a micro, small and medium enterprise (MSME) varies widely between countries. There is no common agreement on what distinguishes a micro enterprise (MIE) from a small enterprise (SE); a SE from a medium enterprise (ME); and a ME from a large enterprise (LE). MSMEs may range from a part time business with no hired workers or a non-employing unincorporated business, often called self-employed units, such as traditional business units making and selling handicrafts in rural Java in Indonesia, to a semiconductor manufacturer employing hundreds of people in Japan. They may range from fast growing firms to private family firms that have not changed much for decades or stagnated. They range from enterprises, which are independent businesses, to those, which are inextricably part of a large company, such as those which are part of an international subcontracting network. The only true common characteristic of MSMEs is that they are "not-large"; that is whether a firm is really an MSME or not is relative.

Moreover, definitions and concepts used for statistical purposes can vary from those used for policy or program purposes (for example, to determine eligibility for special assistance). Many countries have definitions for policy purposes, and to complicate matters further, these definitions often differ from the definition used for statistical purposes, as also differ by industry and policy program.

According to data from the State Ministry of Cooperatives and SMEs (Menegkop & UKM) and the Central Statistics Agency (BPS), in 1997, there were around 39.765 million MSMEs, or around 99.8 percent of the total business establishments in Indonesia. The number of MSMEs grows every year, except in 1998, when the Asian financial crisis during the 1997-98 period hit Indonesia. The crisis caused the Indonesian rupiah (IDR) exchange rate to depreciate by more than 200 percent against the United States dollar (USD). As a result, many domestic companies went out of business or were forced to reduce their production volume for various reasons, such as the high cost of foreign debt (loan repayment plus interest) in rupiah; high domestic inflation; high-interest rates on the domestic money market which, along with many domestic banks experiencing financial difficulties due to bad debts and losses in USD trading, made it difficult for domestic businesses to obtain credit at that time; and high import prices for raw materials and other production inputs in rupiah.

Table 2. Number of MSMEs and their workers by sub-category in Indonesia, 2016-2018

Description	unit of measure	2016		2018	
		Total	Share (%)	Total	Share (%)
MSMEs LEs	Unit	61,651,177 5,370	99.99 0.01	64,194,057 5,550	99.99 0.01
Total companies		61,656,547	100.00	64,199,607	100,00
MSMEs LEs	People	112,828,610 3,444,746	97.04 2.96	116,978,631 3.619,507	97.00 3.00
Total workers		116,273,356	100.00	120,598.138	100.00

Source: Menegkop & UKM (http://www.depkop.go.id/)

This crisis also caused the national economy to experience the biggest recession in Indonesian history since independence in 1945 (or even during the Dutch colonial period), with a negative GDP growth rate of 13 per cent. At that time, the number of MSMEs decreased to around 36.8 million units or decreased by 7.42 per cent. Menegkop & UKM estimated that nearly 3 million MSEs have stopped doing business during the crisis, and the number of MEs and LEs that have closed their businesses was estimated to be around 14.2 per cent and 12.7 per cent, respectively, of the total enterprises (Tambunan, 2019). However, in 1999 when the national economy began to recover, the number of MSMEs began to grow again to 37.9 million units or an increase of 2.98 per cent, and from there it continued to grow.

As shown in Table 2, in 2016, the number of MSMEs was recorded at nearly 61.7 million companies or around 99 per cent of the total business units in Indonesia in that year. In 2018, the number increased to more than 64 million. Of this, MIEs were dominant, which reached almost 98 per cent, while the SE portion was only about 1 per cent and MEs even less, not up to 0.1 per cent. This means that when someone talks about Indonesian MSMEs, what he/she really means is MIEs.

In comparison, in other economies in the Asia and Pacific (AP) region, more than 98 per cent of companies were considered MSMEs, with more than half of the economies, including Indonesia, holding a share of more than 99 per cent (Table 3). This share has remained constant over the past decade for all economies. Based on how each economy defined its MSMEs and the availability of most recent data, nearly 150 million businesses in the region were considered as MSMEs, representing around 99.8 per cent of all businesses in the region. It is important to note that what is considered as MSME in one economy may not be considered as MSME in other economies given the fact that economies in the region define MSME differently.

In all economies in the AP region, the role of MSMEs in the formation of GDP is always smaller than their role as job creator: MSMEs accommodate more than 90 per cent of the total workforce absorbed in these economies, but their output contribution to GDP is below 90 per cent (even though the ratio varies between economies). In Indonesia, even though MSMEs collectively contributed more than 50 per cent of the country's GDP (see Figure 4), which is greater than that of LEs, however, considering that the number of MSMEs is always far more than that of LEs, the actual contribution of MSMEs to GDP is much smaller than that of LE. Within the MSME group, there are differences: the total contribution of MIEs and SEs to GDP is less than the contribution of MEs, and the contribution of this last sub-group of MSMEs to GDP is smaller than the contribution of LE.

As in many other developing countries, the development or growth of MSMEs in Indonesia is hindered by many obstacles (e.g. Tambunan, 2019, 2020). These obstacles (or their intensity) may differ

*Table 3. Number of MSMEs in the AP region by economy**

Economy	Total number (million)	% of total enterprises	Year
Australia	2309.4	99.8	2017-18
Brunei Darussalam	5.9	97.2	2017
Canada	1280.8	99.8	2018
Chile	944.9	98.6	2017
China	21921.1	99.6	2017
Hong Kong, China	338.1	98.3	2018
Indonesia	64194.1	99.99	2018
Japan	3578.2	99.7	2016
Korea	3733.0	99.9	2017
Malaysia	907.1	98.5	2015
Mexico	4169.7	99.7	2018
New Zealand	518.9	97.0	2018
Papua New Guinea	49.5	13.0	2016
Peru	1899.6	99.5	2017
Philippines	920.7	99.6	2017
Russia	4531.3	N/A	2014
Singapore	262.6	99.5	2018
China Taipei	1466.2	97.6	2018
Thailand	3077.8	99.8	2018
United States	30748.0	99.9	2016
Viet Nam	507.9	98.1	2017

Note: * the number of MSMEs was rounded up.
Source: APEC (2020).

Figure 4. Share of GDP by business size in Indonesia, 2016-2018 (constant 2000 prices; %)
Source: Menegkop & UKM and BPS

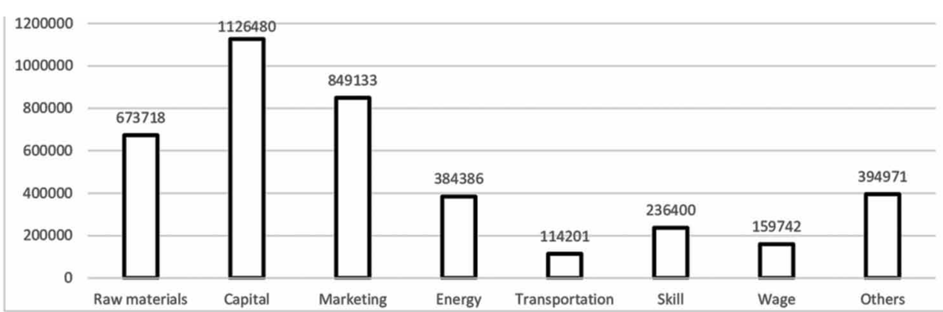
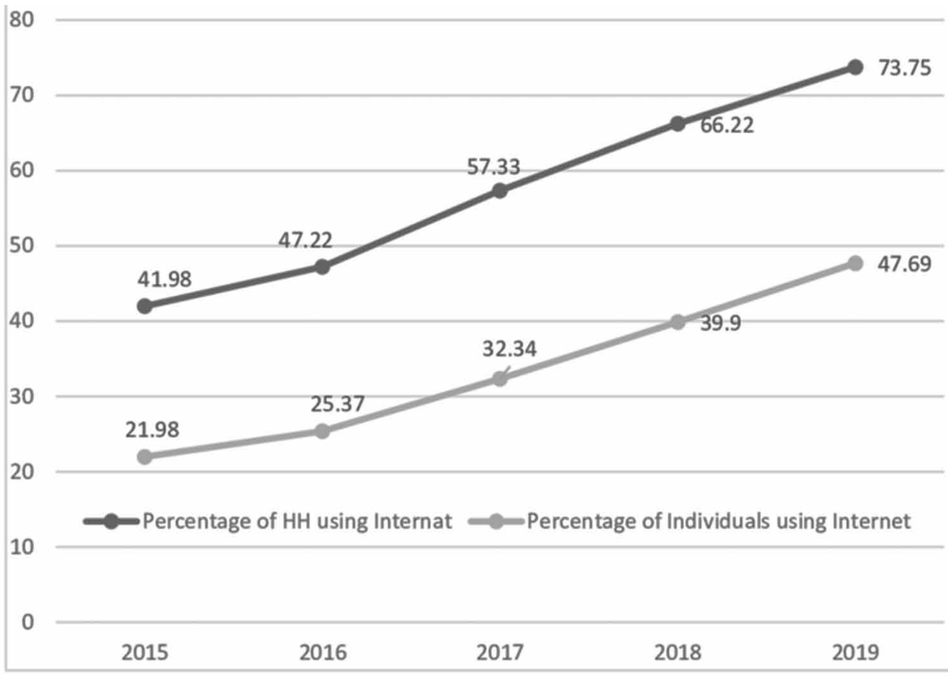


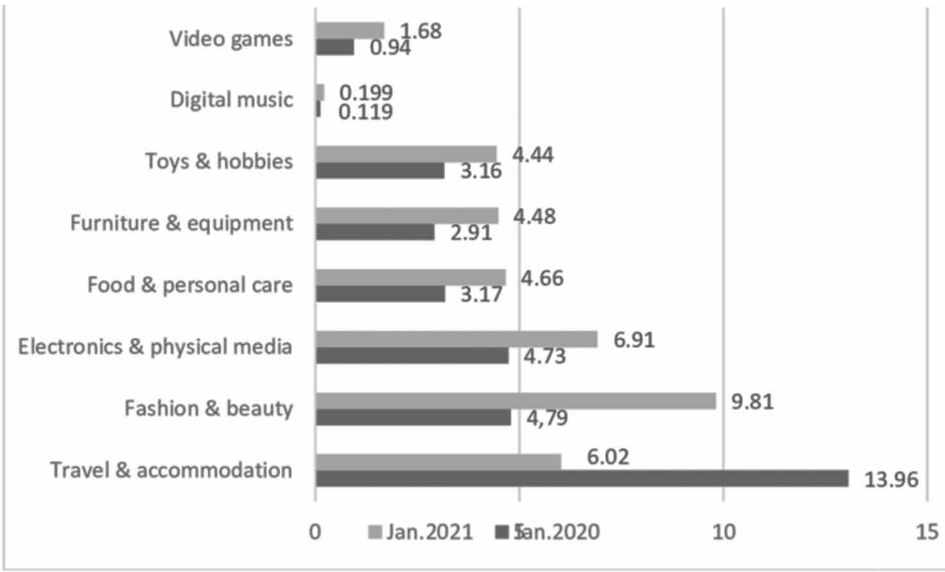
Figure 5. Types of MSIs constraints, 2017
Source: BPS (2018a)



by region within the country or between rural and urban areas, or between sectors, or even between companies in the same sector. However, there are some problems that are common to all MSMEs in any country, especially those in developing countries. Common obstacles include limited working capital and investment; difficulties in marketing, distribution and procurement of raw materials and other inputs; limited access to information about market opportunities and others; limited skilled personnel (low quality of human resources); low technological capabilities; high transportation and energy costs; limited communication; high costs due to complicated administrative and bureaucratic procedures, especially in business licensing; and uncertainty due to unclear or uncertain economic regulations and policies.

Based on data from the 2010 National Survey on manufacturing micro and small enterprises (called micro and small industries or MSIs), it was found that around 78 per cent of all MSIs (i.e. 2,732,724 units) experienced difficulties in running their businesses. The biggest types of difficulties were difficulties in funding, marketing, and raw materials, each with, respectively, 806,758 units, 495,123 units and 483,468 units. MSIs in the food industry experienced the greatest difficulties, i.e. 745,824 units (34.96%) which included capital difficulties as many as 255,793 units, raw materials 206,309 units, and marketing difficulties as many as 146,185 units. Whereas data from the 2017 National Survey on MSIs also revealed the same picture, namely the limited capital, followed by difficulties in marketing and in the procurement of raw materials (Figure 5).

Figure 6. Percentages of HHs and individuals using internet, 2015-2019
Source: BPS (2019, 2020a)



DIGITAL ECONOMY

The emergence of digital technology has created a drastic change in business practices which presents a serious challenge for the success of the implementation of the inclusive development strategy in Indonesia. Simply because digital technology has given birth to new business models that encourage higher economic growth and increase in per capita income more rapidly. The most important indicator of the digital economy phenomenon is the level of internet usage. Based on the data from BPS and the Ministry of Communication and Information (Kemkominfo) (BPS. 2019), in 2018 internet penetration (IP) in Indonesia grew rapidly, from 21.98 in 2015 to 39.90 in 2018 per 100 people. Meanwhile, in terms of IP by households (HHS), 66.22 percent of HHs have had access to the internet in 2018. This value has increased from 38.40 percent in 2015. In 2019, according to a national socio-economic survey 2019, around 47.69 percent of the total population or 73.75 percent of total households have access to the internet in 2019 (Figure 6). The high number of Internet users in Indonesia was inseparable from the rapid development of cellular phones. In that year, there was 89.09 percent of households in Indonesia owning/using at least one active cell phone number. This number has increased compared to 2015 with only 88.04 percent (BPS, 2020a). No doubt that this development can encourage the development of internet use in economic and financial activities or digital economy phenomenon.

The e-commerce phenomenon is probably the most important indicator regarding the development of the digital economy. In 2018, BPS published statistics on the use and utilization of ICT in the business sector based on the results of a survey of 4,537 companies spread across 34 provinces, covering 129 districts/cities in Indonesia in 2017 (BPS, 2018b). The scope of the survey covers five main activities, namely the manufacturing sector, trade, the provision of accommodation, the provision of food and beverage, and the information and communication sector.

Table 4. Percentage of companies that make sales and purchases through **internet by main sector, 2017**

Sector	Sale	Purchase
Manufacturing industry	30.34	31.28
Trade	25.61	23.15
Accommodation provision	49.69	21.96
Food and drink preparation	37.80	15.36
Information and communication	30.69	39.46
Business sector	28.78	24.49

Source: BPS (2018b).

The survey results show that the network facilities owned by the companies surveyed vary, ranging from the internet, intranet, local area network (LAN), and extranet. Most of the respondents have the internet as their network facility, namely 69.53 percent. Meanwhile, companies that have an intranet, LAN, and extranet facilities are respectively 48.00 percent, 56.13 percent, and 16.80 percent of the total respondents.

In terms of types of internet access, internet connections are divided into 4 types, namely fixed narrowband, fixed broadband, mobile broadband, and satellite antenna (VSAT). Of the total companies surveyed using the internet, those using fixed narrowband access were 10.25 percent, fixed broadband 71.44 percent, mobile broadband 24.66 percent, and VSAT 7.70 percent.

For the main indicators describing e-commerce, BPS in its survey used the proportion of companies that receive orders/make sales via the internet and the proportion of companies that make orders/purchase goods/services via the internet. The result presented in Table 4 shows that as many as 28.78 percent of companies in the sample have received orders/made sales via the internet, and the proportion of companies that have ordered/ purchased goods/services via the internet is 24.49 percent. It also shows that the proportions of making sales and placing orders via the internet vary by sector.

Another important finding from this survey is the purpose of using the internet, as shown in Table 5, the largest proportion of internet use is for sending and receiving e-mail (85.92 percent), followed by looking for information about goods and services (71.57 percent), and for using instant services (64.93 percent).

Table 5. Percentage of companies by the purpose of using the internet, 2017

Purpose	Proportion
Sending & receiving email	85.92
Looking for information about goods and services	71.57
Using instant services	64.93
Banking transactions	54.80
Social media	54.47
Looking for information about government institutions	44.79

Source: BPS (2018b).

In 2020 BPS published *the 2020 E-Commerce Survey*, based on a survey of 17,063 companies in all provinces, covering 101 districts/cities, throughout Indonesia. It shows that most of the companies surveyed (90.18%) sold goods/services through the internet during 2020 (up to 31 August); although the ratio between using and not using e-commerce varies between provinces (Table 6). Many factors can explain this, including access to ICT or internet infrastructure (especially broadband access in rural areas); the respondent's location (whether in a remote village or in a city); market conditions (e.g., market size, competition) served by the respondent; or personal reasons such as preferring to sell directly (offline), not interested in selling online, or lack of knowledge or expertise in e-commerce about selling online. Nearly half of the companies surveyed using e-commerce (48.42 percent) are in the wholesale and retail trade, car and motorcycle repair, and maintenance sectors (BPS, 2020c).

Covid-19 has brought humanity around the world into an unprecedented phase of isolation. Various efforts were made including social restrictions which were considered the most effective in slowing the spread of the virus until the discovery of a Covid-19 control vaccine. This forced business managers including MSMEs to transform their business into digital form and to adopt e-commerce to market their product if they wanted to survive. On the other side, the Covid-19 pandemic crisis has also pushed households or consumers to purchase online all their necessities as much as possible. Figures 7 and 8 show that the use of e-commerce in Indonesia has experienced a significant growth during 2020.

Data from the Ministry of Cooperatives and SMEs show that because of Covid-19, around 2 million MSMEs entered digital platforms. Meanwhile, the results of a survey conducted by the United Nations Development Program (UNDP) in collaboration with the University of Indonesia found that around 44 percent of respondents joined e-commerce sites during the pandemic. Most of the respondents admitted that at first, it was hard and difficult to learn and to use digital facilities, but now they are familiar with this technology (Kompas, 2021b).

Data from Indonesia's central bank, Bank Indonesia (BI), suggests that the digital economy and finance in Indonesia will be more vibrant. BI's projection is that electronic trade transactions in 2021 will increase by 33.2 percent annually to IDR 337 trillion. An increase is also predicted to occur in digital banking transactions by 19.1 percent annually during the same period. Meanwhile, the use of electronic money will grow by 32.3 percent (Kompas, 2021c).

In 2016, Google and Temasek launched a multi-year research to delve into the digital economies of Southeast Asia (SEA) with Bain & Company joining as a research partner in 2019. Their research in 2020 examined the digital economy of the region against the backdrop of COVID-19 across multiple industries, including e-Commerce, online media and more. Their data is very useful to see how Indonesia's position in the digital economy in the region (Table 7). As pointed out in their last report, internet usage in the region continues to grow, with 40 million new users in 2020 (400M YTD vs 360M in 2019). In Indonesia, e-Commerce remains the main growth driver at 54 per cent year-on-year base (yoy) (US$ 21billion in 2019 to US $32 billion in 2020), offsetting the -68 per cent (yoy) decline in travel (US$10 billion in 2019 to US$3 billion in 2020). In the group, only Vietnam and Indonesia's digital economies that still have double digit growth, i.e. Indonesia 11 per cent and Vietnam 16 per cent.

Table 6. Percentage of E-commerce businesses by province, 2020

Province	Do e-commerce		Total
	Yes	No	
Aceh	92.17	7.83	100
North Sumatera	91.39	8.61	100
West Sumatera	81.56	18.44	100
Riau	94.3	5.7	100
Jambi	77.66	22.34	100
South Sumatera	82.85	17.15	100
Bengkulu	87.84	12.16	100
Lampung	92.25	7.75	100
Bangka Belitung	88.74	11.26	100
Kep. Riau	94.95	5.05	100
DKI Jakarta	96.58	3.42	100
West Java	88.25	11.75	100
Central Java	95.53	4.47	100
DI Yogyakarta	90.65	9.35	100
East Java	90.31	9.69	100
Banten	83.38	16.62	100
Bali	87.61	12.39	100
West Nusa Tenggara	88.41	11.59	100
East Nusa Tenggara	92.77	7.23	100
West Kalimantan	90.37	9.63	100
Central Kalimantan	93.05	6.95	100
South Kalimantan	87.55	12.45	100
East Kalimantan	87.99	12.01	100
North Kalimantan	95.41	4.59	100
North Sulawesi	84.92	15.08	100
Central Sulawesi	84.87	15.13	100
South Sulawesi	94.21	5.79	100
Southeast Sulawesi	88.18	11.82	100
Gorontalo	83.17	16.83	100
West Sulawesi	80.58	19.42	100
Maluku	96.85	3.15	100
North Maluku	78.69	21.31	100
West Papua	95.31	4.69	100
Papua	79.59	20.41	100
Indonesia	90.18	9.82	100

Source: BPS (2020c)

Figure 7. Total E-commerce shopping in Indonesia, January 2020-January 2021 (bill. USD)
Source: Kompas (2021a),

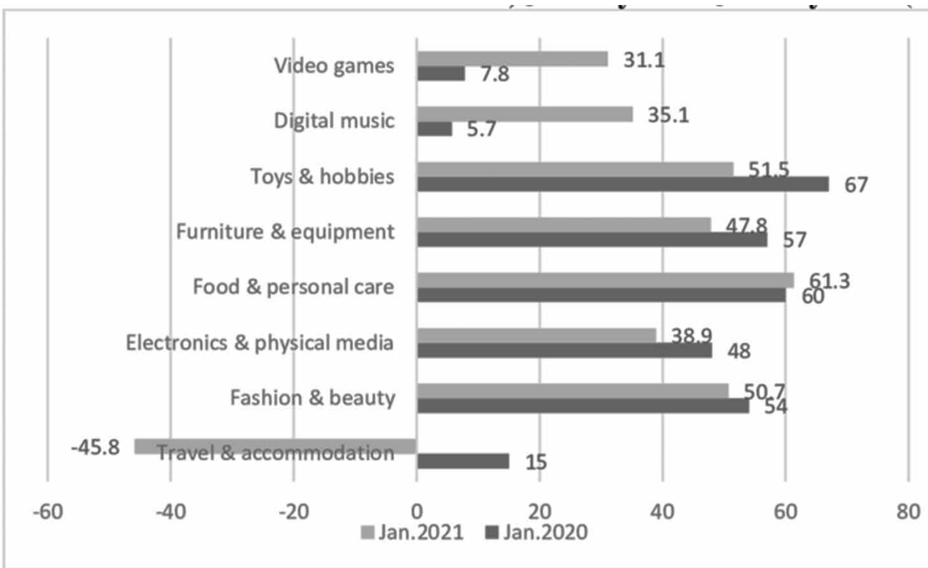
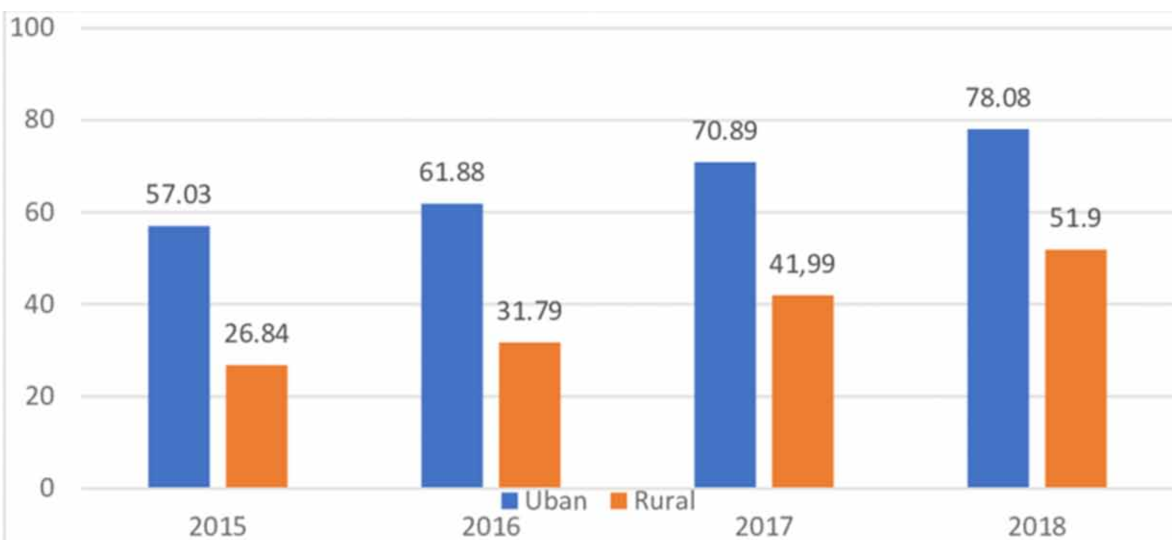


Figure 8. Growth of e-commerce in Indonesia, January 2020-January 2021 (percentage)
Source: Kompas (2021a),



IS THE DIGITAL ECONOMY IMPORTANT FOR ACHIEVING AN INCLUSIVE ECONOMY?

All the above-shown evidence, especially with respect to the use of e-commerce, may suggest that Indo-

*Table 7. E-conomy Southeast Asia 2020 (US$)**

Indicators	V	T	S	P	M	I
Investment in Internet sector ($M):[i] 2019 First half 2020	935 327	183 199	7.1[ii] 2.5[ii]	221 169	373 267	3.2 [ii] 3.8 [ii]
Internet e-Conomy GMV ($B) 2019 2020	12 14	16 18	12 9	7.1 7.5	10.7 11.4	40 44
New consumers to Internet economy services 2020 (%)	41	30	30	37	36	37
e-Commerce GMV ($B) per sector 2019 2020	5 7	5 9	2 4	3 4	3 6	21 32
Average hours spent online per day (personal use) 2019 2020	3.1 4.2	3.7 4.6	3.6 4.5	4.0 5.2	3.7 4.8	3.6 4.7

Notes: * V=Vietnam, T = Thailand, S = Singapore, P = Philippines, M = Malaysia, I = Indonesia; M = million; B = billion
i) Deal value
ii) in billion
Source: Google, Temasek and Bain & Company (2020)

nesia's economy is moving towards a digital economy, and in theory, the digital economy will support or speed up the process towards inclusive development. However, in the short term, efforts towards a digital economy can have different results because not all levels of society in Indonesia have the same ability to take advantage of this new technology, which is partly due to the uneven development of internet infrastructure in Indonesia and lack of knowledge strongly related to the level of education.

As shown before in Figure 6, the number of households (HHs) with access to the internet has increased from year to year. However, it is seen in Figure 9 that rural areas with various limitations still experi-

Figure 9. Percentages of HH using internet by location, 2015-1018
Source: BPS (2019)

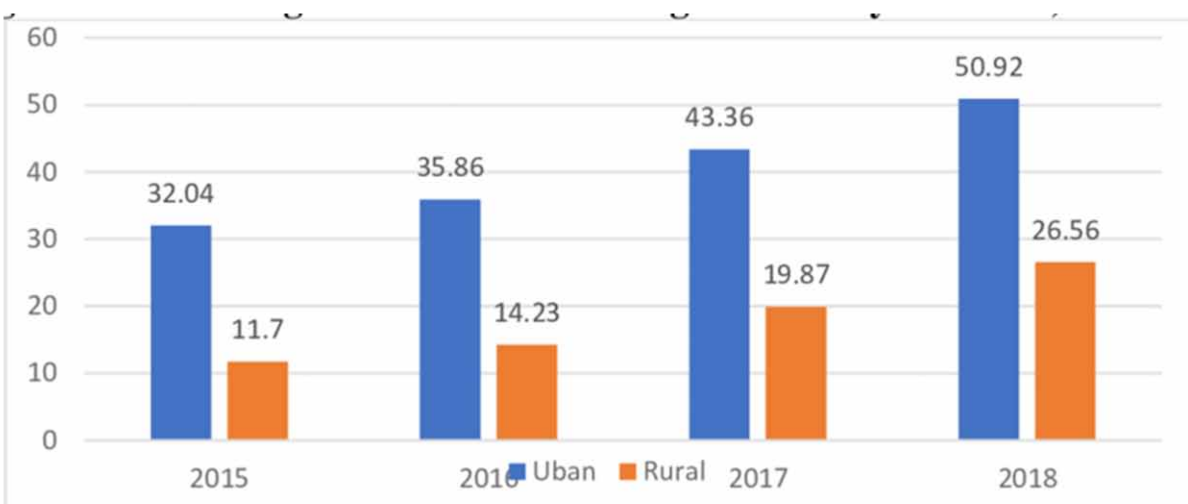
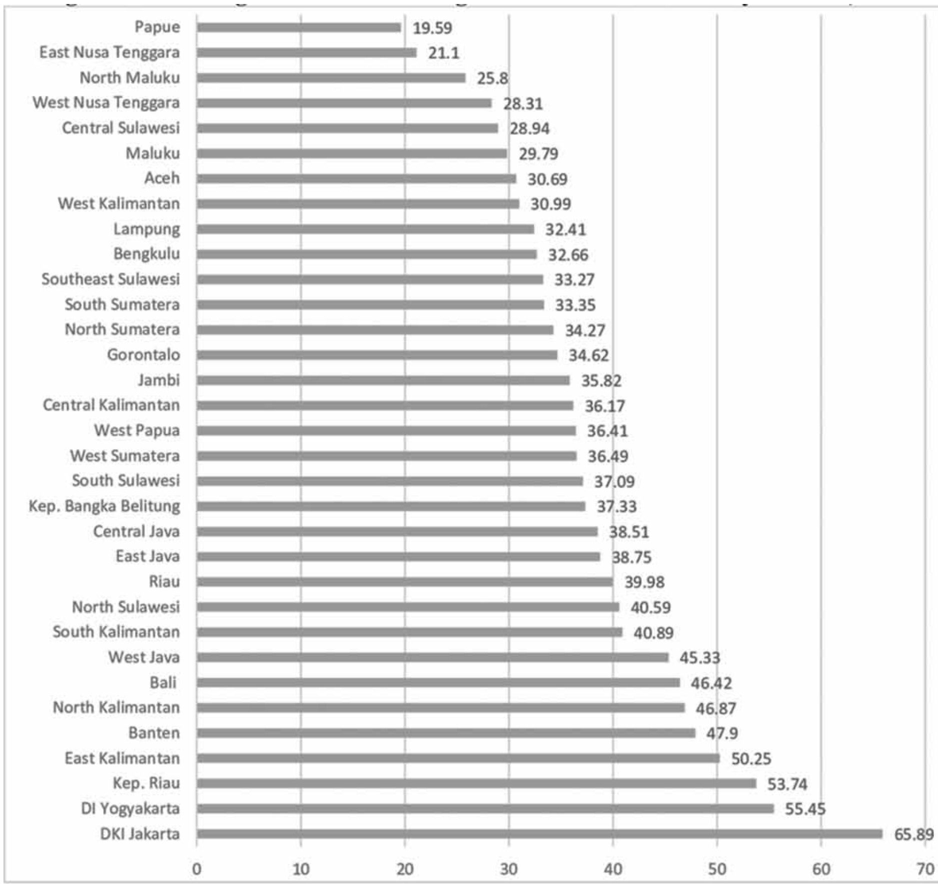


Figure 10. Percentages of individuals using internet by location, 2015-1018
Source: BPS (2019)



ence problems in accessing the internet. Urban household internet use in 2018 reached 78.08 percent, while in rural areas, it reached 51.9 percent. The policy of providing internet access evenly to remote areas continues to be carried out so that all people have equal access to information. Individually, as shown before, internet penetration in Indonesia has also continued to increase. However, as with HHs, there is also a gap in internet penetration in urban and rural areas. Figure 10 shows that the percentage of individuals using the internet in urban areas is almost double that of rural areas.

In comparison between provinces, disparities in the level of internet penetration also occur. In 2018, there were four provinces with internet penetration of more than 50 percent, namely DKI Jakarta, DI Yogyakarta, Riau Islands, and East Kalimantan. Meanwhile, internet penetration in Maluku, Central Sulawesi, West Nusa Tenggara, West Sulawesi, North Maluku, East Nusa Tenggara, and Papua is still below 30 percent (Figure 11).

Based on his study, Panolih (2021) shows that the penetration of internet users in Indonesia is around 73 percent or 196.7 million people. However, most of them are found on the island of Java, the most populous region as well as the most advanced in terms of development which is also the centre of economic and financial activities. According to his records, around 56.4 percent of the total internet users

Figure 11. Percentage of individuals using the internet in Indonesia by province, 2018
Source: BPS (2019)

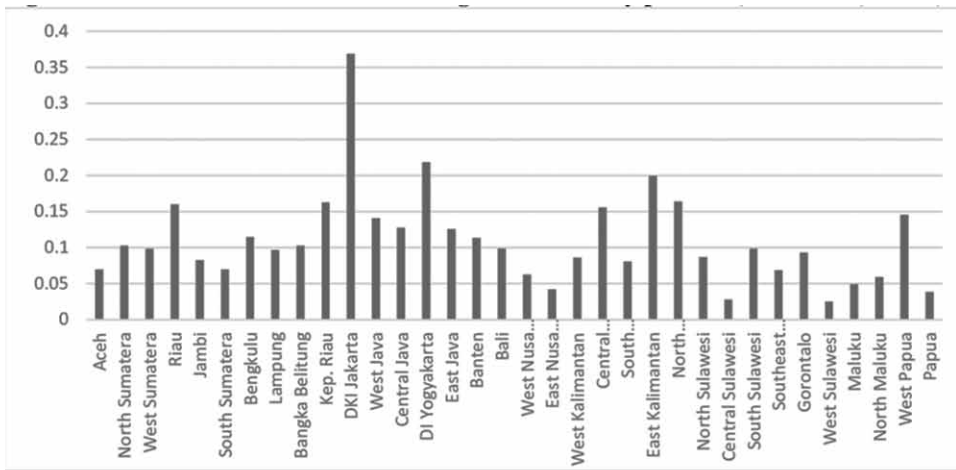


Table 8. Contribution to internet penetration in Java by province (%)

City/province	2018	2019
Banten	4.8	5.0
DKI Jakarta	4.8	4.6
West Java	16.6	17.9
Central Java	14.3	14,4
DI Yogyakarta	1,5	1,4
East Java	13.5	13.1

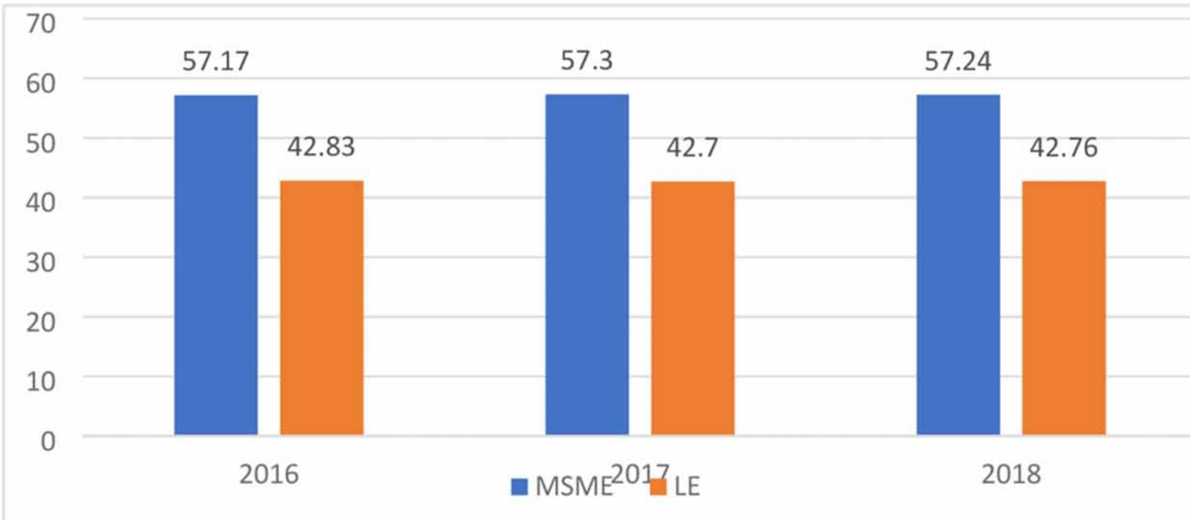
Source: Panolih (2021)

Table 9. Cities in Indonesia with the fastest internet connection (Mbps)

City	download speed	Upload speed
Medan	17.75	10.57
Palembang	17.75	12.69
Kota Tangerang	18.97	12.28
Jakarta	17.91	10.81
Depok	17.02	11.21
Bekasi	17.50	10.99
Bandung	16.78	11.09
Semarang	16.34	9.66
Surabaya	17.11	10.10
Makassar	18.50	11.13

Source: Panolih (2021)

Figure 12. Distribution of total MSEs using the internet by province, Indonesia, 2019 (percentage)
Source: BPS (2020b).



are in Java. followed later in Sumatra as much as 22.1 percent (Table 8), and only some cities, mainly in the western part of the country that have fast internet connections (Table 9).

In Indonesia, despite the rapidly growing internet media, the number of MSMEs, especially micro and small enterprises (MSEs) that use the internet is still very low. According to the 2016 Economic Census, only as many as 563 thousand enterprises or about 2.14 percent of total MSEs in the country have used the internet media for their business activities. According to Julianto (2016), there were various obstacles faced by the Indonesian government (the State Ministry of Cooperative and Small Medium Enterprise) in encouraging MSEs owners to use ICT, which included their low understanding of this kind of technology, their mindset which is opposed to using the internet to conduct business, and their lack of knowledge on how to operate this technology.

It reveals from 2019 data on MSEs that 11.9 percent of a total of 4.38 million MSEs used the internet, and the distribution by province shows that most of them are in Java Island (Figure 12). The province in Java with the highest proportion of MSEs using the internet is DKI Jakarta with 36.89 percent. DKI Jakarta is not only the Capital city of Indonesia but also the most advanced region in all respects and as a financial centre in the country. The next province is DI Yogyakarta with 21.8 percent, followed by West Java 14.05 percent, Central Java 12.74 percent, East Java 12.55 percent, and Banten 11.34 percent. Once again, this fact suggests a positive relationship between the level of development of a region and people's access to ICT, including the internet. If development in Indonesia remains uneven, the opportunities for the community or MSEs entrepreneurs to take advantage of ICT or the internet will also remain lame.

It is feared that this imbalance in access to ICT will increase income inequality that wants to be eliminated by inclusive economic development policies. Whereas the growth of MSEs, especially in rural areas, is very helpful towards an inclusive development or economic growth, and one of the important factors determining the ability of MSEs to develop is their full access to ICT.

Even worse, the predatory pricing phenomenon has emerged recently. The control of the e-commerce ecosystem of parties who have access and privilege raises predatory prices and exploits imported goods to Indonesia, which of course will kill local MSMEs that are unable to produce similar goods with better competitiveness and more competitive prices. Official data on Indonesia's foreign trade shows that goods made in China are increasingly dominating Indonesia's domestic market, and these e-commerce players are Chinese companies. There is a potential for investors to legally push vendors to set prices and close opportunities for competitors, including local MSMEs (Kompas, 2021a).

Another predatory pricing model is to take advantage of the algorithms in e-commerce systems as well as machine learning that can limit competitors. E-commerce systems can detect items that consumers often buy and see. This information is used to create similar products (Kompas, 2021a), Complaints about price wars from a small-businesswoman and their associates using a trading platform to market their merchandise can provide a clear picture of this issue. She and her associates make brooches for the hijab, and they sold them for 25,000 IDR to 30,000 IDR per piece. About two weeks later, a similar item appeared from China, priced at 5,000 IDR per piece. It was imported by a large trader. According to her, the quality of this imported Chinese brooch is far below the quality of their product, but many consumers protested them because their selling price was considered too expensive. As she complained, many buyers have chosen imported brooches from China. So, it is conceivable that this price war which could only occur through trading platforms could kill off many small producers, instead of increasing their sales (Kompas, 2021d).

From the seller's perspective in e-commerce, there is a potential gap. In Indonesia, the richest 20% of society account for 63.39 percent of e-commerce sellers. The proportion of people in the middle 40 percent and the bottom 40 percent groups are 34.62 percent and 18.92 percent, respectively. Thus, the development of e-commerce in Indonesia has the potential to widen inequality because it is controlled by upper-class people who have access to imported goods. This also shows that e-commerce is not yet inclusive for MSMEs or vulnerable groups in Indonesia. MSMEs in the food-beverage, shoe, textile, furniture, and toy industry groups were most affected by imported goods sold via e-commerce (Kompas, 2021a).

Now back to the third question: is the digital economy important to achieve an inclusive economy? As the theoretical contribution of this chapter, economic digitalization will provide business and job opportunities and facilitate access to all levels of society, including the poor, to health, education, and other public services all of which will ultimately improve welfare, and this is the ultimate goal of an inclusive economy. However, economic digitization can exacerbate inequality or increase poverty because, as pointed out by several reports (e.g., Agahari and Sudrajat, 2019; SMERU, 2020, ILO, 2021), not everyone, especially the poor and people with disabilities, has access to ICT and other digital tools. In other words, empowering the poor, especially in education and training on the one hand and providing full access to ICT and other digital tools, on the other hand, are the main requirements that must be met so that economic digitization has a positive impact on achieving an inclusive economy.

CONCLUSION

This chapter has demonstrated Indonesia's achievements in inclusive economic development and a digital economy. It can be said that since the launch of an inclusive economic development strategy in 2009, much progress has been made. In particular, the poverty rate continues to show a decline. But inequality is still a formidable homework for the Indonesian government. The existence of the Covid-19 pandemic adds to the burden on the government in implementing inclusive development, especially to maintain the rate of decline in the number of poor people and reduce inequality.

On the other hand, Indonesia is in the process of moving towards a digital economy. In fact, Indonesia is one of the countries in the Southeast Asia region that is quite fast in developing the digital economy, especially with respect to the rate of increase in the number of people who have access to the internet in recent years. The emergence of digital technology has certainly created a drastic change in business practices which presents a serious challenge for the successful of the implementation of the inclusive development strategy in Indonesia. Simply because digital technology has given birth to many new business models that, at least theoretically, encourage higher economic growth and increase in per capita income more rapidly.

In other words, the process towards a digital economy can go hand in hand with the process towards an inclusive economic development, at least in the long run, *ceteris paribus*, other factors that influence the achievement of an inclusive economy remain unchanged. Because as has been shown in the discussion before, in the short run still not all, especially the poor, including MSEs, have access to ICT or the internet. This means that as part of efforts towards an inclusive economy, the Indonesian government still has to make extra efforts so that the poor, marginalized people, and those living in remote areas such (e.g. eastern part of Indonesia and in the outer islands) have full access to it. ICT or the internet. If the government fails to provide this access it could lead to Indonesia's failure to achieve a fully inclusive economy.

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Chapter 6
E-Sports Industry in the Time of Green Digital Ecosystems:
Security Decision Support Empowerments

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ABSTRACT

The phenomenon known as "eSports" has been growing in numbers in terms of revenue, market share, and popularity. This research aims to study this phenomenon in a larger scale which include findings from Southeast Asian countries such as Thailand and Singapore. The structure of the study will compromise of describing the eSports industry which is crucial to understanding the whole ecosystem of eSports, such as the economics behind the industry and the different roles that come under the industry. In order to do that, the application of a decision support systems tool is used to further study the future of eSports.

INTRODUCTION

Electronic Sports, called by eSports for short, can be similarly compared to traditional sports tournaments (Premier League, National Basketball Association, etc.), but it is more commonly known to be a competitive scene where professional eSports teams and athletes compete through playing video games in order to achieve big titles and prize pools. eSports have been slowly emerging into the business in

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the last decade, but the scene has grown rapidly the past few years and has been getting the attention that it needed. Just last few year (2019-2020), the global eSports market reached a total revenue of $1.1 billion with a year-on-year growth of +26.7% (Susanto et al., 2021; Pannekeet, 2019; Jenny et al., 2018; Mohiddin et al., 2020). The phenomenon is now widely seen in Asian countries namely Korea, China, some neighbouring countries such as Malaysia and Indonesia (Table 1). eSports is not entirely based on competitions, but is a collective motion that constitutes to the subject that includes social entertainment from streaming services, eSports-based events which attracts the public towards the initiative, managerial efficiency in the organization.

Table 1. Gamers in various Asian countries

	All values are in millions								
Region	**Number of Gamers**			**PC Gamers**			**Mobile Gamers**		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
China	516.6	564.8	645	7.3	7.7	11.3	527	561	620
Indonesia	38.8	43.7	53	36.3	39.7	53.4	159	173	207
Malaysia	12.1	14	24	11.9	12.5	18.1	52	54	65
Singapore	2.7	2.9	6	2.09	2.19	6.8	9	9.3	18.9
Philippines	25.3	29.9	43	32.1	34	43	141	147	176
Thailand	16	18.3	29.1	11.8	13	23.3	51	57	76
Vietnam	30.5	32.8	41.2	26	27.8	37.9	114	121	134

The gaming culture has been interest that dates back in 2015 where competed in a First-Person-Shooter video game called "Counter Strike 1.6" that proved to be a fun and competitive environment to be involved in. At that time, the gaming community was very much non-existent but that changed drastically these past few years where more competitive games became a favourite for the locals, such as League of Legends, Mobile Legends, Fortnite, etc. The eSports Association was a huge steppingstone for the gaming community, but the whole aspect of the eSports industry and what lies behind it (the structure, economics, management) is alien for most people. For that, the industry is need for graduates of managerial and IT backgrounds for the success of the growth of the industry. Managerial graduates are able to help with the decision making in the industry and graduates with an IT background can increase the efficiency of work processes involved with the growth of the industry, for example utilizing the use of Information Technology applications will surely increase the rate of productivity in an organization as it speeds up the workflow accurately.

To further elaborate, professional athletes have been growing in numbers which brings to the next form of e-Sports, getting into the industry as a career. ESports is not all about playing games, the industry includes business-related jobs such as marketers, team managers and organizers. This support of the eSports industry led to the increase in local professional athletes and with the support that the eSports community has, players can compete nationally. The eSports industry here is showing a lot of potential, the rise of numerous gaming communities, organisations and teams will be the starting point of the growth of the industry. These findings have concluded that the right definition of eSports that should be used in this study is a competitive scene of professional eSports athletes competing in a video game event that will be spectated by millions both online and offline (audience present in the event). Esports can and should be compared to traditional sports as it a lot of time and effort is put into winning a championship with a big prize pool on the line for those competing.

Moreover, this study involving the effective growth of the eSports industry by using Decision Support Systems that aims for graduates to have the knowledge for a career in the development, implementation and management of business information systems in various business areas and have an understanding of the application of information technology from a business perspective. The aims of the course correspond to the focus of the study, which is to implement Information Technology tools, primarily Decision Support Systems was studied alongside Database Systems allows for a steady understanding of the processes of analysing data (Bonner & Woodward, 2012; Ibrahim et al., 2020). This study reveals the factors that influence the growth of the eSports market industry at the same time gain a deeper understanding and phenomenon. As now, market size of e-sport for Asian countries is becoming promising (Table 2). With the three years' experience in the course, questions regarding the involvement of Information Technology or better yet, the utilization of Information Technology applications can be answered thoroughly.

Table 2. Potential eSport markets: Asian countries

	All values are in millions					
Region	**Occasional Viewers**			**eSports Enthusiasts**		
	2016	2017	2018	2016	2017	2018
China	4.1	5	11	3.6	4.3	8
Indonesia	20.6	26	42.3	17.7	22.3	35
Malaysia	6.7	8.2	17.5	5.8	7	15
Singapore	1.2	1.4	8.4	1	1.2	6.7
Philippines	18.2	22.2	35.7	15.6	19	31.4
Thailand	6.7	8.5	19.2	5.7	7.3	16.7
Vietnam	14.7	18.2	29.1	12.7	15.6	26.4

The aim of this study paper is to fully understand the eSports industry. With a better insight of the industry, eSports can offer more value economically. Thus, this should be included in the study as well as identifying the factors affecting the growth of the eSports industry in the recent years. Essentially, utilizing Decision Support Systems as a tool to help manage the data gathered during the research to study the growth of the industry. This can be done by observing, examining and analysing the data needed in order to answer the research questions that will be stated in the later parts of the introduction.

Problem Statement

eSports on its own is a complex and a massive ecosystem that requires constant attention and a thorough understanding to produce a thriving development. The support for the gaming community has increased in numbers with many types of development and initiatives added. The future of the industry is unpredictable without the help of Information Technology applications, such as Decision Support Systems tools, Knowledge Management, and Information Security Management tools. Overall, eSports is an understudied topic that should not be overlooked, as the increase in awareness in the recent years have shown great success that the industry can achieve. The study must also include the growth, especially for the future of eSports. Therefore, more research should be done about eSports and studying the future of eSports through the implementation of Information Technology applications, primarily focusing on Decision Support Systems tools. With the use of DSS, the quantitative data collected (numerical) regarding eSports from the recent years can be analysed further to predict the outcomes.

Objectives

The objectives will be structured accordingly with the research questions stated in this study. A summary of what needs to be done is arranged in a table format so that the objectives are clear and well delivered. Table 3, will deliver all the information needed for this subsection.

LITERATURE REVIEW

How Well Educated are the Public of the eSports Industry

E-Sports have become a huge phenomenon that has been looked up upon by the youths and the numbers supporting eSports are growing at an exponential rate by the minute. Yet, most people generally understand eSports as playing video games in return for a big prize, commonly in the form of cash. This perception of the industry is an unorthodox way of thinking but the whole structure of it is more complicated than said. From the literature gathered, some definitions differ from others, but most of them have a similar concept in mind. That equates the definition of e-Sports as competitive gaming at a professional level. Although it may seem simple enough to understand, the whole ecosystem of eSports is a far greater topic to discuss and quite complicated to understand with the stated definition (Block & Haack, 2021).

eSports is supported by streaming services like Twitch, which allow viewers to watch as their favourite gamers play in real time, and this is typically where popular gamers build up their fandoms. Professional gaming takes an immense amount of practice, energy and strategy to play at a professional level. The popularity is on the rise, the competition is continually getting fiercer, and the science and data that goes into propelling the cyber athletes themselves is on par with most other sports (Willingham, 2018).

Armstrong (2001) stated that it is mainly a competitive scene that is heavily based on physical competition to gain its revenue from. While the competition itself is physically fixed, more viewers can watch the competition online. Thus, the definition clearly states that there are different forms of income for the eSports industry, such as mentioned in the statement itself; from large competitions and the revenue gained from streaming the competition. However, keeping in mind that compares eSports with other athletic events, for example, the National Basketball Association, Major League Baseball, the Super Bowl, etc. There are various amounts of similarities that can be found between sports and eSports, one of them being for a person to join the competitive eSports scene, it will take a lot of practice, energy and strategy in order to compete professionally. Therefore, the whole ecosystem of e-Sports works together with traditional major sports leagues. Both eSports and sports leagues involve the management of players, strategy management, recruitment of players to form a team to achieve the goal of winning the championship (Yu, 2021; Funk et al., 2018).

Table 3. Research mapping

Research question	Objectives	Constructive Overview
How well educated are the public of the eSports industry?	1. Get a clear definition of eSports 2. Explain what the eSports industry can provide 3. Set a scale for the research study	• Explore and explain all the different definitions of eSports • Gathering information and statistics of market share and revenue achieved by e-Sports in the last 5 years • Set a decision on the scale of the research study (Either based on local data or a larger scale, which will most likely be collecting data on eSports among South East Asian countries
What are the factors affecting the growth of eSports?	4. Identifying the main factors of the growth of eSports 5. Weigh the factors in accordance to the importance or which has the most impact toward the growth 6. Explain more in detail of the top 2 most influential factors that will be used for data analysis	• Gathering literature reviews on what influences the growth of eSports • Comparing all the data collected and developing a contrast of value of impact towards the eSports industry • Discussing in depth about these factors whilst gathering more information about the most influential factor
What can be done to challenge these factors?	7. Examine chosen factors and come up with solutions	• Provide a discussion about a set of solutions • A brief introduction to information technology and its benefits
Will the implementation of Decision Support System tools be beneficial for the eSports industry?	8. Determine the values that will be provided with the implementation of DSS tools in the eSports industry 9. Analysis the growth of the industry with the factors in hand	• Compile all the different definitions of DSS and state which will be the most appropriate for the research • Discuss the benefits of the implementation of DSS for the eSports industry • Collect necessary data needed for the analysis for the future of eSports

To summarize on how the definition is produced, the main definition is clear to everyone, but the more structural definition is a blur for some people. Thus, the definition provided all the necessary information that people might overlook and will get a better understanding of the term "eSports" (Hamari & Sjöblom; 2017; Hallmann & Giel, 2018).

Factors Affecting the Growth of E-Sports

The global market for eSports changes with every new release of a competitive game or even a genre of a game. The industry has shown massive growth in terms of viewership and total revenue these past couple of years. But it is still somewhat a mystery to what constitutes to the overall growth of the eSports industry. According to a statistic by Sports Pro (2018), there were 215 million casual viewers as well as 165 million enthusiasts, making a total eSports viewership audience of 380 million in 2018. Moreover, with an approximate year-on-year growth of 14% if the eSports viewership audience, Newzoo predicts that there will be a total of 557 million eSports audience by 2021, which consists of 307 million causal viewers and 250 million eSports enthusiasts. The trend of the steady growth will continue for the next couple of years coming, but the main argument to make here is that more than half of the audience are not eSports enthusiasts, but rather regular viewers who don't play the game but still enjoy watching these eSports broadcasts. This brings the discussion into one of the main factors the growth of the eSports industry, the eSports viewership and its audience.

Therefore, the increase of eSports viewership, awareness and time spent on watching eSports will have an effect towards branding companies, especially those that are supporting the eSports industry through sponsorships. The increase in number will eventually increase the number of people that they can reach in the eSports industry, producing a larger community of people to target. Thus, efforts in developing with their target audience and with the help of marketing through eSports, brands can expand their reach easily.

Lastly, year-on-year revenue growth in the eSports industry should be investigated. According to Newzoo (2019), the annual increase in the total global revenue by the eSports industry was at an average of 38.2%, for which 76% of the total revenue was from brand investments, that was a total of USD694 million solely from brand revenues. Moreover, it is predicted that in 2021, the total global eSports revenue will exceed USD1.6 billion and USD1.3 will be coming from brand investments. To elaborate, the revenue from brand investments are generated by sponsorships, advertising, media rights and content licenses. Sponsorships having to contribute the most out of all the revenue streams, but media rights have a year-on-year growth of about 50% between 2016 and 2021 which is seen as the fastest growing revenue stream in the eSports industry. Media rights defined by Law Insider as "the right to broadcast, transmit, display, film and photograph a competition, as well as all recordings thereof in any form and in all Media now known or hereafter and the right to exploit such rights". Therefore, in 2021, the total revenue from brand investments will be coming from sponsorships and the second most contributor would be from media rights.

RESEARCH METHODOLOGY

Firstly, qualitative data play an important role in this research study. For this study, a method of observation through case studies will be analysed in-depth, and the advantage of this method is that various case studies can be used. This is done to acquire a greater understanding of the factors influencing the growth of eSports in the previous years. With the limitation in mind, the collected qualitative data are taken from both primary and secondary sources. Thus, the method of observation will demonstrate the analysis of research questions. In other hand, numerical data will be identified as quantitative data, and this type of data is needed in order to perform quantitative analysis that precisely measures the data and projects the analysed data in patterns of statistical representation. These numbers and values are to be used during the statistical analysis and will in turn produce a unique numerical pattern that is associated with the situation given in the analysis. The analysis also enables quantitative data to be measurable, scenarios can be done by easily controlling various parameters during the analysis. Thus, decisions can be made through the statistical analysis of quantitative data.

Thematic Analysis

This type of analysis provides the study a reasonable understanding of the factors affecting the growth of the eSports industry, the study of the future growth by analysing and measuring the patterns of influence using the data collected. It is considered as one of the methods of clustering, which focuses on identifying patterns and the understandings behind those patterns. The 'identifying' part of the analysis refers to pinpointing the factors affecting the growth of the eSports industry. The factors must have a huge influence towards the growth for the analysis to be relevant, but this method also recognizes the unwanted factors which will not be needed during the analysis. To further explain how the thematic analysis is done, the following tool are used to perform such analytics in this research study.

DISCUSSIONS

With the advancement of technology, devices have become more and more convenient and portable. This concept can be applied to mobile gaming as well. The relevance of mobile gaming is on the rise these past few years, disrupting the dominance of the PC game titles that has been on the top of the global eSports industry. With the growing number of mobile games titles, however, are slowing building their player-bases and at the same time sipping through revenue at a larger amount compare to the platform counterparts. Mobile eSports is especially growing in the Asian market as well as several international audiences that are interested in joining the mobile eSports scene.

The improvements in mobile technology has bought off any differences between the gaming experiences on PC and on mobile, although gaming on a mobile will not in line with the processing power of PC hardware. Most phone companies are producing mobile hardware that are catching up to PC, as well as providing apparatus and peripherals for mobile eSports to improve the gaming experience for mobile players. Companies have been creating smartphone dedicated to gaming that has better hardware components and software features that will help improve the performance of gaming on smartphones, and this will provide a competitive edge for mobile eSports athletes. This revelation has been realized by several PC game developers (e.g. Fortnite, Players Unknown Battle Grounds, etc.). Revenue streams from the developers will increase as the shift in the player-base, will result in an increase of the gaming market, allowing the developers to reach a new gaming community, that will allow PC gamers for example to engage with the same game, but in new favourable and more convenient ways.

Moreover, with 5G connections slowly emerging in several countries, there will be a shrink in the gap between mobile connection services and wired broadband connection services. This will give mobile gamers the advantage of connections speed, less ping means better gaming experience. Thus, more players will eventually shift from PC gaming into mobile gaming in the coming years, because of the great advantages mobile gaming offers. Games of the smartphones are free, and this give an advantage for the mobile game developers because the demographic of players who plays the games are widespread, from casual gamers to competitive. While mobile games are mostly free, most of the revenue gained from mobile gaming are through in-game transactions. In-game transactions is where players pay a certain amount of money for a change of in-game currency, and those currency can be used to pay for whatever the game can offer to the player and when the purchase of any item in the game is called an in-game transaction. Free games on mobile attracts to more people both non-competitive players and casual gamers. This is because mobile games depend on the support of the long term development of the game, where players slowly transition from occasional players into competitive, in-game transactions will be favoured because it allows these competitive gamers to increase the gaming experience as well as satisfying their needs.

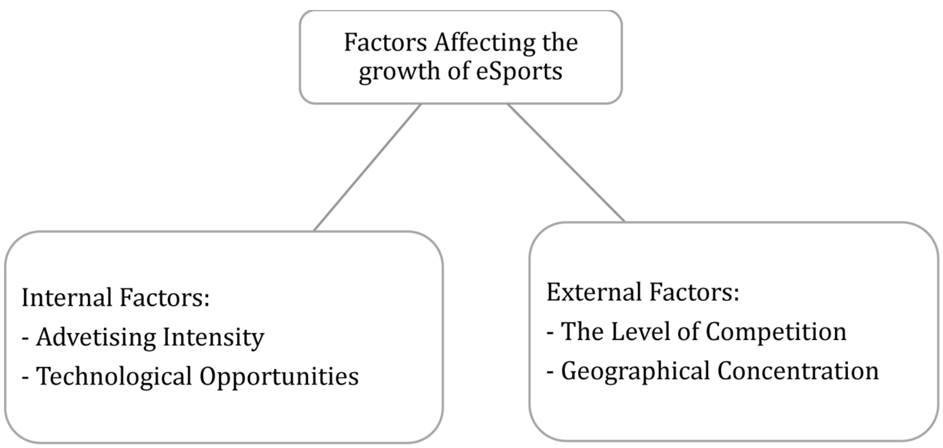
To add, the main factor of a healthy growth of the eSports industry is streaming viewership, where tournaments and any type of eSports events will perform well when they are able to attract target audiences. Therefore, streaming platforms such as Twith.tv, YouTube or Mixer are the integral part of the main economy of eSports and is seen as a key growth of the eSports industry. This is because streaming services are not fixed to appealing competitive gameplay, but it also entices creative content from playing competitive titled games. So, the success of a streamer is based on how many subscribers the user has and the total amount of hours watched from different audiences.

Therefore, three of the numerical data can be used and further analysed using a Decision Support System tool, RapidMiner. Based on these data, on hypothesis has been created that is to analyse how the number of players and streaming audiences affect the eSports revenue.

Conceptual Framework

Following the deliberation above, a conceptual framework compromising the following theory and model is proposed (figure 1):

Figure 1. Conceptual framework



Each part of the conceptual model is aimed to correspond with the two research questions that were to be answered, which was research questions two and four. Factors affecting the growth of the eSports industry are all closely related to this conceptual model. Advertising intensity, is the level of strength that the organization advertises their product so the advertisements can be seen by the public and the organization will benefit. Franchising and merchandising the eSports industry will have a long-term effect towards how the public and eSports followers view eSports, but this topic is still a learning process. An example would be a tournament held by the game developers will play a major role because these developers have direct contact with the people who oversee the cosmetics available in the game. Players and teams that are competing will put a lot of effort on their team performance, while merchandising will grow their reputation in order to attract fans as well as building a community of their own. “eGG Network” oversaw the role of becoming a 360-marketing platform for Southeast Asian countries.

Challenge Factors

The Industrial Revolution 4.0 where the "computers are connected and are able to communicate with one another to ultimately make decisions without human involvement". Computers are now used as a medium of reliable information processing where; information is gathered, stored in a system that will later be converted into more useful information. But the reliability of those computers is not heavily dependent on them, but they are supported by the components that comes about the fourth Industrial revolution, for example, the Internet of Things, Cloud Computing, Information Technology, etc. With all the components of IR 4.0, there will be an increase in productivity and efficiency when companies and organizations have utilized Industrial Revolution 4.0. To understand more on how the Fourth Industrial Revolution works with the study of this study which is to implement Information Technology tools, Decision Support Systems tools in particular, for the understanding of the processes of analysing data. It is best to discuss what information technology is, but in this case, the study involves the use of data and processing those data into useful information, Information Technology Management is to be discussed instead as it is more involved in the use of data and information, how to make them useful for the organization. Moreover, one of the benefits of Information Technology Management include a better way for employees to access, share or copy organizational information. IT management stores information that the organization possesses in a single system that can be accessed through the organization owned devices, primarily computers. Information technology allows organizations to store, back-up and share files while protecting the transference of data from cyber criminals or unauthorized employees. With information easily accessible by the employees, business processes will increase in efficiency and productivity will surely be improved too. Therefore, information technology management is a better alternative for a guaranteed safety of organizational data and empowers the organizational processes. In contrast, incorporating information technology management in an organization allows systems to work together to operate correspondingly with the organization's business strategy.

The Decision Support System: Beneficial of e-Sports Industry

Recent advancement of technology or specifically the use of Decision Support System tools is found difficult to discuss mainly due to the fact that there is no possible literature that discusses the benefits of implementing a Decision Support System tool in the eSports industry. Although DSS is found to be a relatively new process, but it is found to have been used for a long time. The use of DSS in the eSports industry is alien, but other business companies and organization have been using this type of system of assist the organization to project revenue over a course of a year for example, and those profit gained by the organization will further add up to the growth of the organization. In this case, the benefits of implementing DSS tools in an organization is found useful, and therefore, should also be equally useful for the eSports industry. The use of information in this data driven era has showed its importance, especially in a constantly changing competitive environment. Also, with data rapidly growing by the day, data is known to be an organization's asset, and those said data will be the source of maintaining a competitive advantage if the data possessed by the organization is used correctly. With Decision Support Systems, intelligent decision-making information will be produced for managers and other higher level-executives to better evaluate the alternatives in order to effectively come to a decision. Therefore, DSS provides for the ability to retail control over the decision-making process.

Moreover, some added benefits come with the implementation of Decision Support Systems tools will have an effect to the future of the eSports industry. These benefits can provide solutions to different types of problems, namely, structured solutions and unstructured solutions. Structured solutions are indirect changes that can be tangible or intangible that can be identified (e.g. better quality of decision-making). On the other hand, unstructured solutions are direct changes that can be identified immediately (e.g. reduced cost, increase competitive edge, better communication, etc.). Both types of solutions will be further discussed in order to understand how the implementation of Decision Support Systems can truly help the eSports industry such as;

1. Time Saving
   The use of DSS tools have a substantial effect on not only the decision-making process, but the use of the system in an organization can effectively increase employee productivity and provide more quality information for decision-making.
2. Reduced Costs
   Indirect costs of the implementation of Decision Support Systems include labour savings of decision-making process and the costs of infrastructure.
3. Improve Interpersonal Communication
   The open communication between managers and higher executive during the decision-making process will essentially be improved with the use of a model-driven Decision Support System. It will produce an outcome that is based on discussions surrounding facts and statistical data.
4. Competitive Advantage
   Competitive advantage depends on how the organization uses their data. An organization that heavily converts their data into useful information is found to be at a competitive advantage.
5. Increase Effectiveness
   Improved quality of information makes for better decisions made in the managerial level. But it is found that the effectiveness of the decision is difficult to measure and document. Therefore, an increase in the analysis of possessed data will increase the effectiveness of the quality of the decisions made.

However, technological opportunities, refers to the potential for technological progress in general or within a field that affects the overall industry and individual enterprises. This will relate to the implementation of Decision Support Systems or the advancements of mobile technology within the field of mobile as well as the shift to 5G technology. Decision Support Systems will help an organization in the eSports field to project future outcomes of eSports and at the same time providing a better decision-making process. While the advancements of mobile technology and 5G will appeal to a wider target audience. Thus, increasing the gaming market, allowing players to play the same game but in a different, but a more favourable setting.

Geographical concentration refers to the population of people that are interested in the product. This explains that the population of gamers and the awareness of eSports plays an important role in the external factors if eSports growth. The amount of people that are interested in eSports will directly affect to the viewership audience, market, and the population of gamers too. Thus, product targeting is important for international eSports initiatives. The level of competition. Where game developers will have to fight to get their customers, mainly in the mobile eSports community. Mobile Legends and Arena of Valor are great examples, both are from the same gaming genre but developed from different companies. The initiatives done towards attracting more players from Arena of Valor are hosting tournaments with higher prize pools than Mobile Legends while still maintaining the competitive edge.

Looking closely at the quantitative analysis done three factors are considered, the number of gamers within that certain region, total number of audiences which are occasional viewers and the total number of audiences which are eSports enthusiasts. To know how the number of gamers have an influence towards the growth of eSports, it is important to note that there are various types of players that can be identified within the Southeast Asian region, such as mobile gamers, Multiplayer Online Battle Arena (MOBA) PC players, First-Person Shooter (FPS) players, Twitch streamers, and many more. These statistics must be considered so that the industry know what type of market segment that country can be classified into. For example, Korea is the home for the top League of Legends players and teams in the world, namely, SK Telecom, where that single team has won three world championship titles that has never been done before. Most of the MOBA players are segmented and are revolved around the Korean player base, so the focus of promoting the Korean teams for League of Legends content. However, for the Southeast Asian players, the market is more shifted towards mobile eSports, this is mainly due to the advancements and convenience of mobile technology that has been offered to the Asian market. Chinese smartphone developers, such as Oppo, are developing smartphones that are capable of handling heavy usage of the phone that can manage high intensity gaming at a very low price. Having said that, game developers also have an impact towards the eSports scene in Southeast Asia, most of the competitive gaming titles are developed by Asian countries. Therefore, servers provided by the game developers are closer to those countries, making the gaming experience more available and attentive where there is no latency when playing.

This gives room for the other factor considered, showcasing to your audience. The Southeast Asian market is focused on mobile eSports and MOBA type games, most tournaments held are of the two. Revenue can be made from live streaming or even content creating videos of the game genres. Live streaming professional games can be educational and is an attraction for eSports enthusiasts and occasional viewers that just wants to learn the game. Plus, creating content about the games will attract more viewers into playing the game, for example, when a content creator shower the viewer how to do an amazing combo to win a game, it will in turn allow the viewers to try the combo out themselves. Thus, the population of gamers increases. Streaming and content creating is the best way to promote the game and get sponsorships, both contributes to the revenue.

Therefore, with reference to the conceptual model, all data have pointed out towards the factors of the growth of eSports, and heavily emphasizes the importance of advertising, as it helps capture the market. Then, utilizing the advance technology and making them a priority for all business processes, the population of eSports audiences, for example, if a certain type of audience prefers to watch eSports for entertainment purposes, then that geographical population will be advertised with creative content developed from eSports.

CONCLUSION

The finalized definition that has been produced throughout the course of this study is a competitive scene of professional eSports athletes competing in a video game event, spectated by millions online and offline. Moreover, the other objectives that is present in the questions are followed accordingly. These claims were established with a mix of local articles and other secondary literatures which states that the eSports ecosystem is made up of a group of talented people with different course of backgrounds that hold the structure of eSports into what it has become today, those people of diverse backgrounds are; managers, marketers, organizers.

IR 4.0 can be utilized by the study of information technology management that involves the use of data and information, and how to make them useful for the organization. Information technology management functions to produce greater value from the use of technology and this can be achieved by aligning business strategies and technology management within the organization. The main factor influencing the growth of eSports is identified, eSports audience viewership. Several literatures were found to support the factors, and in addition to that, data regarding audience's viewership was gathered and a quantitative analysis is done to prove that the claim is true. Three tests were done that will affect the audience's viewership and all three of the tests were positive. Thus, the hypothesis of population of gamers and audience's viewership has a positive effect on the eSports revenue for the Southeast Asian region. A conceptual model was made in order to answer the question. The conceptual model was done to assist the identification of the patterns that will influence to growth of the eSports industry. For which the data related to those patterns are further analysed in a DSS tool used in this research study called RapidMiner. Thus, the tool helped study the future of eSports and what can be done to those factors that are lacking. Therefore, with several evidence supporting the statements, the implementation of Decision Support System tools will be beneficial for the eSports industry.

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Chapter 7
Digital Marketplace as a New Frontier of Electronic Commerce

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ABSTRACT

The digital marketplace is a major competitor now for the conventional marketplace especially in Southeast Asian countries (ASEAN) where digital marketplaces are booming and developing at an aggressive rate. The study also focuses on the challenges of eBay as a leading digital marketplace in battling their privacy and security threat, handling customer complaints about their services, or how government intervention provides an impact to their business, and competing with similar service provides. The other challenges are also associated with geographical distribution for marketing strategic location and why eBay should maintain their business like any other conventional business practices. Finally, the authors explore how concerned they are towards customer service as fundamental for any business.

INTRODUCTION

Electronic business (e-business) is the handling, trading, and offering of goods byways of transmitting funds or information through digital networks such as the Internet (Jovarauskienė & Pilinkienė, 2015; Anshari et al., 2019). According to internetlivestats.com, there were around 3,424,971,237 internet users around the world in 2016 (Roser et al., 2015). The fact that billions worldwide are now able to access the Internet demonstrates its effectiveness as a tool in the trade as well as in the advertisement of goods

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or services. E-business can conveniently be done from any place and at any time through the use of simply any electronic devices such as smartphones, personal computers (PCs) or tablets (Hasmawati et al., 2020; Ahad et al., 2017). This phenomenon has enabled many business organizations to establish and grow extensively in contrast to the traditional ways of doing business.

eBay is a multinational e-commerce company founded in 1995 by Pierre Omidyar. eBay is an online shop that contains several vendors coming from the public crowd to the big companies. Vendors or sellers from around the world are given independence in their product choices and method of delivery of such products. The e-business provides a stage for the general world population to conduct sales and purchases within online consumer-to-consumer and business-to-consumer platforms (Almunawar & Anshari, 2014; Almunawar et al., 2015). As the big company operating in 30 countries worldwide, it has reached 162 million registered users, including 25 million sellers, with more than 800 million items computed in its market places (Smith, 2016). This shows that e-commerce has the potential to establish and grow a company. Although with the advantages it brings to companies and customers, there has also arisen resulting problems (Anshari et al., 2021; Almunawar et al., 2013b).

Section 2 discusses the literature reviews are compiled from reports about e-commerce, its definitions as well as the benefits, problems, and challenges faced by companies and customers involved. Then Section 3 highlights methodology followed by discussion in Section 4. Finally, the conclusion is made in regards to the case study on eBay.

LITERATURE REVIEW

Electronic business, as stated by Sukumar and Edgar (2009), is a phenomenon of buying and selling through an online platform that is becoming more broadly accepted. E-business has recently been forecasted to reach an indeed high amount, i.e. 1,115 billion dollars in sales relating to goods and services (Chaffey, 2016). The Internet and the massive adoption of the smartphone have become an enabler of online transactions. This is further augmented by the fact that billions of people are now able to buy or sell items online, at any time and from anywhere (Eugine Franco and Bulomine Regi, 2016; Mulyani et al., 2019).

E-business is the use of the Internet to network and empower business processes, electronic commerce, organizational communication and collaboration within a company and with its customers, suppliers, and other stakeholders (Combe, 2006, p. 1). In simpler terms, it is another way of conducting business, which is with the use of the Internet (or other electronic networks) through electronic devices (Mohan, 2015). While, e-commerce, on the other hand, is similarly using the Internet, only it is in the purchasing and selling of goods and services, whether as transactions of Business-to-Business (B2B), Business-to-Consumer (B2C), Consumer-to-Consumer (C2C) or Consumer-to-Business (C2B) (Rouse, n.d.). Because e-business often also includes e-commerce, these two terms are frequently interchangeable synonymously (Anshari & Lim, 2018).

Among the most common e-business models is that of B2C and C2C, where B2C refers to business forms that are conducted straightforwardly between business agents and last purchasers (Jovarauskienė & Pilinkienė, 2015). While C2C is where two parties execute business between each other, possibly with the involvement of a mediator in enabling the exchange to occur. In the case of C2C, the mediator would incur a charge or commission (not of the item trade) for its service of providing the stage for the general population to interact with one another. C2C appears regularly as a closeout where the offering is done online.

Advantages of E-Business

There are various advantages to conducting e-businesses, both to the companies involved as well as to its customers. Firstly, the advantages of electronic business are people does not have to queue up and carry currency notes. Secondly, capacity to have vendors bid for business people and effective procurement. Lastly, the advantages are the capacity to buy and sell to other consumers (Niranjanamurthy et al., 2013). E-business companies often require a lowered capital cost, and also have cheaper maintenance and inventory costs, as physical constructions (warehouses, store furniture, etc.) are often less needed if not completely unnecessary (Chan et al., 2001). Similarly, relatively less is also required in terms of work energy as business processes and management can be done with the aid of external parties such as mediators, or it can even be fully automated. As Griffin (n.d.) has put it, in doing business, one needs a boss, a manager, and employees. In an e-business scenario, a boss, a manager or even an employee is may not be needed, which in turn would result in more capital being saved, and also the extension in a business's range of service hours it would bring. All that is needed in terms of necessities, as Griffin (n.d.) has mentioned, are an Internet connection, PC or smartphone. In addition, with the potential for sophisticated processing of facts that Sukumar and Edgar (2009) have highlighted the Internet has brought that it is most affordable for everyone in the marketplace, e-businesses can provide better customer services (Chan et al., 2001; Razzaq et al., 2018). This is further enabled with the knowledge companies can gain regarding their weaknesses from communication with consumers as an important aspect in succeeding in business, according to Rahman and Raisinghani (2000) as well as the feedback and reviews the consumers leave behind.

Retailers and consumers enjoy the benefits that e-business platforms. With the Internet, retailers can reach the international market from across the globe (Chan et al., 2001); online transactions (or C2C staging) may be conducted by everyone as well (Gary et al., 2012), widening customer bases, and giving an enormous hand to small retail companies in growing their business. As a result of the consistent availability of consumers, retailers are then able to keep their business running more securely in contrast to traditional companies that attract only local and nearby consumers, depending on their popularity.

E-business also provides convenience and various other benefits for consumers. For instance, in allowing them to access online shops anytime, as mentioned previously (Chan et al., 2001). Another benefit, which results also from the retailers profiting more and expending less, is the lowering of prices of products sold online (Chan et al., 2001), as consumers are also naturally more ready to pay and to venture upon the service and quality of the product being traded (Resnick, Zeckhauser, Swanson & Lockwood, 2006). Also, with the ability for e-business companies to provide better information and details regarding their companies as well as the services and products they offer, as well as reviews and feedback, customers can know and examine better the company, products and services that they seek to utilize or purchase. Consequently, this access to detailed and broad knowledge also allows consumers to compare prices and quality of the offered and select from wide varieties according to their preferences.

Disadvantages of E-Business

In contrast, conducting e-business comes also with it several disadvantages. Firstly, the disadvantages are sometimes the goods deliver delay and powerlessness to experience the product before purchase. Secondly, the disadvantages are the multiplicity of regulations and taxation and chargeback's (Niranjanamurthy et al., 2013). Furthermore, there are issues of potential threats in terms of security and privacy (Sugiantoro et al., 2020). As Mohan (2015) has mentioned, the Internet is a place of a high prevalence of consumers being victims of being hacked and identity thefts, as well as virus infections resulting in the loss of important data. Subsequently, there is commonly an absence of personal touch between consumers and goods being sold. As a result, consumers often prefer to instead use services conducted physically over e-businesses, where they can examine first-hand services offered or goods sold, such as in the case of traditional shops.

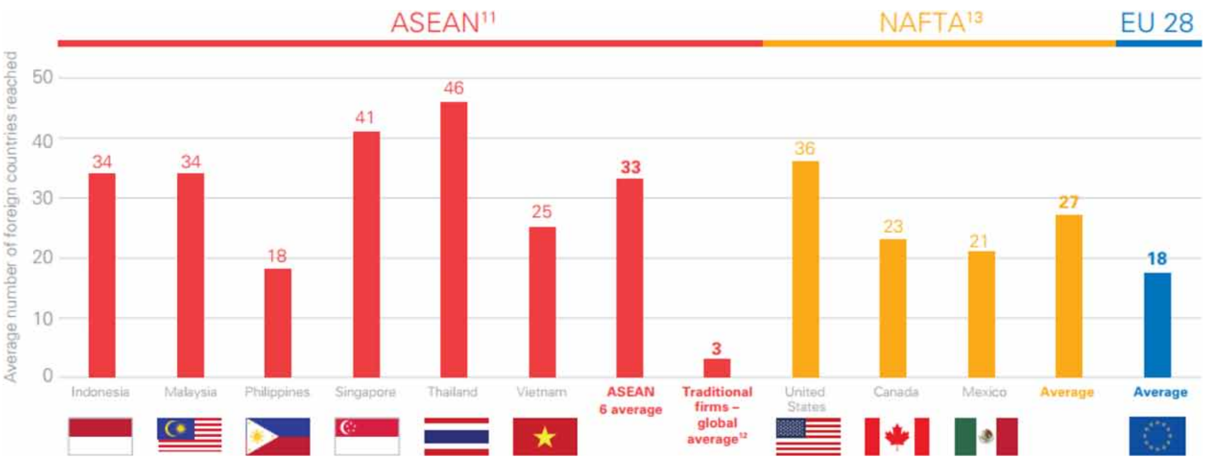
In regards to business's owners and retailers, it has become a necessity for them to emphasize their attention on their foundation and the level of trust their consumers have towards them (Gary et al, 2003) since they would be representing non-visibly. The trust systems can be built with the aid of reputation systems which was introduced by eBay in 2004. It provides information about the past behaviour of transaction partners who are expected to build a rational basis for trust. It is possible that a trustworthy seller shows good item images but fails to show such habit to overthrow suspicions. Gary B. et al (2012).

Nevertheless, even with the implementation of secure payment methods and reputation systems, the risk on C2C platforms is still high, which is unfortunate for consumers as they could then only depend on their ability to inform themselves to know which sellers to trust. Consequently, as mentioned by Paul et al. (2004), only popular vendors with a good reputation built over a long period may make a fortune as they are generally viewed as more trustworthy. Therefore it will be a challenge for vendors who have only recently started conducting their business.

Challenges of E-Business

Nevertheless, running an e-business is not without its challenges. Zaied (2012) has mentioned that said challenges lie in technicality, economy and in adapting to social cultures. In terms of technicality, the challenge is in the necessity of acquiring qualified staff for the management and growth of e-business, more especially for starting companies and for companies in developing countries where technical knowledge of e-businesses is generally lacking. There is, for instance, the aspect of Strategic Information System Planning, or SISP, as mentioned by Galliers and Leidner (2014). According to Galliers and Leidner (2014), it is a huge commitment to businesses and different organizations. The effective implementation of SISP requires organizations to conventionally apply one of many predetermined methodologies, though carrying out such a process would be the key problem facing management (Galliers and Leidner, 2014). It demonstrates how much of a challenge it involves dealing with hardware, software, databases and telecommunication technologies (Galliers and Leidner, 2014). Hence, computer expertise is a necessity. Another technical challenge is the network issues relating to Distributed Denial of Service (DDOS). Such an event is described as an assault in which an unequivocal endeavour by the aggressors has arisen, keeping clients from utilizing a business framework. According to Ladan (2013), prominent organizations like e-Bay, and Amazon.com were liable to DDOS assault and put out of administration at some point in the year 2008. Other than those mentioned, Session Interception and Messages Modification are also issues, where attackers may modify transmitted messages and block sessions. Finally,

Figure 1. Average destination reached by eBay commercial exporters by trade bloc (Lee, 2015, p. 13).



in regards to adapting to social cultures, there is the case where the unfamiliarity of e-businesses runs prevalent, such as in developing countries such as India, which leads to potential customers having a higher inclination towards traditional brick and mortar shops and upfront cash payments over online trading and transactions (Malhotra, 2014).

eBay

eBay is a place for business people to come together and deal with anything and it is a global online marketplace with 164 million active users in the second quarter of 2016 (Statista, 2016). eBay's model is an intermediary e-business model that operates business-to-consumer (B2C) and consumer-to-consumer (C2C) interactions. These are interactions between buyers and sellers when they communicate and leave feedback for one another. eBay becomes one of the market leaders in the digital marketplace through the acquisition of other companies as of September 2014, eBay has acquired over 40 companies, which include the payment system PayPal. PayPal is secure and encrypted, acts as an alternate means to transact online, which is not only safer but also faster than direct credit cards transactions. Another notable acquisition eBay has made is that of the GSI Commerce, as they had announced in March 2011, which is a leading e-commerce specialist. From GSI Commerce, eBay has received help and brought improvements to their CRM business strategy (Almunawar et al, 2013a; Low & Anshari, 2013). eBay has also acquired Skype Technologies. This move was conducted to provide a more convenient means of communication between buyers and sellers regarding their products.

eBay have many sections. The sections are fashion, electronic, collection & art, home & garden, sporting goods and motors. For each of the sections, it has two categories, there are top and other categories. For example, fashion section the top categories have 3 parts there are men's, women's and kids which we can choose what are we going to shop for like shoes, watches, etc. Furthermore, eBay has two choices either by online auction or purchase it right away, for online auction, the offering opens at a value the dealer determines and stays on eBay for a specific number of days. Purchasers then place offers on the thing. At the point when the posting closes, the purchaser with the most noteworthy offer wins. A buyer who does not want the online auction, the buyer can purchase the items by purchasing them right away which the main purchaser willing to pay the vendor's cost gets the thing.

The potential for the digital market in ASEAN to grow can be caused by digital growth. Here we have statistics (Kemp, 2017) showing digital growth in Southeast Asia from January 2016 up to January 2017. It shows up to around 80 million people have started using the internet in the span of only a year and this is only in Southeast Asia (Figure 1). Thailand is eBay's largest online retailer in Southeast Asia as the country had the highest number of sellers and trading value, defeating Singapore, Malaysia, Philippines, Vietnam and Indonesia (Retailasiaonline, 2015).

eBay has exerted substantial effort in providing its customers with excellent utilities. In terms of services, other than the previously mentioned acquisition of PayPal and GSI Commerce, it has also purchased Half.com back in 2000. Other service operations include eBay International, an attempt in creating a global marketplace. Although bidders may participate in auctions from other countries, legal issues may prevent trading as certain items are not permitted in some countries. In order to overcome this problem, country-specific sites are created. Among the countries in which this feature has been implemented are Austria, Australia, Canada, France, Germany, Ireland, Italy, Japan, Korea, New Zealand, Switzerland and the UK. There is also eBay Motors, eBay's single largest market which enables the online selling of used cars, motorcycles and auto parts. It was in 1999 that eBay realized its high market for cars on their site. In reaction to the said phenomenon, eBay introduced a new category specifically for automobiles. It is known that eBay has ventured into the Japanese market, although with it, eBay did not encounter as much success as Yahoo! did.

METHODOLOGY

This research study is based on a quantitative method by surveying higher education students at undergraduate and postgraduate levels asking about their experience in using the digital marketplace especially eBay. While secondary data from similar topic interest from peer-reviewed journals were gathered for this paper derived from indexed journals at Scopus. There were 1796 publish papers from 1999 – 2021 with the keyword "eBay" from the Scopus indexed database. These secondary data collections help to analyzes a recent direction of eBay save time and are used particularly because of the nature of this research besides providing a larger and high-quality database. To further strengthen the understanding of eBay as a case study for this research due to worldwide penetration and the larger scope of opportunities involved within the industry.

Analysis and Discussion

Based on the survey that has been taken from respondents, it shows that 39% are male and 61% are female. The majority of respondents were university's level, 89% are above 21 years old and 11% are below 21 years old. Most of the respondents who took this survey are using the Internet for 6-12 hours by using smartphones and PC. 71% of the students are being aware of privacy and policy on using the Internet but the other 29% are just knowing how to use only.

The most popular activity among participants was price comparison between eBay and other markets as 89% of the participants (students) vote this "consistently". Through the price comparisons, they try to find the cheapest price of items to be bought. This is normal as students normally have limited budgets.

The bidding through auctions on eBay is not popular among students because they are not very familiar with it. In addition, they may find products offered by eBay also offered by many similar platforms from neighbouring countries using the conventional price setting that they are familiar with.

Participants in the survey like plenty of choices offered by eBay. However, they found that most similar products can be bought cheaper in the local groceries. Numbers of participants appreciate the convenience and time-saving of shopping offered by eBay. eBay also offered free shipping for some items for some countries. The following are some key points raised by responders.

Convenience and Time Efficiency

On eBay, customers need only to access the website via electronic devices with internet access, such as laptops or smartphones to browse goods that they are interested in. Just with a few more clicks, they can confirm and make the payment or participate in an auction bid, while they are in the comfort of their homes. As a result of the high accessibility of the Internet by buyers, through a digital marketplace like eBay, sellers can reach more potential customers either from domestic and international markets. Due to benefits derived from technological advancement, transactions perform in digital marketplaces such as eBay are done digitally with no time and space constraints.

Availability of Feedback from Customers

Negative and positive feedback is very helpful for e-commerce because valuable information is vital for making important decisions. Nowadays, the existence of many competitors: makes it hard to retain existing customers. Successful companies do not neglect their customer’s opinions, perspectives about the items or services. Successful companies would persistently search for ways to improve their business. The feedbacks can improve a product or service to meet the customer’s expectations and satisfaction, this will help create loyalty of consumers to the company. In addition, it will attract more potential customers when they read good comments on products and services. Therefore, feedback is very useful to stay in business or grow further.

Added Security

Quality services from sellers are easily encouraged as well since they anticipate more customers choosing them as a result of having higher levels of rating. Hence, customers feel secure when making payment for their desired items because with high rating means that the business or trade items are not a fraud or a scam. Frauds or scams have become a threat to eBay as they can potentially leave a bad impression on the company. Examples include e-mails being sent to registered eBay members that were fashioned as though they were sent from the company itself. Once the recipient believes that it is authentic, they may not hesitate to provide their personal information such as their passwords, or even bank account numbers. In addition, the customer’s feedbacks also help buyers to feel more secure, knowing that the ratings are from valid customers (Price, 2014).

Enable Customer to Make a Rational Judgement

A digital marketplace like eBay encourages its sellers to state detailed information and specification about the items that they intend to sell or to make an auction from. Detailed information such as size, colour, material quality or performance ability is very important for a consumer to make an evaluation and a rational judgement before making a payment to avoid wasting money on low quality or unsatisfactory products.

Low Capital Management Cost and High-Profit Margin

Since sellers are responsible for the fees or charges, such as shipping charges. eBay should not be concern about the maintenance and physical costs like the warehouse. This shows that eBay experiencing low costs, and their "wide customer base" shows that eBay could possess higher revenue. Therefore, eBay will experience the benefit of a "high-profit margin", as profit is the result of revenue minus the costs. It is important for eBay because it reflects the corporate strengths in the market and proves eBay is a powerful brand. It can also enable eBay to utilise its budget on expanding and growing its business towards different markets in the long run.

Payment Made Easy

Online payment such as PayPal is only needed for making payments on eBay. This is an efficient way to make payments because customers do not need to go to the assigned counter to make physical payments using cash. It is as convenient as making payment sitting on a comfortable sofa in your peaceful home environment with just a click of a button on your computer. The payment process is also simple, you just need to 'log in' to your PayPal account and confirm your payment, rather than going out to withdraw your money from the bank. In addition, millions of users around the world trusted and use PayPal.

It is a Great site

eBay is a great digital marketplace site because it is easy to search for any item just by typing the name on the search box provided. It provides a lot of items categorized in many sections such as fashion, home & garden, electronic appliances, collection & art, sporting goods and motors: these items are for both men and women of all ages. This gives the buyers to have more choices and this is a good strategy for eBay because it increases the potential buyers with varied interests, targeting many markets.

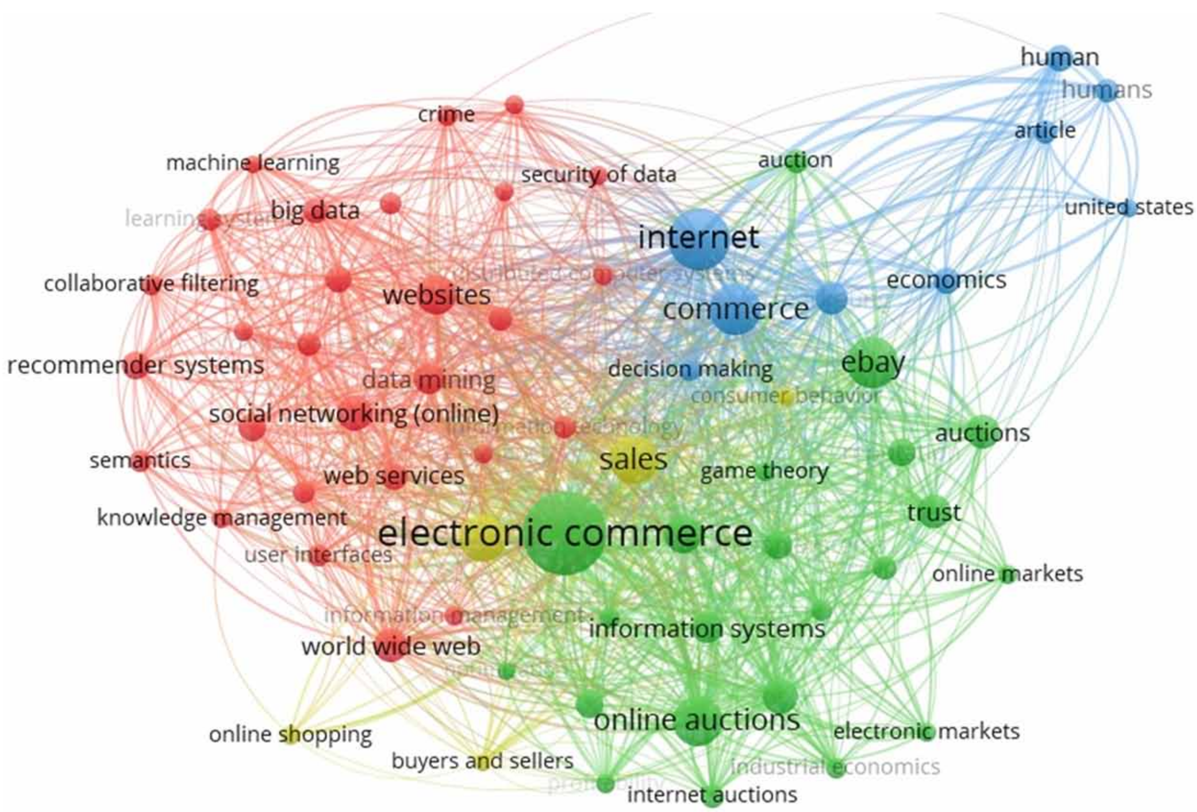
Provides Warranty

There is a warranty available for customers who do not satisfy with their received items. eBay provides a warranty within about a month or 30 days. This shows that eBay is very concerned about its services. In addition, a secure payment system is provided to overcome scams, fraud and unsatisfied customers. Therefore warranty and payment security help eBay to engage, negotiate and win clients in the competitive market. As these will mitigate buyers anxiety from having an unexpected or faulty product. In addition, this will create good relationships between eBay and its clients; which would create an additional profitable after sale opportunities.

Challenges

Figure 2 shows the bibliographic analysis from 1796 documents indexed in the Scopus database. There are three big clusters highlighted in the research of eBay which is technology, business, and human/ customer perspective. The technology consists of social networking, data mining, data security, big data, collaborative filtering, recommender systems, knowledge management, mathematical modelling, and user interface. While, business context covers sales, auction, game theory, online markets, internet auction, online shopping. Finally, from the human/customer side are decision making, consumer behaviour, trust, and industrial economics. While, the recent publications' trends of eBay's research are human side, digital crime, big data, machine learning, collaborative filtering, semantics, and recommender systems.

Figure 2. Network visualization result for eBay 1999-2021 (Source: Authors' Compilation, 2021)



eBay has as one of its aims the development of work ethics and culture within a fun, open and trusting environment. With this move, eBay has become a likely target for any fraudulent activities, which the company often apply countermeasures against. Fraudulent activities include tricking buyers with counterfeit goods, and the selling of stolen items. Such activities would likely affect the C2C business models that eBay is involved with. Finally, as with many e-business companies, eBay has experienced system shutdowns and outrages (Bijal Zaveri Amin and Prashant Amin, 2012). Though only temporary, it disrupts trading and transactional activities on eBay.

There are some challenges raised by the participants. They mentioned the points in a similar meaning that items expected by consumers are not true or in good condition. Some writing their experience of the arrival of the item was late and takes more than 2 weeks. The other participants were saying that some of the items cannot be refunded and no warranties were given. Last but not least, giving points unsuccessful bidding only happen if the price does not reach the average price of a certain item. In other words, an item cannot be sold at a lower than average price even though the customer won the bidding. Below are the details of the challenges faced by eBay.

1. Privacy and Security

The problem with the ease of accessibilities is that the third party can easily intervene in the online activity with the right tools available for data on the Internet and they are called "hackers". Problems arise when they successfully scam and fraud to abuse a user's credit card account, which leads to loss of money. This affects the buyers to lose trust and interest to buy items online and it also affects the seller's reputation (Anshari & Sumardi, 2020). It is advisable for eBay to strengthen its security and to improve privacy settings for e-commerce users. eBay should countermeasures the problems by analysing and fixing them through encryption, access control, intrusion detection, backups etc. These can prevent their data from being breached and be abused by other parties.

2. Competitive and Challenging Business Environment

As an e-commerce company, eBay has many established and up-rising competitors, especially when trading in the international market. For example, Amazon has been a tight competitor for eBay because they provide similar services and both companies provide similar items, this makes eBay faces "perfect competition" in the market, where there are many buyers and many sellers in the market selling homogenous products. The main problem with perfect competition in the market is that price margin is fixed and seller cannot charge higher than normal price, which is prevailing in the market because a consumer will move to another seller, hence sellers keep selling standardized products at price fixed by market forces of demand and supply. However, there are some strategies to prevent this drawback from "perfect competition", such as giving better deals or promotions. Another challenging business environment for eBay is that a newly established e-commerce company such as Zalora sells fashion clothing at cheaper prices in a strategic location. This gives an advantage especially to the Asian region where they would enjoy cheaper tax rates and lower exchange rates. This can be a big problem for eBay as they also sell clothing. Therefore, location plays a big part in this situation where a company such as Zalora conquer the market share in the Asian region. This is because the best location is likely to generate more sales than the firm that is not located in a prime location and hence, location also plays a vital part for this business rather than just concerning about customer service in this situation.

3. Geographical Boundaries

Because there is some area that does not have internet access such as those in a deep jungle of South America or some areas in Asia, eBay does not provide a way to extend their services to reach them. To overcome this, eBay could give a contribution such as providing network services in these areas. This does not only benefit the local community, eBay can also gain more potential customers and get recognition and compliments for their outstanding contribution, which would benefit them in the long run of their business survival.

4. An Increase in Price for Some Items is Decently Unacceptable

For example, inexpensive items which cost less than $10 were charged with an additional shipping fee of $40, this will accumulate to an overall of about $50. The buyers need to pay more than the actual price, and this price might even exceed the normal retail price. Hence, it is depressing and this does not encourage the buyers to purchase items on that seller anymore, and this affects the service provider as they lose another buyers demand.

5. Government Intervention Giving Protectionism.

Protectionism such as giving “import tax” is the main problem to produce the ideal profit. Taxation would affect the demand and supply of buyers and sellers, which will influence the service provider, such as eBay. That is when buyers have been “dis-courage” to purchase the item and this decreases the demand for the products provided by eBay. Since they lose interest in buying the items provided, this affects the sellers, which will also affect the service provider. Whereby, eventually the money is not received since there are no or little payments made. Hence, revenue is less than expected and profits are depreciating than usual.

6. Lack of Customers’ Inclination towards Online Commerce and Necessity of Having Internet

Some potential customers are not computer literate, such as old people, children or remote villagers who are not exposed to or adapted to the usage of computers. However, some potential customers have a demand for the items, who are computer literate, who use computers as their everyday activity but they do not know how to make online payment or the process of online transactions. Hence, they may lose interest in buying their demanded product as they do not know how to make the payment. eBay would lose these potential customers that would contribute to their revenue. To enter the e-commerce websites such as eBay needs internet access. Internet access may not be available in some places, particularly outside the society range such as: in the jungle or above the mountain. And certain under-developed countries do not have internet access available in their respective location or if they do have the accessibilities to the internet, the network connection would not be really strong compare to developed countries.

7. Adapting from Social Cultures.

Because some social cultures are not inclined towards online commerce, sellers must intervene in the added problem of familiarizing their potential customers with the concept of e-commerce. The absence of “personal touch” concerns human relations above all else. It focuses more on the interaction, communication and engagement between users. It is important to consider “personal touch” and building a “human-centric” approach to customer service through wonderful people and clever technology. This can make the customers (users) feel valued, appreciated and heard (Almudimigh & Anshari, 2020).

8. Relatively Outdated System for Buyers and Sellers.

The system has been known to favour and welcome buyers more than sellers, an inequity problem. There were many complaints about this issue. If eBay can solve this inequity problem, sellers will be happy and more sellers will join. Many sellers are from micro, small, medium enterprises (MSME) that can contribute to generating income in the economy. It is very important in an economy because the population does not always rely on government provision of goods and they can have a sustainable economy (Hamdan & Anshari, 2020).

In addition, consumers are disappointed in a common situation where they receive items that do not meet their expectations. Such as receiving faulty products or products that do not resemble as they appeared on the catalogue. Customers are also disappointed because the sellers have the authority whether to 'eventually' sell their items or not in an auction. When the items were not sold as promised, it does not meet the customer's expectations because they have wasted their energy and time during the bidding. Therefore, this affects the eBay brand image because customers will lose interest and be sceptical about the service provided.

Some purchased items on eBay do not arrive on time as promised, where the items should be received a month, weeks or days earlier. This is a big problem when, for example, a bride purchasing her dress for her big wedding or a person purchasing spare parts for his only vehicle. Mentioning about time-consuming, however, there is also a problem regarding the time of response to an in-patient customer. There were many complaints about users does not have a quality and convincing response from the customer service. Some questions are ignored due to somehow lack of knowledge of the response. One of the reasons is that eBay employed their staff such as teenagers who do not have any knowledge or experience about their task. Eventually, with this customer dissatisfaction for their service, can lose more potential customer that would contribute a large amount of revenue in the long-run. Therefore, customer service is fundamental for eBay.

9. Difficulty in Maintenance

Maintaining an e-commerce system is as challenging as the traditional business. E-commerce such as eBay that provides services to buyers and sellers need to keep track of their transaction and activity such as shipping activity, this is because they are responsible for any compliments or complaints that will affect their image. Just like any other 'large company', e-bay should also be concerned with their employees' motivation, mentoring their cash flow, structured their organization, being cautious about their activity that affects their stakeholders and eventually meets their overall aims and objectives. There are several reasons why mainstream e-commerce websites such as eBay to be down (where people cannot access the website) intentionally or unintentionally. Sometimes, eBay itself temporarily shut down their websites for scheduled server maintenance and would inform their stakeholders of the situation. Another reason for the system to shut down is because of unwelcome guests such as DDoS attacks, where the shutdown occurs due to an overwhelming volume of traffic. Therefore, eBay should strengthen to organize their security management to avoid these possibilities because when eBay missed a day or week of services, they may lose a lot of potential customers that contribute thousands or million dollars of revenue.

CONCLUSION

Technological advancement has made the lives of mankind more convenient and has saved massive amounts of valuable time as it enables individuals to multitask with ease. eBay gives benefit is to the people with the aid of an Internet connection and simply any electronic device to access it from, it has become an easy task to enter websites at any time and from any place, operating 24/7. eBay enables its consumers to interact with one another, both domestically and internationally. This helpful platform provides an incredibly broader choice of items sorted in various categories, empowering users to make their own rational decisions as they are provided with enough information about their demanded items which the sellers are encouraged to give. Despite all these benefits, eBay is not without limitations and challenges. Among them are: battling with tight competitors such as Amazon or Alibaba, securing their systems from "hackers" attempt to breach their website or users' account and managing their business activity to prevent scams, fraud and customer dissatisfaction. There have been many complaints regarding consumers not having their expectations met upon receiving their ordered item. It is worthwhile that the e-business companies like eBay strengthen their policies to improve their reliability in regards to their service and the products being traded. Also, since Internet access is a necessity in accessing their services, eBay would not gain the potential revenue from those people living in areas without Internet connectivity. As with other large companies, it is not an easy task to maintain their success and survivability. It is therefore advisable for eBay to strengthen their relationship with customers such as applying modifications from customer feedbacks and providing advice about particular items or services. Consumers may then become knowledgeable when they decide to purchase their desired product. As a result, the e-business company also gains the benefit of obtaining a trusted brand image, which may eventually lead to a significant increase in more potential consumers.

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Chapter 8
The Digital Payment Service Automation Attributes Model:
Empirical Evidence of Railway Public Transport

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ABSTRACT

The purpose of this study is to examine the effect of automation attributes in railway digital ticket payment toward the commuters' satisfaction and retention in railway transportation. Digital payment security is one of the essential qualities which was little discussed in determining public transportation service performance. This study used the partial least square structural equation modeling method study to measure the six effects indicated by the proposed research framework to fill the last research gap. The results showed two automation attributes, reliability and security, significantly influenced commuter satisfaction, supporting the behavioral theory as commuter satisfaction also substantially affected the commuters' retention attitude. This study revealed that the reliability factor was the most significant. The findings communicate important insight for local government in improving its railway transportation's quality of service. The study's scope was to train commuters who live in Jakarta metropolitan area and use the railway as their public or mass transportation.

INTRODUCTION

In this globalization era, which is marked by the rapid development of digital technology and society, the demand for excellent and comfortable public transportation becomes one of the problems that must be addressed immediately (Coyle et al., 2011), especially for developing countries like Indonesia, a

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rapid population explosion. Public transit is meaningful because it can help the community's mobility. Besides the public transportation should be more affordable and accessible to almost all routes (Ilahi et al., 2015). The existence of public transport also has a good impact on the overall value of mass transportation. The number of people transported by public transport is growing more than private vehicles so that it can reduce congestion in the highways.

Indonesia can be categorized as a developing country with a relatively high population explosion, especially in urban areas like Jakarta. Moreover, due to Jakarta's high population and high mobility, traffic congestion becomes a problem that the local government cannot solve. Therefore, optimizing the role of public transportation in Indonesia, especially Jakarta, would be something necessary to do. To address transportation problems in Jakarta, the government has been providing various public transportation services such as TransJakarta buses, Moda Raya Terpadu (MRT) subway, Lintas Rel Terpadu (LRT) railway, and the older Commuter Line railway (Statistics Indonesia DKI Jakarta Province, 2018). Among those several public transportations, rail transportation seems to be the most popular and common transportation mode used by Jakarta metropolitan area citizens.

Although such public transport facilities have been provided by the government, in terms of public transport, especially in Jakarta, many citizens still choose not to use this kind of public facilities. People decide not to use public transportation for several different reasons. Primarily because of the convenience factor, which is expected because many people need to use public transit. According to Gustina (2016), other influencing factors were the conditions and tamped capacity, as well as the time spent waiting, making people reluctant to use public transportation. In responding to this problem, the use of advanced digital technology in public transportation might be one of the best solutions to improve the service quality and people's willingness to use public transport.

In some urban areas in Indonesia, especially in Jakarta, digital technology development is rapidly growing. Hence, as it seems almost impossible to include digital technology in the transportation sector, it is hoped that this could fulfill the people's desire to have better service than public transportation itself. However, new digital technology may affect worrisome citizens because of a lack of trust in the security issues of using the latest digital technology, which may impact customer satisfaction as well (Chang & Chen, 2009).

This study will examine further a new research model as proposed by Ong et al. (2015) and Chang & Chen (2009). The use of new digital technology in railway transportation can be in digital payment service automation, consisting of four attributes: reliability, convenience, customization, and security. These attributes help to increase commuter satisfaction and indirectly affect their retention to use more rail transportation mode. This study examined commuters' behavior using the advanced technology of digital payments, such as various kinds of debit cards issued by banks and railway providers, which were introduced to replace the old ways of purchasing tickets digitally.

BACKGROUND

Service Automation

Automation in several business sectors is an idea that includes the role of digital technology in business activities. It is mentioned that service automation is software that can do repetitive tasks on services, thereby reducing the role of humans in it (Lacity & Willcocks, 2016). The implementation of service automation is critical in business, especially for companies engaged in services or service providers. Service automation can give a significant value that is not associated with human labor conditions. When human labor cannot perform their best performance, or even if there is a lack of human work, it will not affect the public service performance.

This service automation will also have other positive impacts on businesses, apart from previous effects like consistency and better performance, or even can reduce the number of costs incurred. Beyond all that, other benefits can be enjoyed by businesses and the community, which are safety and security (Ross, 2016). Furthermore, it also helps businesses to develop, sustain, and competitive in their market. Service automation has become a solution for a company that, by its application, can improve quality and sustainability. The service automation attributes differ, depending on how the service is provided to its users, whether it is a self-service or personal service. However, of the various qualities that exist, in the services business and to enhance customer satisfaction, there are at least four attributes involved in this study: reliability, convenience, customization, and security (Chang & Chen, 2009; Ong et al., 2015).

Reliability

One of the attributes of service automation is reliability. In a service, reliability can be said as a service provider's ability to provide appropriate and accurate services to its customers. According to Alhkami & Alarussi (2016), reliability in a service refers to how a company or service provider can perform and complete the promise they offer from their service. At this stage, the service provider must fulfill the wishes of the customer anytime and anywhere. Reliability is indeed a significant factor in improving the quality of a service offered by a business. It is because reliability is a measurement that can produce repeated use of a company's service.

Performed by a service provider, reliability can also be defined as a system's ability, which in this case is a service system, so it continues to operate over time. Reliability will also help the corporations encounter inconsistency problems, creating customer trust and likely using the service over again. The existence of reliability in this service automation can encourage customer trust and satisfaction through the services provided, assessed from the function and how responsive the service automation is. It is also beneficial in streamlining and maintaining procedures and maintaining the service provider firms' quality standards of service.

Convenience

Another factor that has a significant influence in evaluating whether a service is excellent or not is convenience. Convenience refers to the effort and the time needed by customers to access a service provided by a business. Service convenience shows that customers do not need to use enormous effort and a long time to access and use the service (Dai & Salam, 2014). Service convenience is essential for a service provider firm, especially when providing accessibility for time-constrained consumers. People usually have some considerations for their preference, such as quality and time consuming for a particular service, which refers to the convenience factor. Customers commonly may judge how much time and effort they use as a valued price they sacrifice. Thus, the more time and effort they have, the worse their perception will be about the convenience provided by a service.

As for a service provider business, performing a high level of customers' convenience within their business operations is necessary to help it get closer to its users or customers. The convenience attribute is one of the critical factors that may increase customer perceptions of service quality, especially in an automated service business. In this case, service convenience can be improved by several things, such as applying technology in performing the service (Ong et al., 2015). Thus, providing the best services by using technology, in this case, is service automation, will help a service increase its convenience.

Customization

One of the things that makes a customer or service user feel comfortable and satisfied with any service or product provided is the service provider's ability to ensure the appropriate product, thus making the customers feel pleased with the product. Service customization makes the products or services offered by a business somewhat different from most other conventional companies. The nature of the traditional business leads to on as much as possible to attract customers from the market, by only giving satisfaction to the limited number of customer needs (Simoson, 2015).

According to Wang et al. (2010), customization itself is the ability of a business provider company to provide services or products that are appropriate and can meet the diverse needs of customers. Over the past decade, products or services that have uniqueness and conformity to customer desires have become a foundation and source of its competitive advantages. Referring further to making a product or service unique or different, which shall operate by the wishes of the customer, the business introduced a concept called customization (Coelho & Hanseler, 2012). Customization is a way that companies can provide a unique and personalized experience for customers. Customization of products or services provided by businesses has provided significant changes to customer habits, especially the problem of demand for products or services. It makes customers switch to products or services provided by businesses, which have more variety, more features, and still have the quality of the product or service.

Security

In running a business, whether it is a business that manufactures products for customers, or a business that moves and provides services for its users, security is one of the biggest focuses that companies must consider. Security can be categorized into various forms, but in the business itself, most security concerns are more towards misuse of information and personal security when using a service, such as theft and abuse. The low-security level is one factor that makes most people reluctant to use the same service or buy an identical product from a business. Once again, losing information, data, or even receiving unpleasant actions while using a service, becomes their primary concern. Security is defined as the extent to which the potential customers or users believe that the product or mainly the business's service is secure for them (Chang & Chen, 2009).

Moreover, the development of increasingly advanced technology can undoubtedly increase the security level of service. That is why providing service automation integrated with security is one of the things that businesses must apply. However, the security factor is closely related to a potential, which can create economic hardship to data resources that can occur through data stealing, data modification, service denial, and fraud (Armesh et al., 2010). It explains why some customers or service users to be reluctant to provide information or use a service due-to fear of losing data or objects or even getting inappropriate treatment from business providers of the products or services offered.

Customer Satisfaction

One of the critical success indicators of a business that provides services or products is customer satisfaction. It has become the most used valuation method to measure how well a company is doing. According to Tam (2004), customer satisfaction is an emotional response that results from a cognitive process of evaluating the service received against the cost of obtaining the service. Thus, the higher the quality of service they receive, or in this case is experience, compared to their expectations, the higher their satisfaction level as a customer.

Customer satisfaction refers to the person's feeling about his/her pleasure or happiness about something they received (Kaura et al., 2015). Thus, customer satisfaction can be interpreted as a feeling of satisfaction or pleasure that a customer owns for the services they receive from a business. Another understanding of customer satisfaction is balancing what customers or users expect from the service to guarantee or feel after using the service. Besides, based on Mehmood & Najmi (2017), customer satisfaction is one way that businesses can use to see the ability of their service or product. Customer satisfaction will also help companies or service providers to evaluate the quality of products or services they have provided.

Customer Retention

Maintaining good relations with customers or service users must be held and continuously carried out by a business. Also, according to Dawkins & Reichheld (1990), the higher the level or value of customer retention, the net present value of a customer will be even greater. Therefore, maintaining good customer retention is something that a company must do. Customer retention can be measured and managed by using the data from previous customers, or complaints received, and even service data that has been done (DeSouza, 1992). Therefore, businesses can identify which can reduce the possibility of a customer switching to using services or products from other companies.

Customer retention is an essential thing that a business must own. Based on Zeithaml (2000), retention refers to return or continuous interaction or exchange with a particular firm ongoing basis. Service quality is one of the answers to how to retain a customer or to create customer retention. Furthermore, the level of satisfaction from a customer will indirectly create what is called customer retention (Ahamad & Buttle, 2002). The more satisfaction customers receive, it makes they think that the service is good, and it will be beneficial if the products or services are still used. In this fierce competition era, relationship marketing is one of the most important things for companies to have as strategic tools for today's dynamic market. Customer preferences can change very quickly (Nasir, 2015).

Method

This research is conducted as discussed earlier that the automation or technology in businesses can provide a better service to the customer and create customer satisfaction (Wilburn & Wilburn, 2018). This research used quantitative method techniques to contain several calculations derived from the primary data obtained from the survey results. Moreover, the quantitative methods used were utilizing numerical data processed in specific statistical techniques to answer the sought research questions. Furthermore, the study will use mainly structural equation modeling examinations. There were four exogenous variables: Reliability (R), Convenience (CO), Customization (CU), and Security (S), which influence directly to an endogenous variable, Customer Satisfaction (CS). This model resulted from the hypothesis development on H_1, H_2, H_3, and H_4. The further statistical model used to determine Customer Satisfaction (CS) as an exogenous variable, and Customer Retention (CR) as an endogenous variable resulted from the hypothesis development of H5 in the research model.

The questionnaires were developed based on six variables: reliability, convenience, customization, security, and customer satisfaction variables. The developed questionnaire consists of 19 items and tested on 38 respondents to measure the instrument's validity and reliability. Based-on the Keiser-Meyer-Olkin (KMO) & Anti Image tests, this study concluded that all the questionnaires were valid and reliable. The excellent and reliable questionnaires were then distributed online via Google Form by using Likert scale format. This research applied Partial Least Square (PLS) statistical method, which is a variance-based method.

There is a two-steps evaluation of the measurement model used in this study. In the first step, validity tests were conducted to measure its convergent validity and discriminant validity. The concurrent validity used in this study was done to evaluate the validity of Loading Factors within the research model and its Average Variance Extracted (AVE). Meanwhile, the discriminant validity was done through Fornell Larcker Criterion on HTMT (heterotrait-monotrait) and cross-loading. For the second step, reliability tests were conducted to evaluate its Composite Reliability (CR) and the vital measurement using Cronbach's Alpha. Further analysis to measure the structural model fitness of the research undertaken through five relationship measurements.

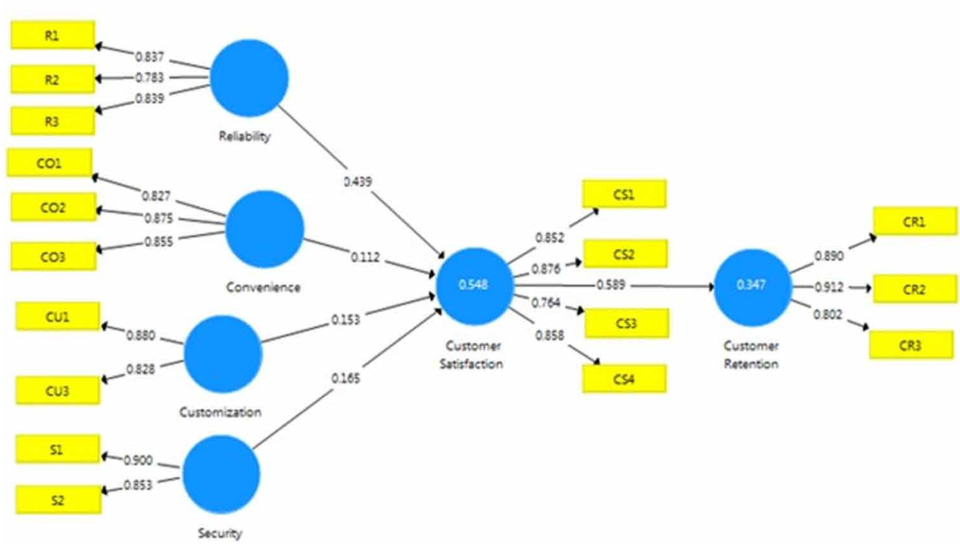
R-Square test was conducted to see how much influence was given by the variables to explain the research model. The second step was to do the Path Coefficient test to understand whether the variables gave negative or positive relationships. Further, with bootstrapping technique, the t-statistics values can be measured to analyze which path had significant influence. Construct cross-validated redundancy was then used to see how good the observation values produced. And finally, model fit measurement was conducted to examine the overall structural research model fitness by using its NFI values. After following the steps mentioned above, this study concluded that the evaluated proposed research model had good model fitness. This result can be used as the novelty of the study.

RESULTS AND DISCUSSIONS

According to Hair et al. (2010), to determine the number of samples, researchers can use the rule of thumb by multiplying the number of indicators in the study by 5-10. The number of indicators in this study were 19 items. Therefore the minimum number of samples that suitable to be used were as many as 95-190 samples. However, this study obtained as many as 207 valid respondents (39% male, 61% female) who mostly (63.3%) live in Jakarta city and the rest (36.7%) are living in its greater area (Bogor, Depok, Tangerang, and Bekasi cities). Further validity tests by using the SmartPLS program showed that there were two indicators of Convenience (CO4) and Customization (CU2), which considered to be deleted from the model because the values are below 0.7 (0.647 and 0.679, respectively) as indicated in its red color marks in the PLS algorithm computation outputs. As the results, all factor loadings implied strong relationships among those variables (see Figure 1) as they were more than 0.7.

Further tests conducted on the research model showed that all indicators used were considered valid since all its Average Variance Extracted (AVE) coefficients were greater than 0.5. It means that more than 50% of the instrument item's variance can be measured by the latent variables (Fornell & Larcker, 1981). The higher the coefficients, the better value required by the research model. Based-on computa-

Figure 1. Factor loading and R square diagram
(Source: Author, SmartPLS)



tion, the generated AVE values were respectively: Convenience = 0.727, Customer Retention = 0.756, Customer Satisfaction = 0.703, Customization = 0.730, Reliability = 0.673, and Security = 0.769. It implied that the research model achieved convergent validity.

The discriminant validity test was conducted using Fornell Larcker Criterion on HTMT (heterotrait-monotrait) ratio of correlations, which measures the value of AVE square root. The study summarizes the output of the bivariate correlation amongst all constructs in Table 1. The study revealed that the square root of AVE values of the latent variables is much greater than all other cross-correlations amongst the constructs. Therefore it indicated that all constructs had adequate discriminant validity (Fornell & Larcker, 1981).

Table 1. Fornell Larcker criterion on HTMT discriminant validity

	CO	CR	CS	CU	R	S
CO	**0.853**					
CR	0.553	**0.869**				
CS	0.648	0.589	**0.839**			
CU	0.731	0.599	0.596	**0.854**		
R	0.769	0.497	0.687	0.597	**0.820**	
S	0.524	0.582	0.503	0.602	0.427	**0.877**

Notes:
1. Diagonal bold numbers: the square root values of Average Variance Extracted (AVE).
2. Off-diagonal numbers: correlations among constructs.
3. CO: convenience, CR: customer retention, CS: customer satisfaction, CU: customization, R: reliability, S: security.

Table 2. Cross loading discriminant validity

	CO	CR	CS	CU	R	S
CO1	**0.827**	0.459	0.497	0.597	0.648	0.401
CO2	**0.875**	0.504	0.609	0.684	0.754	0.492
CO3	**0.855**	0.447	0.543	0.582	0.555	0.439
CR1	0.524	**0.890**	0.512	0.505	0.430	0.530
CR2	0.500	**0.912**	0.572	0.564	0.466	0.526
CR3	0.411	**0.802**	0.441	0.490	0.397	0.459
CS1	0.565	0.454	**0.852**	0.518	0.591	0.416
CS2	0.540	0.521	**0.876**	0.521	0.607	0.457
CS3	0.450	0.377	**0.764**	0.411	0.552	0.310
CS4	0.604	0.597	**0.858**	0.538	0.559	0.484
CU1	0.716	0.494	0.549	**0.880**	0.552	0.447
CU3	0.520	0.534	0.465	**0.828**	0.463	0.596
R1	0.652	0.430	0.615	0.566	**0.837**	0.386
R2	0.580	0.327	0.468	0.369	**0.783**	0.247
R3	0.654	0.452	0.591	0.511	**0.839**	0.397
S1	0.529	0.529	0.478	0.615	0.380	**0.900**
S2	0.378	0.491	0.399	0.427	0.370	**0.853**

Notes:
1. Diagonal bold numbers: the outer loadings.
2. Off-diagonal numbers: correlations between indicators and variables.
3. CO: convenience, CR: customer retention, CS: customer satisfaction, CU: customization, R: reliability, S: security.

A further discriminant validity test using the cross-loading technique was conducted to test whether all indicators correlated among the others. It aimed to reduce the multicollinearity amongst latent variables. It denoted that the AVE of a latent variable should be higher than the squared correlations between the variable and all other latent variables (Chin, 1998; Chin, 2010; Fornell & Larcker, 1981). As the results, the latent variables used in the constructs still can be considered as having good validity (see Table 2) since they were much greater than the other outer loadings produced in the other variables across different indicators. This test verified that each construct's manifest variables represented the assigned latent variable and confirmed the model's discriminant validity.

The reliability tests were conducted first using the Composite Reliability (CR) test produced by PLS algorithm computation. It communicates whether the research model measures were stable over time and consistent. Based-on the calculation by using the PLS algorithm, it found that all variables were stable or reliable since the output CR values were more than 0.7 (Hair et al., 2011). The results were consistent with the out of each variable's Cronbach's Alpha. The indexes showed that the variables between 0.6-0.8 have good internal consistency/reliability, while 0.8–1.0 is considered to have excellent or very high reliability (Hair et al., 2010).

Further tests with the path coefficient showed that all the coefficients had a positive direction, which means that the variables' relationships were positive. The path coefficients of each connection can be demonstrated by the outer loading, as shown in Figure 1. In this figure, this study also found that the R

Table 3. Construct validity and reliability

Variable	Indicator	LF	CR	Cronbach's α	Comment
Convenience (CO)	CO1	0.827	0.889	0.813	High Reliability
	CO2	0.875			
	CO3	0.855			
Customer Retention (CR)	CR1	0.890	0.902	0.838	High Reliability
	CR2	0.912			
	CR3	0.802			
Customer Satisfaction (CS)	CS1	0.852	0.904	0.859	High Reliability
	CS2	0.876			
	CS3	0.764			
	CS4	0.858			
Customization (CU)	CU1	0.880	0.844	0.632	Good Reliability
	CU3	0.828			
Reliability (R)	R1	0.837	0.861	0.759	High Reliability
	R2	0.783			
	R3	0.839			
Security (S)	S1	0.900	0.869	0.702	High Reliability
	S2	0.853			

Notes:
LF = Loading Factor
CR = Composite Reliability

Square value of CS was 0.548, which means that the four variables of CO, CU, R, and S can only explain 54.8% of factors that influence CS as an endogenous variable. On the other hand, as an exogenous variable, CS can only define 34.7% of the CR factors.

A further bootstrapping technique used in the PLS computation generated the results, which can be used to analyze whether all variables were having a significant influence or not. Surprisingly, the results showed that not all variables were crucial since not all the T Statistics values were not greater than 1.96. Assuming the significant level used is 0.05, it revealed that the relationships between CO and CU toward CS were not substantial, as indicated in its T-Statistics value of 0.893 and 1.630, respectively (Table 4). However, the finding showed that CS was the factor that had the most substantial significant influence on the CR. Customer satisfaction is one of the critical factors that can increase customer retention. According to Kaura et al. (2015), customer satisfaction refers to the person's feeling about his/her pleasure or happiness about something they receive. If the customers are happy with the business's service, it will make the customer repeatedly use the service, and therefore it will create customer retention.

This study conducted predictive relevance analysis through construct cross-validated redundancy test by using the blindfolding technique. As a result, it shows that both Q2 values of CO and CR were 0.255 and 0.375, respectively. According to PLS measurement, if the criterion of predictive accuracy of Q2 value is greater than 0, it means that the observed value is good (Chin, 1998). Further tests using the blindfolding technique revealed that the research construct's observation values were considered good (see Table 5).

Table 4. Path coefficient measurement

Hypothesis	Path	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values*	Comment
H_1	R → CS	0.439	0.435	0.101	**4.365**	0.000	Accepted
H_2	CO → CS	0.112	0.121	0.126	0.893	0.372	Rejected
H_3	CU → CS	0.153	0.148	0.094	1.630	0.104	Rejected
H_4	S → CS	0.165	0.169	0.060	**2.772**	0.006	Accepted
H_5	CS → CR	0.589	0.592	0.062	**9.463**	0.000	Accepted

Notes:
1. Bold numbers indicate the path's significance.
2. Number of samples = 207
3. * Significancy level assumption: 0.05.
4. CO: convenience, CR: customer retention, CS: customer satisfaction, CU: customization, R: reliability, S: security.

Table 5. Construct cross-validated redundancy

	SSO	SSE	Q^2 (=1-SSE/SSO)
Convenience	621.000	621.000	
Customer Retention	621.000	462.443	**0.255**
Customer Satisfaction	828.000	517.150	**0.375**
Customization	414.000	414.000	
Reliability	621.000	621.000	
Security	414.000	414.000	

Notes:
SSO: The sum of squared observations
SEE: The sum of squared estimated errors
Q^2: Cross-validated redundancy

Finally, this study conducted the last evaluation of the structural model. It revealed that the Bentler-Bonett's Normed Fit Index (NFI) value produced by Partial Least Square's Model Fit computation was 0.712. The assessment of this model Fit follows the rules of thumb that if the NFI value is more than 70%, it means that the research model is fit as the greater is the fitter since the value of NFI is between 0 and 1 (SmartPLS, n.d.). Therefore, using this rule of thumb's assumption, the study concludes that the computation fitted the research model as the NFI value was 71.2%. Hence, the new structural model of the research can be inferred (Figure 3).

FUTURE RESEARCH DIRECTIONS

The scope covered in this study was only limited to Jakarta metropolitan area users, so The public transport providers can use it for other developed cities which may want to deploy similar railway public transportation mode. The level of commuter satisfaction and retention was only represented by few variables that can partially explain its significant impacts. Therefore, the suggestion for future research can be applied by exploring more fundamental factors that may significantly improve user satisfaction and retention of Jakarta rail transportation's commuters.

Figure 2. Significant (hypothesis testing) path diagram
(Source: Author, SmartPLS)

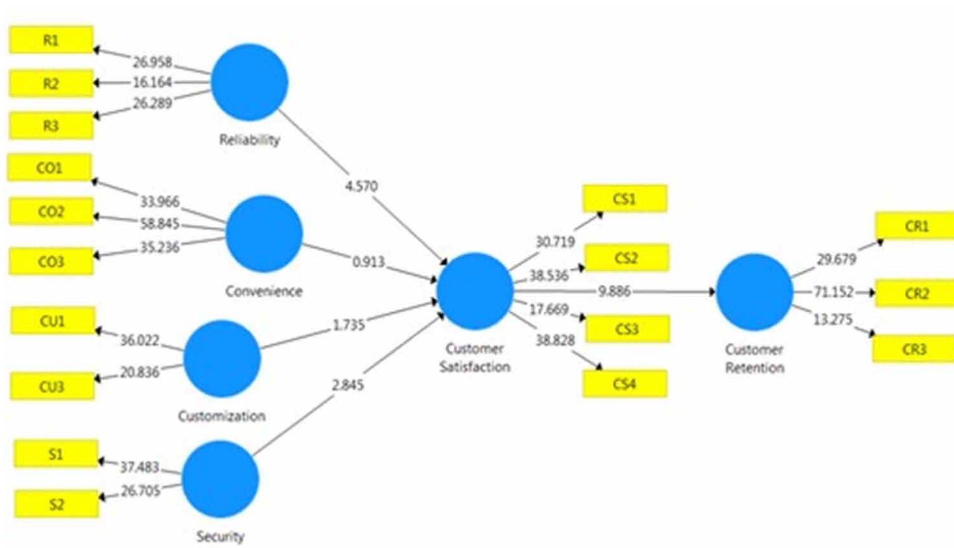
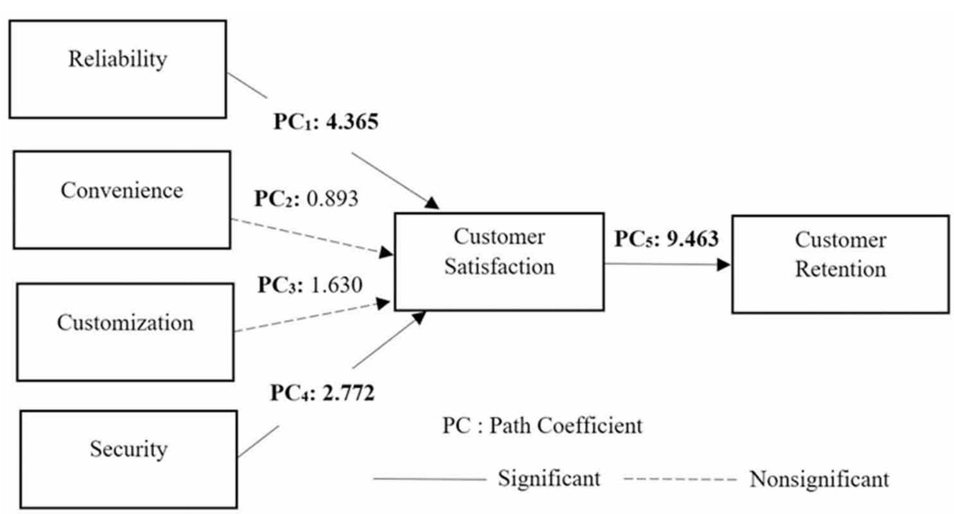


Figure 3.The final research model
(Source: Author)



CONCLUSION

According to the previous section's result and discussion, among all exogenous variables of service automation attributes (reliability, convenience, customization, security, and customer satisfaction), two service attributes (reliability and security) were significantly influenced the endogenous variable of commuter satisfaction. Commuter satisfaction also had considerably affected commuter retention. All the variables had a positive relationship and direction. Furthermore, reliability is the most dominant exogenous variable which influences commuter satisfaction as an endogenous variable. Besides, commuter satisfaction significantly influenced its endogenous variable, commuter retention, which also showed a positive relationship and direction.

This study is consistent with the prior research conducted about service quality dimensions and customer satisfaction. They highlighted that the reliability factor is a service provider's ability to perform and complete the commuters' promise. Moreover, a higher level of reliability will increase customer satisfaction, as reflected in the quality of service it serves. This study may give good insight to the management of the Jakarta rail transportation company to maintain the level of reliable service by providing consistent quality of service performance to satisfy, retain, and possibly increase the number of commuters. It can be done by applying reliable digital technology to their service automation, especially in the digital ticket payment automated service. The public transport provider can consistently deliver the digital payment service as they promise and constantly communicate to the customers. Based on the finding in this structural equation model, if the commuters are satisfied, they will feel that they will use the service repeatedly.

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ADDITIONAL READING

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KEY TERMS AND DEFINITIONS

Convenience: An effort and the time needed by customers to access a service provided by a business so as the customers do not need to use enormous effort and a long time to access and use that service.

Customer Retention: An effort by marketers to return or continuous interact or exchange the customer value to maintain customer loyalty and relationship ongoing basis.

Customer Satisfaction: An emotional response by customers that results from a cognitive process of evaluating the service received from the sellers against the cost of obtaining that service.

Customization: An ability of a business provider company to provide services or products that are appropriate and can meet the diverse needs of customers, which are unique and giving personalized experience for customers.

Reliability: In a public service system, it refers to how a company or service provider can perform and complete the promise they offer from their service.

Security: The extent to which the potential customers or users believe that the product or mainly the business's service is secure from any potential fraud and/or loss for them to be used.

Service Automation: An advanced digital technology system (usually involves several software, as well as hardware integration) that can do repetitive efficient tasks on services, thereby reducing the role of humans in it.

Chapter 9
Evaluation of E-Supply Chain User Experience in the Delivery Service Distribution Area With the Honeycombs UX Approach

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ABSTRACT

This chapter analyzes and measures customer satisfaction in using e-supply chain products using the honeycomb user experience approach. The e-supply chain product tested is a website that provides distribution services for government-owned (public logistic) and private (private logistic) in Indonesia. The purpose of this research is to analyze the value of e-supply chain products and evaluate whether this value has been received by service users through the concept of user experience honeycombs. There are seven aspects assessed, namely useful, usable, desirable, findable, credible, accessible, and valuable. This study shows that the value for the public sector as a whole gets better scores than the private sector. The aspects that need to be improved in the public sector are credible and usable. In contrast, in the private sector, the aspects that need improvement are accessible, desirable, findable, useful, and valuable.

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INTRODUCTION

Today's perspective of interface designs has shifted from an interface design to a User Experience (UX) (Hassenzahl & Tractinsky, 2006; Kula, Branaghan, Atkinson, & Roscoe, 2019). This shift in perspective changes website designers' mindset to think more about how a website interface that users use meets the functional needs and provides a sense of comfort and convenience in meeting its usage needs. In addition to prioritizing use and ease of interface (N.-H. Kim, 2020). UX also focuses on increasing user satisfaction by increasing the website usability factor's value, ease of use, and enjoyment obtained by users (Hussain et al., 2018; Tolle, Pinandito, Putra Kharisma, & Kartika Dewi, 2017). UX assessments help reveal important aspects of designing high-quality interactive products and provide an overall positive value (Kula et al., 2019). UX involves users' beliefs, preferences, thoughts, feelings, and behavior when interacting with products, systems, or services (Hassenzahl & Tractinsky, 2006). Therefore, it is subjective and highly dependent on the context of use (E. L.-C. Law & Van Schaik, 2010) and is related to the potential benefits obtained from products, systems, or services (Hussain et al., 2018). UX is measured using several aspects such as perspective, efficiency, user perceptions, human emotional reactions (Laugwitz, Held, & Schrepp, 2008). One of the most frequently used UX methods is Honeycomb (JIAO, LIU, & LI, 2013). In the honeycomb method, there are 7 aspects where a product or service must provide a good UX. The seven aspects are Accessible, Credible, Desirable, Findable, Usable, Useful, and Valuable (Rosenbaum, Glenton, & Cracknell, 2008).

In the development of information and technology, it is very fast that it affects all lifelines, including the supply chain. Almost all lines of business use mobile apps and websites for marketing their products. A market research company study shows that between 2008 and 2018, consumers used their cellphones more than 5 hours per day, and more than 2 hours per day consumers used laptops to carry out business processes (Jensen, Strengers, Kjeldskov, Nicholls, & Skov, 2018). This creates a shift in the new frame of mind in designing interfaces from user interface design (UI) to UX. These developments changed the mindset of supply chain actors to think about how an interface of the supply chain fulfills a functional need and provides a comfortable and easy interface for its users. So that supply chain actors need a new concept for this problem. Electronic-Supply Chain is a useful solution for improving business processes (Honni, Tang Herman, & Christianto, 2008). the e-supply chain is a strategic choice to increase global competitiveness (Lusiana, Masudin, & Zulfikarijah, 2017). The e-supply chain is considered important because companies are trying to utilize internet technology to integrate all of the company's work partners, especially those related to the supply system for materials or resources needed in the production process.

There is a distribution part of goods from one chain to another in a large supply chain and requires a logistics distribution service either from the sending company itself or from a third party in its distribution. In the era of industry 4.0, the distribution is now based on electronics so that users will inevitably use the website to access it. Given the lack of usability in technology-based planning systems, some researchers have chosen a multidisciplinary approach to SCM problems (Klumpp, Hesenius, Meyer, Ruiner, & Gruhn, 2019). Human-computer collaboration has been considered a more effective approach to the problem at hand. Usability factors such as people, technology, and organization are essential for a successful SCM system implementation (C. H. Lin, Hwang, Wang, & Peng, 2009).

Several studies related to e-supply chain have been conducted, since it delivers many advantages in supply chain process. E-supply chain provides integration of supply chain process, agality, tranparancy of data, holistic decision making, and optimization of process (Ageron, Bentahar, & Gunasekaran, 2020) It also offers the transformation of traditional supply chain process such as planning, task execution, the way of stakeholder interacts and collaborate (Agrawal & Narain, 2018). DSSC framework has been built on e-supply chain to increase capabilities of competitiveness in internal and external integration (Queiroz, Pereira, Telles, & Machado, 2019). However, none of those studies evaluate the impact of UX on contentment of e-supply chain

Therefore it is necessary to have a UX approach to measure customer satisfaction in using e-supply chain products.In this study, the UX of e-supply chain products will be evaluated using the Honeycomb UX method using aspects that are useful, usable, desirable, findable, accessible, credible and valuable. The e-supply chain product tested is a website that provides distribution services for government-owned (public logistic) and private (private logistic) goods in Indonesia. The purpose of this research is to analyze the value of e-supply chain products and evaluate whether this value has been received by service users or not through the concept of UX honeycombs. Currently, the study is limited to discussing UX in the e-supply chain, especially in Indonesia. Investigating UX by participants in the electronics supply chain is necessary. To fill this gap, this article considers UX factors in honeycomb to determine customer satisfaction.The challenge faced in this research is how to convince logistics services to understand the importance of e-supply chains in Indonesia and the importance of improving the quality of their services. The contribution of this research is expected to be able to improve the quality of services for the e-supply chain sector, both private logistics and public logistics in Indonesia.

LITERATURE REVIEW

User Experience (UX)

UX is a science that studies how to design and change a user's feelings, perceptions, and behavior towards a display, service, and performance of a product, system, or service (Hassenzahl, 2008). UX assesses how satisfied and comfortable a person is with a product, system, and service. General terms of UX such as what consumers like, how easily they access it, or what they don't like (Farinango, Benavides, Cerón, López, & Álvarez, 2018). A development from previous fields that explores what users feel when using a system. The purpose of UX is to use the system to get their satisfaction using it (E. Law, Roto, Vermeeren, Kort, & Hassenzahl, 2008). UX focuses on experience, perception, and the value meaning of human and product interactions. UX includes whether the system is easy to learn, efficient to use, fun, and so on (Obrist, Roto, & Väänänen-Vainio-Mattila, 2009).

Honeycomb

The Honeycomb UX is one of the UX concepts invented by Peter Morville (Morville & Sullenger, 2010)

As the name implies, honeycomb, so 7 hexagons contain the quality UX that a product must-have. The following is an explanation of the 7 hexagons:

1. Useful
   Ensuring that the products or systems we make are useful, have innovative solutions that are more useful, and can meet user needs (Barifah, Landoni, & Eddakrouri, 2020).
2. Usable

Ease of users in using the system or product made (Giguere et al., 2012).

3. Desirable
   Ensuring that the resulting product is satisfactory when we use it makes people want to look for it and takes advantage of the design emotionally (Fearns, Graham, & Johnston, 2015).
4. Finable
   Take into account in designing a product with ease of navigation and placement of an object. So that users can find what they are looking for quickly (Huang, Hu, & Yang, 2015).
5. Accessible
   The products that are made are accessible to people with disabilities. Accessibility focuses on people with disabilities, especially users with situational limitations, including users with device limitations and environmental limitations (Henry Lawton, Abou-Zahra, & Brewer, 2014).
6. Credible
   Understand the design elements that influence whether users believe what products say to them (Huang et al., 2015).
7. Valuable
   A product must provide value for the product developer. Feedback from this item is for non-profit; UX must develop the company's mission, while for-profit it can increase customer satisfaction (Morville, 2004).

Honeycomb serves several purposes at once. The first goal is a great tool for developing topics beyond usability and can help people who understand the need to set a priority (Giguere et al., 2012).

So whether users are more concerned with a product that we are interested in (desirable) or easy to access (accessible), depends on the balance of context, content and users, and what sacrifices are needed for it, whether made explicitly or empirically. Second, this model supports a structured approach to a product. Suppose we want to improve our site but don't have the budget and time for a complete overhaul. With this we can re-plan the targets (budget and time) to evaluate and increase the product's credibility. Third, in terms of UX, honeycomb can serve as a view of how to change the way we see what we do and allow us to review and dig deeper beyond existing boundaries (Morville, 2004) Honeycomb UX fits perfectly with this study.

Supply Chain Management

Supply chain management can be defined as the activity of processing activities - activities to obtain raw materials into goods in process or semi-finished goods and finished goods and then send these products to consumers through the distribution system. These activities cover the traditional purchasing function plus other important activities related to suppliers and distributors (Heizer, Rander, & Munson, 2017).

There are several supporting drivers in a supply chain to support a supply chain's running, including facilities, inventory, transportation, sourcing, and information technology *(Dinata & Kempa, 2017).* In a supply chain, there is an exchange of information, one of which is using the website to exchange information. According to yo Wahidin (2013) a website is a collection of web pages related to one another. Functions have important functions; (1) communication function, (2) information function, (3) entertainment function, (4) transaction function. A website is a medium of information, communication, and publication that can influence customers' perceptions or society in general. Website user satisfaction is the main measure of website quality. There needs to be an analysis or assessment of the company website to suit users' needs and desires. The benefits of a website user satisfaction survey include (1) customer identification or customer demographic profile, (2) identification of website strengths and strengths, (3) website improvement recommendations, (4) survey results can be used as input for strategic planning of the website, and (5) a better understanding of website performance through benchmarking with other websites.

Supply chain management (SCM) is an integration of materials, information, and finances in a link among supplier, manufacturer, wholesaler, retailer and consumer (Cooper, Lambert, & Pagh, 1997). Supply chain management consists of coordinating and integrating these flows both within and among companies. It is considered that the final goal of any effective supply chain manage-ment system is to reduce inventory (with the assumption that products are available when needed). As a solution for successful supply chain management, complicated software systems with Web interfaces are competing with Web-based application service providers (ASP) who facilitate to provide part or all of the SCM service for companies who rent their service (Hult, Ketchen Jr, Cavusgil, & Calantone, 2006). Some SCM applications are based on open data models that support the sharing of data both inside and outside the enterprise (this is called the extended enterprise, and includes key suppliers, manufacturers, and end customers of a specific firm. This shared data may reside in diverse database systems, or data warehouses, at the web sites of the enter-prises. By sharing this data "upstream" (with a company's suppliers) and "downstream" (with a company's customer), SCM applications have the potential to improve the time-to-market of products, reduce costs, and allow all parties in the supply chain to better manage current resources and plan for future needs (Larson & Halldorsson, 2004). Increasing numbers of companies are turn-ing to Web sites and Web-based applications as part of the SCM solution. A number of major Web sites offer e-procurement marketplaces where manufacturers can trade and even make auction bids with suppliers.

E-Supply Chain Management (E-SCM)

Electronic Supply Chain Management (E-SCM) is a system developed to keep up with the times that an electronic information exchange system has supported. Basically, E-SCM has the same function as SCM in general. Electronic Supply Chain Management is a platform used to run manual SCM into a digital system (Almajali, Mansour, & Maqableh, 2016). The E-SCM method will greatly help business people monitor the turnover of goods that occur under the SCM system (H.-F. Lin, 2014). The supply chain is a very large and extensive system; in a supply chain, there is something called the distribution of goods from one chain to another and requires a logistics distribution service either from the sending company itself or from a third party in its distribution. Nowadays, the distribution has been based on electronics to lead to various kinds of website products.

In recent years, scholars have made significant progress in addressing the logistic distribution problems of E-SC, for example: S. X. Xu, Cheng, and Huang (2015) proposed an efficient intermodal transportation auctions to assist B2B e-commerce logistic enterprises in resolving transaction costs. Ruan and Shi (2016) developed a framework for monitoring fruit e-commerce deliveries using the internet of things. Kadłubek (2015) examined the e-commerce logistic development strategy in E-SC and made policy recommendations. Furthermore, Yu, Wang, Zhong, and Huang (2016) presented the state-of-the-art e-commerce logistic in supply chain management from a practice standpoint, and world-wide implementations and corresponding models, as well as supporting techniques, were reviewed. In recent years, Lukinskiy, Lukinskiy, and Shulzhenko (2017) addressed the approach to increasing logistic system efficiency on the basis of various forms of logistic integration development in supply chains, with modified variants of the model of economic order quantity for echelon two-level systems. Yazdani, Zarate, Coulibaly, and Zavadskas (2017) proposed a decision support system for selecting logistics providers based on the quality function deployment and the technique for order preference by similarity to ideal solution (TOPSIS) for the agricultural supply chain in France. S. Xu, Liu, and Chen (2017)investigated and analyzed the characteristics of the transportation vehicle scheduling problem in E-SC with a third-party logistic enterprise.

METHODOLOGY

There are six stages in this research. The first stage is the problem identification stage. At this stage, the researchers conduct a literature study and analyze the proposed values to collect data and information. As said by (R. Xu, Liu, & Panneerselvam, 2014) proposed value analysis is the stage of analyzing the value offered by e-supply chain services carried out by observing, the researchers analyze its aspects are taken from the vision, mission, advertisement, the slogan, the appearance of the website is in accordance with the honeycomb UX method, namely accessible, credible, desirable, findable, usable, useful and valuable (Peter Morville, 2004). The value analysis results are then grouped based on their source, then scoring each e-supply chain using a Likert scale with intervals of 1 to 5, where the results of the scoring have different results. The next stage is the stage where the researchers use a questionnaire as a test tool. The instrument design stage contains the design of the questionnaire that will be used to design an instrument containing the questionnaire's design. Data collection was carried out on respondents who had used the e-supply chain product. Sampling was done by distributing questionnaires, namely by using google Forms. Determination of the number of samples at this data collection stage, using non-probability sampling method, namely purposive sampling. Non-probability sampling is a sampling technique that does not provide equal opportunities for every element of a population to be selected as samples (Sugiono, 2013). The purposive sampling method of determining the sample by determining the population elements that are estimated to be the most suitable for data collection. Retrieval of data using the type of primary data, namely, researchers collect their data by a survey, interview, and direct observation in the field. This study is unknown population is an expert group who use public and private logistics services for at least one year. There are several methods to determine a sample when the population is not known with certainty. According to Borg and Gall, experimental and comparative research requires a sample of 15 to 30 respondents in each group (Alwi, 2015). The number of respondents used in this study was 30 respondents. In this study, the authors measured each research variable's indicators using a questionnaire data collection tool through the interview with the customer. The questionnaire questions are arranged based on each variable's indicators determined in the honeycomb model. Measurement of the questionnaire question group uses a Likert scale with five levels; there are 5 (strongly agree), 4 (important), 3 (neutral), 2 (disagree), and 1 (strongly disagree). Each e-supply chain questionnaire has a different number of questions or statements - different on each questionnaire according to the proposed value analysis that will be carried out before. The purpose of this questionnaire is to find out the user's evaluation of an e-supply chain product then match it to the value offered by e-supply chain actors (Octafian & Hadiwijaya, 2020).

The third stage is validating with two stages of expert validation and pilot testing methods. In the expert validation, there are three experts in UX and two from the supply chain who will provide scores and comments regarding assessments and descriptions of values that researchers have researched. The fourth stage is the stage of processing the data from the results of the proposed values that have been validated and then the score for the answers from each aspect is determined, which is then compared with the perceived value obtained from the questionnaire. The fifth stage is an analysis and drawing conclusions and suggestions for this research. This stage is carried out after there are results from data processing that have been calculated. The analysis carried out is a quantitative inferential analysis that aims to produce a finding that can be generalized more broadly into a population. In UX research, there is a discussion analysis represented by using spider salts. Spiders are used because they can visualize complex information and are a fast and easy way to organize the answer's concept (Mutiasanti, Tri Ananta, & Muslimah Az-Zahra, 2018). The last stage is drawing conclusions and suggestions. At this stage, conclusions are drawn from the research results that have been carried out at the analysis and interpretation stage of the results. Then given useful suggestions and input for further researchers.

RESULT AND DISCUSSION

Proposed Value

This stage is a process to analyze the value offered by supply chain actors where the aspects are taken according to the honeycomb UX method, namely accessible, credible, desirable, findable, usable, useful, and valuable. The purposed value analysis is carried out by observing, in which the researchers analyze the value of the e-supply chain product based on the vision, mission, advertisements, slogans, and website appearance. The results of the value analysis are then grouped based on their source. After that, scoring was carried out for each e-supply chain using a Likert scale with intervals of 1 to 5, where the results are different.

Results of Proposed Value Analysis on Each Website

In the proposed value analysis, there are six categories, including honeycombs aspects, sources of proposed values, values, description of values, codes, and given scores. The scores are obtained subjectively. In table 1, you can see the results of the proposed value analysis in the public and private logistic.

From the table above, the results for public logistic are as follows:

1. Accessible
   For the accessible aspect based on the official Public Logistic web source, researchers found that Public Logistic has many service points, long operating hours, online services, and pick-up services with accessible value scores of 5, 5, 5, 4 with an average of 4.75, which means strongly agree. For the accessible aspects based on the official private logistic web source, researchers found that private logistic providing android and IOS-based applications to make it easier for consumers to access them. The private logistic service has long operating hours, 24-hour

Table 1. The results of the proposed value analysis in public logistic

No.	Honeycombs Aspects	Sector	Source	Value	Description of Value	Score
1	**Accessible** (Ease of users accessing physical or situational limitations)	Public Logistic	Official Web	The number of point of sales	Public Logistic is a company engaged in the logistic sector, which has a very wide network of up to 4,800 online offices. The number of service points (Point of Sales) reached 58,700 in the form of post offices, agents, Mobile Postal Service, and others.	5
				Long operating hours	Longer operating hours at the central public logistic office, especially in the package delivery division.	5
				Online service	Public logistic has also had online services since 2010 and can be accessed easily for various other purposes.	5
				Pick-up service	Public logistic provides a pick-up service for particular customers.	4
		Private Logistic		Online services and smartphone application-based	Easy access on smartphones, private logistic provides Android and IOS-based applications to make it easier for consumers to access them.	4
				Long operating hours	Private logistic has 24-hour outlets in major cities of Indonesia to deliver goods without time restrictions.	4
2	**Credible** (Customer trust in the product)	Public Logistic	Official Web	Insurance protection guarantee	Public logistic provides insurance protection for goods and documents by providing 24-hour call center services via call centers or social media such as Line, Telegram, and Webchat.	4
		Private Logistic	Vision and Mission	Customer trust in service	Private logistic provides the best services in shipping and logistic services by serving the needs and interests of customers optimally in Indonesia and internationally in a professional, honest, responsible manner, with full of confidence and high dedication to always be the best.	4
			Official Web	Insurance protection guarantee	Private logistic provides services in shipping with guaranteed protection insurance for goods and documents that add convenience when shipping goods by providing 24-hour telephone service and receipt checking that can be easy to access.	4
				Insurance protection guarantee	Private logistic provides guaranteed goods with several awards it achieves, along with the certification it gets.	4
3	**Desirable** (Satisfying when we use it, make people want to look for it and make emotional use of the design)	Public Logistic	Official Web	Various service products	The service products offered by public logistic are very diverse and include domestic and international shipping services, financial services, and business solutions.	5
				Flagship products	Public logistic serve the delivery of correspondence and derivative products, such as stamps.	5
		Private Logistic	Official Web	Various service products	The products offered by private logistic are very diverse. Starting from international service (INT), same day service (SDS), one-night service (ONS), regular service (REG), economy service (ECO), trucking service (TRC).	5
4	**Findable** (Ease of navigation and placement of objects on the web)	Public Logistic	Official Web	Ease of navigation	In the display of the website, the public logistic navigation page shows the shipment tracking, shipping rate calculation, the nearest post office service point, and a choice of various services from the public logistic.	4
		Private Logistic	Official Web	Ease of navigation	In the display of the website navigation page, Private Logistic shows service checks, rate checking, and location checking on the front page of the web, along with the desired product.	5
5	**Usable** (Ease of users in using the system or product created)	Public Logistic	Official Web	Ease of international shipping	Ease of using Express Mail Service (EMS) products from public logistic as an international shipping service.	5
				Ease of payment	For big customers and corporations, payment facilities in public logistic can be easily paid on credit, according to the request and agreement with the customer.	4
		Private Logistic	Official Web	Ease of using service products	Ease of delivery and pick-up services for private logistic goods online through a private logistic application on a smartphone named JEMPOL (Jemput Online/online pick-up) service.	5
6	**Useful** (Ensuring that the product or system is a solution, innovative and beneficial for users)	Public Logistic	Vision and Mission	The main solution for logistic services and financial services	Public logistic is the main choice for e-commerce logistic services, integrated finance, competitive and professional digital documentation and authentication in order to support financial inclusion. As well as the functions of a professional service operator	4
			Slogan	The main solution for logistic services and financial services	"For you, we exist". From the slogan, it can be interpreted that public logistic is a solution to logistic problems so far	5
			Advertisement	The main solution for logistic services	From the public logistic advertisement, it explains that public logistic is a solution for the fast delivery of goods	4
			Official Web	The main solution for financial services	It is a competitive integrated financial service solution to support digital-based financial *inclusion*, such as *e-money top-ups*, *e-commerce payments*, etc.	4
		Private Logistic	Slogan	The main solution for logistic services	"Only one fast service logistic". From the slogan, it can be interpreted that Private Logistic is a solution to logistical problems so far.	4
			Advertisement	Logistic service solutions	The advertisement explains that the existence of private logistic can make it easier to send packages.	4
			Official Web	Logistic service solutions	Private logistic can deliver goods or documents without getting off the vehicle and are open for 24 hours. Private logistic is a pioneer in this service. Currently, the 24-hours Drive-Thru of private logistic is in the Jakarta area.	4
				Logistic service solutions	On the packaging side, private logistic provides repackaging services if the packaging does not comply with packaging standards.	4
7	**Valuable** (Providing value for product developers and profits)	Public Logistic	Official Web	Affordable rates	The rates charged by public logistic are more affordable	5
				The many numbers of public logistic programs	The many numbers of public logistic programs for both customers and partners who collaborate with public logistic	4
		Private Logistic	Official Web	The great number of promos	Private Logistic provides many and attractive promos in collaboration with Bukalapak, such as a free postage promo.	5
				The great number of programs	The membership program for private logistic customers provides discount benefits in the form of a Tooz Wallet balance every time you transact with private logistic.	4
				Affordable rates	Private logistic rates are cheaper for shipping large packages.	5

outlets in major cities in Indonesia, with accessible value scores of 4, 4 with an average of 4, which means agree.

2. Credible

For the credible aspect based on the official web source, Public Logistic provides insurance protection for goods and documents by providing 24-hour call center services via Halopos or social media such as Line, Telegram, and Webchat, with a credible value score of 4, which means agree. For the credible aspect based on the vision and mission and the official private logistic web source, it provides insurance protection guarantee for private logistic goods and documents by providing 24-hour telephone service and receipt checking that can be easy to access, with a credible value score of 4, which means agree.

3. Desirable

For the desirable aspect based on the official web source, the service products offered by Public Logistic are very diverse, such as domestic and international shipping services, financial services, and business solutions serving correspondence delivery and their derivative products, such as postage, with desirable value scores of 5, 5, with an average of 5, which means strongly agree. For the desirable aspect, based on official web sources, the service products offered by private logistic range from international service (INT), same day service (SDS), one-night service (ONS), regular service (REG), economy service (ECO), trucking service (TRC), with a desirable value score of 5, which means strongly agree.

4. Findable

For the findable aspect based on the official Public Logistic web source, the researchers found that the display on the Public Logistic navigation website page showing the ease of navigation with the availability of shipment tracking, shipping rate calculation, the nearest post office service point, as well as a choice of services from the post office, with a findable value score of 4, which means agree. For the findable aspect based on the official private logistic web source, the researchers obtained the ease of navigation in the private logistic website page display which displays service checks, rate checking, and location checking on the front page of the *web*, along with the desired product, the score of findable value is 5, which means strongly agree.

5. Usable

For the usable aspects based on official Public Logistic web source, researchers found that Public Logistic provides the ease of using Public Logistic EMS products as international shipping services while payment facilities in Public Logistic can be paid easily on credit for big customers and corporations, according to requests and agreements with customers, with usable value scores of 5, 4, with an average of 4.5, which means strongly agree. For the usable aspects based on official private logistic web sources, researchers obtained the ease of online private logistic goods delivery and pick-up services through a private logistic application on a smartphone named JEMPOLservice (online pick-up), with a usable value score of 5, which means strongly agree.

6. Useful

For the useful aspects based on the vision and mission, slogans, advertisements, and official Public Logistic website source, researchers found Public Logistic as the main solution for integrated logistics and financial services, competitive and professional digital documentation and authentication to support financial inclusion. As well as the function of professional service operators, with usable value scores of 4, 5, 4, and 4, with an average of 4.25, which means

Table 2. Expert validation results for public logistic

	Honeycombs Value from 5 Expert						
	Accessible	**Credible**	**Desirable**	**Findable**	**Usable**	**Useful**	**Valuable**
Average value of each honeycombs value	4,9	4,6	4,4	4,0	4,5	3,8	4,3

agree. For the useful aspects based on slogans, advertisements, and official private logistic web sources, researchers found that private logistic is the main solution for logistics services, private logistic is a pioneer in delivering goods or documents without getting off the vehicle and is open for 24 hours so that it can make package delivery easier, with useful value scores of 4, 4, 4, 4 with an average of 4, which means agree.

7. Valuable

For valuable aspects based on the official Public Logistic web source, researchers found the affordable Public Logistic service rates and many programs from public logistic; with valuable value scores of 5, 4, with an average of 4.5, which means strongly agree. For the valuable aspects based on official private logistic web sources, researchers found that the service rates were affordable and had many programs and promos, so the score for valuable values was 5, 4, 5 with an average of 4.67, which means strongly agree.

Instrument Validation

Instrument validation is carried out in two stages, namely expert validation and pilot testing methods. In expert validation, there are three experts, one from the field of UX and two from the supply chain, who will provide scores and comments regarding assessments and descriptions of values studied by researchers. After that, pilot testing is carried out. Pilot testing is one of the methods used to validate the respondent's understanding of the words written on the questionnaire and to understand the time taken by the respondent in filling out the questionnaire. The expert characteristics used in this study are those who have worked in the field of UX for more than three years and have publications in the field of UX and supply chain. Based on these characteristics requirements, five experts were tasked with doing expert validation.

Expert Validation Results

From the results of Expert validation carried out in public logistic, the results can be seen in Table 2 as follows:

In the public logistic, the lowest value is useful, with an average value of 3.8. Some experts explain that in public logistics, information needs were being addressed in the form of plain language summaries. The next lowest value is findable with a value of 4.0, and experts find it difficult to find specific content on the site using on-site search. Whereas the valueable got a value of 4.3, they felt the site is too complicated, and to desirable with a value of 4.4; the expert felt the site seemed off-putting. From the results of Expert validation carried out on private logistic, the results can be seen in Table 3 as follows:

Table 3. Expert validation results for private logistic

	Honeycombs Value from 5 Expert						
	Accessible	Credible	Desirable	Findable	Usable	Useful	Valuable
Average value of each honeycombs value	4,8	4,5	5,0	5,0	5,0	4,0	4,7

In private logistics, the lowest value is useful with an average value of 4.0, while other variables get a good score above 4.5. The value 4.0 is useful because the expert felt misunderstanding the targeted texts on the front page. A value of 5.0 is even found in the desirable, findable, and usable variables. Usable is considered good because on the site it is deemed to be simple and effective. Whereas in desirable it has a positive emotional response and in findable they can locate what they are looking for

Pilot Testing

Pilot testing is one of the methods used to validate the respondent's understanding of the words written on the questionnaire and to understand the time it takes for respondents to fill out the questionnaire before surveying to evaluate users on an actual website (a product of the e-supply chain). The pilot test is used for the pretest, to see whether the population sample already understands the created questionnaire. To do the pilot test, there will be 5-10 people for each website, so that the total number of respondents is 30. Respondents are users of the product. The pilot testing stages are as follows:

1. Researchers provide questionnaires in the same way and conditions as planned in the actual data collection and record the start and end times so the researchers can find out how long it takes to complete each questionnaire.
2. The researchers note where the respondent is hesitant to answer and asks for clarification because this may be an indication that the question or answer has vague answers, is difficult to understand, or has more than one meaning.
3. After the respondents complete the questionnaire, researchers explain that the researchers want to ask how the respondent understands each question and the choice of response.

The number of respondents for pilot testing on Public Logistic was 10 people. The average filling time was 6.8 minutes. 5 respondents said that the meaning of the question was unclear and the word was wrong. The results of pilot testing for public logistic can be seen in Table 4 as follows:

The number of respondents for pilot testing in Private Logistic was 10. The average filling time was 4.5 minutes. 1 respondent said that the meaning of the question was unclear and the word was wrong. The results of pilot testing for private logistic can be seen in Table 5 as follows:

Table 4. Pilot testing results for public logistic

No.	Description of value before Pilot Testing	Description of value after Pilot Testing
1	Public Logistic provides a pick-up service for particular customers.	Public Logistic provides a pick-up service for particular customers.
2	Public Logistic is easy to deliver Public Logistic EMS.	Ease of using EMS Public Logistic products as international shipping services.
3	Public Logistic makes logistic services and financial services the main choice; provides competitive e-commerce logistic service solutions; performs the function of the designated operator professionally and competitively; provides competitive integrated financial service solutions to support digital-based financial inclusion; providing competitive digital documentation and authentication service solutions.	Public Logistic is the main choice for services, including *e-commerce* logistics, integrated finance, competitive and professional digital documentation and authentication to support financial inclusion, as well as the functions of a professional service operator.
4	On the website navigation page, Public Logistic displays shipment tracking, shipping rates calculation, the nearest post office service point, as well as a choice of various **services** from Public Logistic.	The Public Logistic website navigation page displays the shipment tracking, shipping rates calculation, the nearest post office service point, as well as a choice of various services from the Public Logistic office.
5	"For You, We Exist"	"For You, We Exist" From the slogan, it can be interpreted that public logistic is a solution to logistic problems so far.

Table 5. Pilot testing results for private logistic

No.	Description of *value* before *Pilot Testing*	Description of *value* after *Pilot Testing*
1	"Only one fast service logistic"	"Only one fast service logistic" From the slogan, it can be interpreted that Private Logistic is a solution to logistical problems so far.

Results of Respondent Data Processing

Processing the Average Score of Perceived Value

As the stages in the Honeycomb UX method, it aims to calculate the total score of each Supply chain System. Of the seven values tested, the total score is calculated one by one, so does the average score for each value in the Supply chain System. The formula for the total score per value X from each supply chain system is shown in equation 1 as follows:

$$Score\ X = \frac{\sum_{k=1}^{n} value\ X}{n}. \tag{1}$$

Where:

X = the name of *Value*
k = respondent number *k*
n = the number of respondents

Table 6. The value of perceived value

Services	Accesible	Credible	Desirable	Findable	Usable	Useful	Valuable
Public Logistic	3,9	3,6	4,1	4,2	3,7	3,9	3,9
Private Logistic	3,6	3,7	3,9	3,7	3,7	3,8	3,7

From table 6 above, it can be described that the highest average value of public logistic service is the findable value at 4.2 points, followed by desirable value at 4.1 points, accessible, useful, and valuable value at 3.9 points, usable value at 3.7 points, and the last, credible value has a low value of 3.7 points. From this, it can be described that the findable and usable values of public logistics are included in good and very good verbal values, while those for accessible, valuable, and useful values have sufficient and good verbal values. For Private Logistic service products, the highest value is the desirable value of 3.9 points, the useful value of 3.8 points, the credible, findable, usable, and valuable value at 3.7 points, and the accessible value of 3.6 points. From this, it can be described that the values of Private Logistic are included in the category of sufficient and good verbal values.

Comparison between Proposed Value and Perceived Value

To compare the Proposed Value and the Perceived Value, a user checks the value received; a check is done to match whether the value written by the researchers has been accepted or not by the user by looking for the difference value.

Table 7. The average values of perceived values and proposed values in public logistic

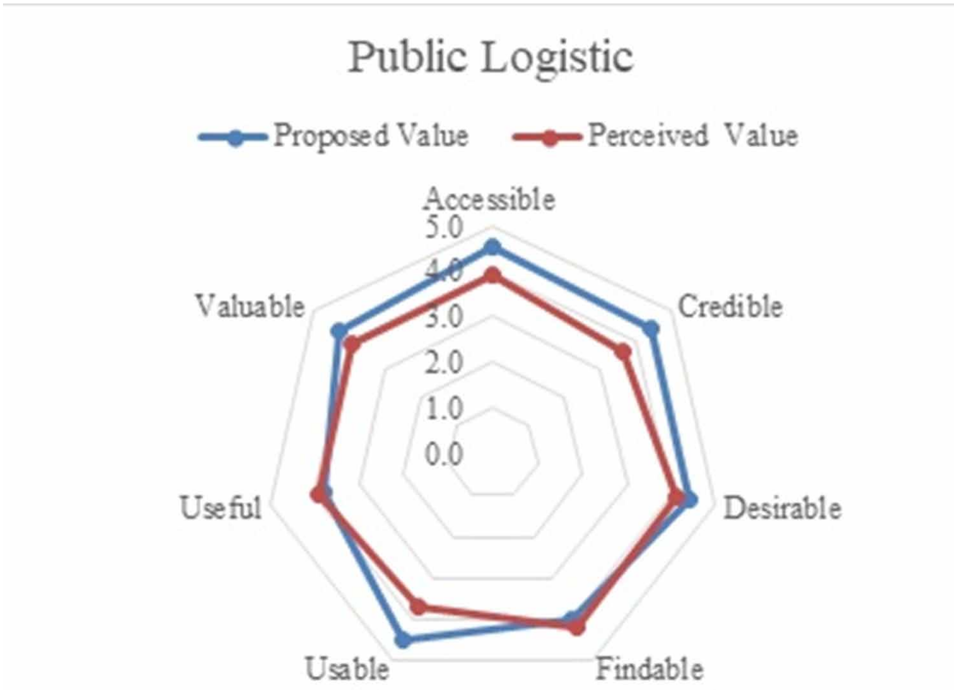
Value	Proposed Value		Perceived Value		Gap	
	Public	Private	Public	Private	Public	Private
Accessible	4,6	4,8	3,9	3,6	0,7	1,2
Credible	4,4	4,5	3,6	3,7	0,8	0,8
Desirable	4,4	5,0	4,1	3,9	0,3	1,1
Findable	4,0	5,0	4,2	3,7	-0,2	1,3
Usable	4,5	5,0	3,7	3,7	0,8	1,3
Useful	3,8	4,0	3,9	3,8	-0,1	0,2
Valuable	4,3	4,7	3,9	3,7	0,4	1,0

Table 8. Results of public and private logistic analysis

Value	Description	Sector	Result	
			Value	Analysis
Usable	Products or services must be easy to use; the system is designed to be familiar and easy to understand; users can easily learn to use the system; it tolerates the level of user failure(Morville, 2004)	Public and private logistic	Sufficient	The products or services are considered sufficient in terms of ease of use, learning, and familiarity and tolerable enough to the failure rate of use.
Useful	Products and services are useful and meet the public needs(Morville, 2004)	Public and private logistic	Sufficient	Products and services are useful enough in meeting needs.
Desirable	The visual aesthetics of products, services, or systems are attractive and easy to interpret (Morville, 2004)	Public logistic	Good	The visual aesthetics of the product are considered good.
		Private logistic	Sufficient	The visual aesthetics of the product is considered sufficient.
Findable	Navigation is easy and makes sense so that users can easily find information and quickly find solutions(Morville, 2004)	Public logistic	Good	Navigation is considered good.
		Private logistic	Sufficient	Navigation is considered good enough.
Accessible	Products are accessible for users who have situational deficiencies or disabilities(Morville, 2004)	Public and private logistic	Sufficient	The products are accessible enough for situational users and people with disabilities.
Credible	Service products must be trusted (Morville, 2004)	Public and private logistic	Sufficient	Service products are considered sufficient in trust.
Valuable	Products provide value to our sponsors, advance the vision and mission to improve customer satisfaction(Morville, 2004)	Public and private logistic	Sufficient	Products are considered good enough in providing value to our sponsors, advancing the vision and mission to improve customer satisfaction.

In table 7 it can be seen that the most negligible difference is in the value desirable with a difference of 0.3. While the credible value and the usable value have the most difference, namely 0.8, this indicates that there is a gap between what the researcher writes and the user. Meanwhile, for findable and useful, the perceived value is higher than the purposed value. This shows that users rate public logistics better than researchers. It can be seen that the smallest difference is in the *useful value* with a difference of 0.2. Meanwhile, the *findable* and *usable value* has the highest difference of 1.3.

Figure 1. Public logistic spider diagram



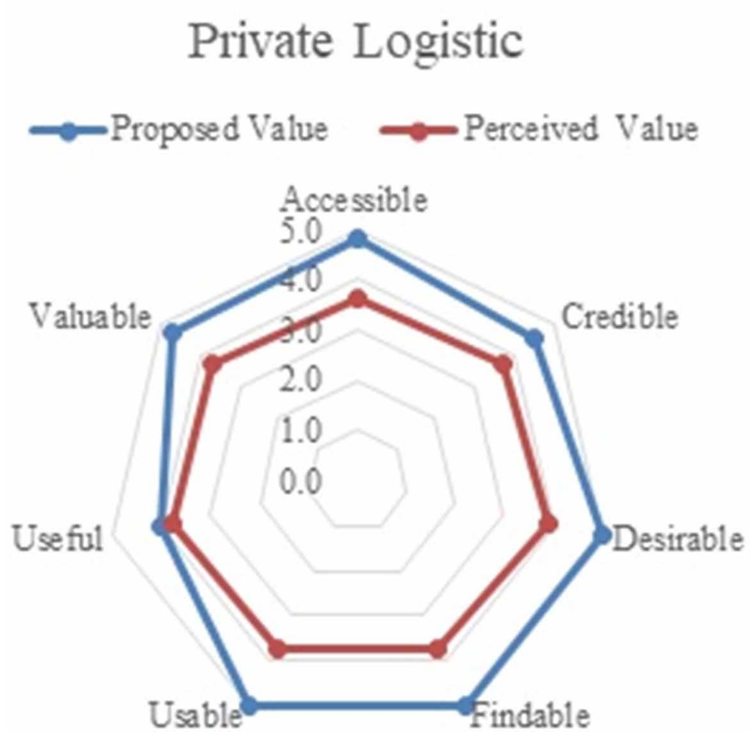
Analysis and Discussion on Comparison of Perceived Value and Proposed Value

At this stage, a discussion is carried out on how to analyze data processing in the previous chapter. After obtaining the results from data processing results, a comparison is carried out by describing it through the *spider diagram* and analyzing it so that it is easy to understand and analyze. The results of the comparison of public logistic analysis can be seen in table 8 .

From Figure 1 Public Logistic Spider Diagram shows that the value with the most difference is the credible and usable value where the products or services are considered sufficient in terms of ease of use, learning, familiarity and tolerable enough to the level of user failure to make customer trust worth enough. It means that the public logistic needs to improve the efficiency and effectiveness of the system, such as complicated regulation or service procedures, whether it is conducting disputes or complaints against goods or services, assuring accurate use or tracking so that users can more easily use the system or product made and have more trust in public logistic. Besides the shortcomings that public logistic has, public logistic has advantages, namely findable and useful value that exceeds user expectations with a plus value of 0.2 points. In other words, public logistic is very easy to navigate and place an object, such as looking for any product or finding the nearest location or web navigation and services that make it easier for users. Therefore, users can find what they are looking for easily. It is also very innovative and solution with a wide variety of products from public logistic and answer all existing problems.

From Figure 2 Private Logistic Spider Diagram shows that the value with the most difference is *findable* and *usable* where users assess the navigation of service products in the private logistic spider diagram, as well as ease of use, learning, familiarity, and tolerance of the failure rate of use, as good enough. It means that private logistic need to improve the efficiency and effectiveness of its systems,

Figure 2. Private logistic spider diagram



such as complicated regulation or service procedures, whether it is conducting *disputes* or complaints against goods or services, assuring accurate use or tracking, as well as the need for improvement in designing a product with easy navigation and placement of objects. Therefore, users can find what they are looking for and use easily, such as a better *web design* by placing their products so that they are easy to find for customers and the *web* that can always be accessed. From these shortcomings, users assess private logistic to be good in *useful* value, where private logistic is considered innovative and solutive with a large variety of products and answers all the problems that exist today.

UX has become a well-known concept, with UX being used in product design, service design, and brand marketing. According to ISO (International Standards Organization No. ISO-9241-210). UX is defined as "a person's perceptions and responses that result from the use or anticipate the use of a product, system, or service." It is also influenced by the user's previous experiences, attitudes, abilities, and personality. According to Alben (1996) UX encompasses all aspects of how people use an interactive product, such as the tactile impression of the product and the user's understanding of the product. During use, whether or not the user requires the service provided by the product, as well as the degree of compliance between the product and the environment (Hassenzahl, 2008). According to the (Petrie & Bevan, 2009) UX encompasses all aspects of the end user's interaction with the company, its services, and its products. Products must accurately meet the needs of users and make them feel joyful while using them; simply owning the product can bring users happiness. Because people are at the center of everything, it is user-centered design (McCarthy & Wright, 2004). Technological progress as well as the popularity of Web pages, UX research originally focused on the interaction between human and machine, turning to UX research of web pages, despite the fact that web page design is different from machine design in the past. It appears less difficult, increases product visual experience, and product purpose; thus, people in the process of using the product, combined with the goal-oriented software interface, and with information content oriented system, become the new UX goals.

MANAGERIAL IMPLICATION

Over the last decade, UX has grown in importance, and it is now explicitly stated in new product or service developments (N.-H. Kim, 2020). The value of experience is critical in achieving a person's happiness and driving a product or service's success. The overall experience that users have when using a system, product, or service, including awareness, reaction, and behavior, is referred to as UX. This began with human-computer interaction (HCI) research in computer science. It is now widely used in computer products and in services, products, and processes across industries and society and culture (O. Kim & Yun, 2019). If the UX is bad, users are more likely to have a negative opinion of the system, product, or service (H.-G. Kim & Kim, 2017). The device, product, or service can eventually fail or require redevelopment if the UX is misjudged and implemented incorrectly. The Honeycomb model for UX analysis has the advantage of allowing anyone to visually check the overall satisfaction level of the different UX sections. The UX Honeycomb model seemed to be a good fit for this study's categorization matrix. Despite its non-scientific origins, the model is often used in applied design (Mansson, Wiklund, Öhberg, Danielsson, & Sandlund, 2020) and met our study's criteria for providing a structure. As a result, we believe the UX Honeycomb model is worth exploring further in UX study (Elo et al., 2014).

The findable group refers to the participants' conversations about accessibility and making navigation easier (Mansson et al., 2020). The participants need a clear and simple design. Findable means that participants must find the web site through Google or other external search and find specific content on the site, using on-site search.(Rosenbaum et al., 2008) It suggest avoiding excessive use of icons to enhance the interface's organization (Fearns et al., 2015). The category accessible refers to the participants' impressions of their ability to access web content and the information given and web access while using the computer(Giguere et al., 2012). The suggestion about the web that the web must be easy to remember what the menu contained. (Mansson et al., 2020). The accessible group includes the participants' opinions on how to navigate the site and complete the exam. The use of too small a font size and too much content on some pages were major usability barriers. The vocabulary used must be clear and easy to comprehend (Fearns et al., 2015)

The desirable group refers to the participants' perceptions of how suitable and appealing the site will be for them as end-users. It should ideally be something that makes participant happy and something that the participant can talk about. To be desirable, they wanted details on the web to be succinct, so they wouldn't get bored or lose track when using it (Rosenbaum et al., 2008). It was suggested that the results of the tracking package be viewed as a line with changes over time To make it more intuitive. Participants' trust in the internet is defined by the category credible. It was thought to be useful to know what could happen if you made a mistake. The business details reassured participants about the web's integrity (Mansson et al., 2020). The helpful category exemplifies participants' views of the app's utility for expected end-users and their needs. The fact that information needs were being answered in plain language summaries was praised by many participants(Fearns et al., 2015). The final category acts as an overarching feature of the model's other six facets. A valuable site has design elements that influence user confidence, has the high motivation, is easy to find what users want, and is simple to use (Rosenbaum et al., 2008)

CONCLUSION

In this study, we have evaluated the customer satisfaction of e-suply chain using Honeycomb UX. The result shows that public logistics are considered very easy to navigate and place an object such as searching for the product or searching for the nearest location or service and web navigation that makes it easier for users. So that users can find what they are looking for easily. Public logistics is also very innovative and solution with a large variety of products. Besides that, public logistics is considered sufficient in ease of use, learning, familiarity, and adequate to tolerate user failure rates that have sufficient value in customer trust. Private Logistic users assess innovatively and solutions with a large variety of products and answer all the problems that exist today. The navigation and ease of use, learning, familiarity, and can tolerate the failure rate of using private logistics is assessed well. Both public logistics and private logistics should increase the efficiency and effectiveness of the system. They should remove complicated regulation or service procedures, whether it is to dispute or complain about goods or services, proper use, or tracking to more easily use the system or product made trust public logistic. So that users can find what they are looking for and use it easily. The aspects that need to be improved in the public sector are credible and usable. In contrast, in the private sector, the aspects that need improvement are accessible, desirable, findable, useful, and valuable.

Limitations

This study has limitations which are the scope of the study. This study only refers to users of public logistics services and only 1 private logistics. They are also limited to a minimum of one year of experience using logistics services without information on the number of times they use logistics services. It is hoped that the managerial proposal can help improve the performance of logistics services in Indonesia, as summarized in the managerial implications. Future studies can use different respondents and circumstances/perspectives, especially during the COVID-19 pandemic or use different variables. The number of respondents can be added and grouped so that the differences will be clearly visible.

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Chapter 10
Effects of Employee Performance on the Implementation of Total Quality Management:
Perspective of Working Mothers

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ABSTRACT

Mother is a person who has many task and responsibilities daily. In addition, as a working mother, tasks and responsibilities are double and triple, for instance task and chores at home and task at the organization. Total quality management is practices and procedures that organizations use in order to enhance or improve the performance of the employee or the organization. Performance of working mothers is said to be not satisfactory, and their performance may drop after having babies. Some organizations and their colleagues don't seem to be helpful to working mothers after rejoining the workforce right after maternity leave ended. Some organization from other countries provide work-family support policies in order to help these working mothers to balance their lifestyle as mother and as an employee. Some researchers claimed that working mothers tend to have very happy children whilst underperforming in the organization. This chapter seeks to investigate the perception of working mothers on their performance after the implementation of total quality management.

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INTRODUCTION

Quality and Performance

One of the most crucial factors that support on organization's survival is customer satisfaction and providing quality product and services (Parsamand, 2021). As stated earlier, quality is proven to be very crucial in either products, skills or even for an organization. To achieve long term success and to stay strong in the market, products need to have very good quality. In terms of skills, quality of an employee is also very important in order to have good performance. As stated in the SPA's website (Civil service commission), public sectors are using annual performance appraisal in order to see whether employees are improving or not, when certain standards are achieved then incentives will be provided at the end of the year. (SPA, 2018)

Improve in performance may result in higher levels of customer and employee satisfaction. Educations were always very difficult to take into account when it comes to measuring employee performance; with greater education does not always result in greater performance, employee also need training. Training can help recipients to improve their performance by helping recipient attain required level of knowledge. Training has shown positive impact towards employee productivity which results in higher level of customer and employee satisfaction, (Borghans, 2001; Allen and Velden, 2001; Green and McIntosh, 2007; Amador & Vila, 2013; Anuar, 2017), however, organizations would prefer to have employee that already have lots of experiences so the organization don't have to spend more money in training new employees.

BACKGROUND AND RESEARCH GAPS

Working Mother

Woman is an integral part of a society. Working mother can be defined as woman who have the ability to combine career and added responsibility that is taking care of the family or in particular, raising children. (Kadale, Pandey and Raje, 2018). According to Brunei Darussalam's Labor Department statistics (deps.gov.bn), in 2020 there were 167,00 women in the workforce and it is not stated how many percentages are working mothers. Spread of education, better awareness, increasing cost of living have cause woman to shift from home to career even as mother. (Kadale, Pandey and Raje, 2018).

Factors that increase the supply of working mothers in Indonesia are due to level of increasingly improved level of education and increase in demand of female workers in textile and garment industry. (Handayanii, Dhyah and Primaningrum, 2019). But the main reason would be because of the higher standard of living, thus if only supported by family with lower income will be seen as a burden. (Handayani, Dhyah and Primaningrum, 2019). For a married woman who decides to work, they would naturally have dual role that needs to be served at the same time. The dual role is an encumbrance that caused domestic duties must remain prioritized by women in addition to public duties (work). (Handayani, Dhyah and Primaningrum, 2019).

A postgraduate from government college in Pakistan concluded that educated employed women in Pakistan did not only contribute to the development of economic prosperity of the nation but also greatly serves her family in all aspects; household budget, medical assistance to family members. (Nargis Ara, 2012).

One important thing to note that a balance is indeed needed to be able to carry out two mandates as well as possible. Woman must have self-management's ability in physical and psychological. Management from the physical side is related to the ability to maintain body stamina to be able to provide optimal services both in the family and occupation's domain. Whereas the management of emotions is related to the ability to manage emotions when dealing with or spending quality time with family, friends or colleagues. (Handayani, Dhyah and Primaningrum, 2019).

Research Gap 1: Research done only on working mothers mostly from specific positions in the organization. Working mothers are mostly employed in these 4 industries; Food, Education, Hospital Industry and Textile/Garment. For instance, garment industry in Bangladesh played a big role in the development of industrial sector and have provides employment to around 4.2 million Bangladeshis women and this number increases day by day and most of them are mothers. (Akter, Wali, Kamal, Mukul and Parvin, 2017). Working mothers also most likely work in elementary and secondary education, within hospital settings and food services, (Glynn and Hamm, 2019) the environment where policies and supports for working mothers are available. How about other industries or high rank positions?

Research Gap 2: Most researchers studied on employees in general, but only few focusing important details on working mothers. Employee performance were measured by gender, by age, marital status, income, and only few that would consider asking mothers whether having children would affect their performance. This makes it difficult to understand the reason why performance is affected, 1 reason from 1st mother cannot be the same as to why 2nd mother have difficulty in keeping up their performance. Mother A might say they don't have difficulties because their children are at age 9-10, Mother B might have difficulties because their children are at age 2-3. When mother B said its difficult, then it will be concluded that all working mothers think that its difficult to cope whilst not all working mothers cannot cope to tension and stress and maintaining their performance.

Research Gap 3: Needed more evidence to understand about working mothers instead of just applying certain policies to support these working mothers in performing. Why organization would consider hiring working mothers who have children that have attended school (5 years and above) instead of newborn, infants or toddler. How are these 2 mothers different? working mothers should be considered as very good in time management because one has to manage their time very well in order to cater to dual career but why were there still option to choose from mother with children age 5 above and mothers with toddlers. More research will be needed to help understand whether policies such as maternity leave, breast-feeding break policy would actually help working mothers in better performing.

Relationship of Working Mothers' Performance and Total Quality Management

Total quality management have loads of policies, tools or method to be implemented in organization or in person. As stated above the repeatedly used policies is customer focus, total employee commitment and continual improvement. Total quality management can be defined as a commitment to achieve needs and continuous improvements. (Ooi, Arumugam, Teh and Chong, 2008). Total quality management can also be seen as a strategy to maintain competitive advantage and way to manage the organization to improve its overall performance and effectiveness towards achieving world-class status (Noor 2016; K, B, Ooi, 2007)

Pregnancy and new motherhood can be the source of deficiency or incompetence in the workplace that could harm this working mother career. Women's job performance has been determined as high as men's with coworkers' inconsiderate treatment of new mothers may exacerbate women's postpartum mental issues which in Brunei could lead to 'distress' or 'meroyan'. Working mother could face few challenges and biological challenges adapting to an environment as women who then switch to mothers that is postpartum pregnancy. This experience may be brought directly into the workplace, which may result to negative evaluations. (Heilman & Chen, 2005; Grandey, 2020; Ma, Wu,Yang & Xu, 2021)

Research Gap 4: Research were made mostly on qualitative data; mostly interviews and observation from working mothers. Researchers tend to only ask the working mothers instead of the superior. Researchers only see at the perception of the working mothers and not the whole organization perceptions on working mothers. Results may be seen as biased if only focus on the working mother and not the whole organization. Working mothers may said that their performance is good but the organization might not see eye to eye.

PROBLEM AND OBJECTIVES

Problems

Nowadays, there are numbers of mothers who are working, some are doing it because of the extra income, and some are doing it because they just "used to" working. Quoting Wilson (2006) *"many working women said they worked because they 'needed' the money and which they defined as specific material goods-an extra lesson, additional clothes, a vacation, furniture, owning a home, car or even just a television"* As a mother who are working, time management is very important. Working mothers have to be able to settle issue arising at office without affecting people at home, they must also know how to manage their time very well, for instance; getting the children ready for school, be back by lunch to prepare lunch and go back to work after lunch on time. Without proper management, mothers can easily feel distress hence affecting work performance. Process of motherhood also changes the ways she is perceived in society and her workplace, it can necessitate her to take more available leave option (Poduval, 2009)

Working mother has to keep convincing stance that she is working not just for her own substance but for the betterment of the family (Wilson, 2006). If total quality management to be implemented, will their performance improving or stay as is. 46.8% Bruneians are working with the public sector and in this percentage, 43.8% are women and out of this percentage only 9.1% are in the parliaments. (Fact Sheet, 2019). Similar to the fact that when a mother is trying to apply a position in an organization, the perception of interviewer will change automatically when the one who apply for the position is a mother. The question will then mostly focus on how the time will be managed between working and raising a child, is the mother still breastfeeding, and is there anyone taking care of the children at home, which can be seen as biased because question shifted from how they can perform which is the important thing to how are children at home. What are the policies that working mothers are provided with in order for them to maintain in the workforce as a working mother?

Objectives

This study reveals a selected case study with mother of 2, with primary objective of research to investigate and understand how the working environment as a mother is, were they able to take care of their family and at the same time perform well in their job. Working mother is an institution where one can combine both successful career as well as financial independence with effective motherhood raising child where both this job is very demanding and to do justice to each without neglecting the other is a very hard task (Poduval, 2009). Were they able to manage their time well? Were there any policies or method implemented in order for them to be able to manage their time very well. Is the organization support working mothers? Since working mothers multi task; work, house work and taking care of children, will their profession as a working mother affect their performance at work for instance, time management, quality of paperwork, delivery of paperwork in time.

Secondary objective is to identify and investigate what are the effect of performance of working mothers if total quality management were to be implemented in the organization or business. To investigate how are the performance of working mothers before and after the implementation of total quality management which support the primary objective of the paper.

METHODOLOGY

Data Collection

Data will be collected using qualitative method. Brunei Darussalam currently is facing second wave of Covid-19 and have restricted any activities outdoor which made it difficult to organize face-to-face interview with working mothers. However this study implement selected in-depth interview to find out perception on working mother over their performances.

Research Design

As this paper primarily concerned with interactions, perceptions and experiences rather applying the method on social groups, the study focusses to understand the opinions, experiences and concepts from previous researchers made on working mothers. Case studies if available, will be used to compare experience across different settings, different environments but focusses on the performance of working mothers primarily.

Research Size

Numbers of case studies, journal articles, books and other materials will be used as many to gather and compare information.

Analysis

Case studies were understood and read thoroughly to make comparison among them and analyze each study to come up with own conclusions.

Potential Challenges

The pitfalls in doing this research, researchers only focus on the performance of employee as a whole when it comes to implementation of total quality management. None are using it to only focus on working mothers but the employee as a whole.

LITERATURE REVIEW

Percentage of Working Mothers

In 2019, there were 76, 852, 000 women aged 16 above in the labor force, representing close to half of total labor force (47%) and women are recovering some job losses experience gaining majority of 64.6% in the labor force in June and July of 2020 in US. (Catalyst, 2020) Office for National Statistics (ONS) stated rise in number of employment rate among mothers from 1.2 mil in 1996 to 4.9 mil about 74% increase in England. (BBC news, 2017). Out of above percentage, 65% are mothers with children age 3 to 4. Reason for the increase in number might be due to flexible working practices and availability of policy provided by either the government or the company.

India has 60% working women in the agriculture industry that will be heavily impacted by job losses due to automation. In the workforce, there are only 19.9% women, and it was predicted that if women's labor force were to be increased by 10%, 770 billion may be added to India's GDP. (Catalyst, 2020) However, research done by Ashoka University stated that 70% of Indian women leave their jobs prior to giving birth and only 27% would consider rejoining the workface but 48% of them would drop out 4 months after rejoining the workforce. (Quint, 2018; Ashoka Bulletin, 2018)

More working mothers are in leadership roles at the office, says a survey by LinkedIn stated by Yuen in report on women at work. Malaysia has total labor force of 15.77 million in 2019, 6.18 million are women and about 46% are working mothers who are in the position of middle management and higher roles (Statistics Department Malaysia, 2019). Malaysian women were keen on jobs that offer good work life balance and job stability. The concern that these women have is very similar to the other working women from other countries which are the rising cost of living and the cost of raising family. This further explain how career and life goals are priority for them. (The Star, 2020)

As of Brunei Darussalam, specific percentage for working mothers are not available but the percentage of working women were specified in Department of Economic Planning and Statistics website. In 2018 there were 160,887 out of 442,400 (population as at 2018) that was 36.3% were women whereas in 2019 it increases to 170,675 out of 459,500 (population as at 2019) that was 37.1% by 0.8% only. Over the decade, Brunei has witnessed how female students outnumbered male student in pursuing higher education and continue to rise over years which cause the increase of female participation in workforce (Rabiah Rahman, 2017). Even with increasing numbers of women in the workforce, women still remain in the middle management whereas top level positions were dominant to the male. (Rabiah Rahman, 2017)

Total Quality Management

The history of Total Quality Management can be traced back to early 1920s. (Rajasekar and Aashirvad, 2020) Organizations have to turn to quality management in order to achieve excellent quality. Total quality management as explained by Mohaghar (1390) and Ahmadi (1391) is a method that assists organization to improve their performance by strengthening quality-based problem-solving that is to focus on employee teamwork and quality improvement hence satisfaction of the employee result in the improvement of their performance. (Parsamand, 2021) The core ideas of Total quality management were introduced in mid-1908s most notably by Juran, Deming, Crosby, Feigenbum and Ishikawa. (Joiner, 2007; Rajasaker and Ashirvad, 2020; Nasim, Sikander & Tian, 2019). Total quality management is an approach or practices that were used to improve performance and even continuous improvement. Total

Quality management can either be implemented on person or organizations. Total quality management is seen as a management system that consists of values, methodologies and tools which aim to improve customer satisfaction with reduced number of resources (Klefsjo, Wiklund and Edgeman, 2001).

Five cornerstones of Total Quality Management were introduced by using novel management Total Quality Management pyramid, where the principles are continuous improvement, participation, leadership, customer and employee focus, and focus on facts (Tausif & Haque, 2020). In this paper, Total Quality Management tools that will be used are policy management and problem solving in order to satisfy the working mothers hence improve working mothers' performance.

Reason why Total Quality Management have been very successful because it is structured and systematic and only use few efficient tools. (Klefsjo, Wiklund and Edgeman, 2001). This means that every value needed to be attended to especially from the commitment of top management, focus on process along with tools that allows the methodologies as such self-assessment and other to achieve successful Total Quality Management, (Hellsten & Klefsjo,2000).

There were few concepts in relates to Total Quality Management such as Deming (1986), Juran (1993), Crosby (1979), Feigenbaum (1991) and Ishikawa (1985). Deming which is created by William Edwards Deming by embracing certain principles of management, he stated that organization can improve quality and at the same time reduce costs; reduction of waste production, reducing staff attrition. Deming was basically focus on the practice of continuous improvement known as Deming Cycle. (Simplilearn, 2021)

Juran principles that was created by Joseph Juran focused on the importance of broad, organizational-level approach to quality which means that Total Quality Management basically begins from highest position and continues to the bottom position. Juran created the Pareto Principle where according to Juran 80% of organizations problems are caused by 20% of the causes. Jurans philosophy primarily focus on quality of end product. Juran developed cross functional management that is call The Juran Quality Trilogy that focusses on quality planning, control and improvement. Quality planning is creating awareness for improvements. Quality control is a process to create method to test the quality. Whilst, quality improvement is process that involves continuous drive for perfections. This is where problems are diagnosed to the root causes to develop solution (Simplilearn, 2021).

Crosby theory is created by Philip Bayard Crosby. His principle is all about doing it right the first time. Crosby theory define quality as full and perfect conformance to customers' requirement. Crosby defined the four absolutes of quality management. First absolute is quality is the conformance to requirement. Second absolute is the system of quality that is prevention. Third absolute is the zero defects of performance standard and final absolute is the measurement of quality is the price of non-conformance. (Simplilearn, 2021).

Armand V feigenbaum is an American quality specialist who devised concept of Total Quality Contol and the concept later became the foundation stone of the stream of Total Quality Manaegement. TQC is a system where quality development, maintenance, and improvements are effectively integrated to ensure production and services at the lower cost but giving higher customer satisfaction. (Shmula, 2019) Similar to other 3 concepts earlier, Feigenbaum also stressed on improvements and satisfactions. Ishikawa introduced quality circle and quality circle have been the essential part of Total Quality Management. While Juran principle stated that quality must be addressed from the top to bottom, Ishikawa believe that quality must be company-wide. Quality circles is when numbers of employees working in the same department meets regularly for e.g one hour every week only to identify and resolve problem in the work are by using seven basic quality tools. The seven basic quality tools are flow charts, scatter diagrams, pareto charts, histogram. Check sheets, cause and effect diagrams and lastly control charts. (Qualitygurus, 2018)

Working Mother

Mother is a person who have many tasks and responsibilities daily. In addition to as a working mother, the task and responsibilities are double and triple adding chores that are to be done at home e.g., getting food on the table, cleaning the house, laundry, getting children ready for school, helping kids with homework, or play time with the children as children really need extra attention from mother. Basically, working mothers are women who are working to earn income and at the same time raising and taking care of children or a family.

In Brunei, there are numbers of woman who are actually working mothers, although no statistics can prove this, but personal experiences, information from fellow friends and families really explained that there are numbers of working mothers in Brunei Darussalam. May it be because to earn income or simply because they used to do tasks and already attached to the organizations even before having baby. Because working mothers have loads of chores, these mothers tend to need extra help to take care of their children, some would ask help from family members, helpers/maid and even send their children to daycare. Working mothers would send their children to daycare in which paying daycare maybe much cheaper than to pay helper (maid).

Performance of woman in employment may be affected when they become working mothers. The transition back to work after birth of one's first child is often a pivotal moment in working mother's professional life as it sets the stage for how she will manage work-life integration for the next phase of career. (Ladge and Greenberg, 2015) Professional women who remain in the workforce following birth of their first child frequently face paradoxical biases because working mother may be perceived as cold-hearted (Cuddy, Fiske & Glick, 2004) and because of their status as working mother they may also be seen as less committed to their work. (Correll, Benard & paik, 2007)

Conflicts and dilemma may occur on the performance of working mother; first conflict is time-based conflict; where conflict occurs when time used to fulfil one role (work) and cannot be used to fulfil the other roles (home). (Asbari, Bernarto, Promono, Purwanto, Hidayat, Sopa, Utama Alamsyah, Senjaya and Fyzhall, 2020). Second conflict is strain-based conflict; when tension and emotions arise from one role making it difficult to fulfill the other roles for example, because the tension and emotions from home, these working mothers tend to feel demotivated and distress in order to finish her task. The third conflict is behavior-based conflict; when the expectations of one behavior is different from expectation from other role behavior, for e.g., career woman would have difficulty to adapt to new roles in which switching from career role to mother role. (Asbari, Bernarto, Promono, Purwanto, Hidayat, Sopa, Utama Alamsyah, Senjaya and Fyzhall, 2020). Dual-career face by this working mother causing them to occupy both work and family roles which could make them limit their performance on either role in order to focus on which roles are important and which roles need to be put first or as priority either career or family. (Ajala, E.M., 2017)

FINDINGS AND DISCUSSIONS: CASE STUDIES

1. Case Study from South West Nigeria of 1526 employed mother from all public universities in South West Nigeria. Questions comprises of job commitment, job satisfactions and organizational support in terms of Likert scale questions. Research explained that the working mothers in South-West Nigeria would show their commitment to work by trying to fulfill every requirement of the job despite feeling satisfied or even when these working mothers were not happy with their job. South-West Nigeria were provided numbers of supports for working mothers for instance; extended maternity leave, flexible starting and closing working hours and even lactation support to help this employee stay committed and stay satisfied. Some universities which failed to provide needed support stated above, working mothers tend to focus on the job and choose to discontinue breastfeeding or not returning to work at all. Thus, agreeing to job demands-resources model (JD-R) that illustrate how jobs performance were affected by wellbeing i.e. stress, working long hours and exhaustion (Bakker & Demerouti, 2007). In addition to that, due to the state of the economy of South West Nigeria, lack of job offer and the pressing need for financial up-keep for the family have made this working mothers to stay committed but not satisfied with their jobs even after supports provided by the public universities. (Alaba, Olagunju, Ngozi Carolina, 2019)
2. Case Study from India, similar to Nigeria were also discussing about the wellbeing of the working mothers. Source of tension of a working mother comes from both at home and workplace because attention have to be divided. Domestic responsibilities hinder women to concentrate on their work office. 410 working mothers were used as sample in this case study from various companies, banks. Schools and colleges (Vamana Baliga, 2017). Reasons why these mother join the workforce were a) to supplement the family income, b) to achieve economic independence c) to gain recognition in the society and d) pressure from family members. The main problem experienced by these working mother at home is to take care of their children and no cooperation from husbands and in-laws falls to second and third problem faced by mothers in India and over 66% actually feel overburdened due to their dual role. Out of 100%, 21.5% feel the need to leave their job due to feeling overburdened. Mothers in India only provided with social support and not much of policy management approach. These mothers tend to just do yoga and meditate in order to reduce their stress. Instead of asking for help from their family members, 27.3% sought help from domestic helpers and 5.4% sought help from their neighbors. (Vamana Baliga, 2017)
3. Research articles from Taiwanese semiconductor manufacturer, Company T, the first semiconductor manufacturer to provide lactation room and breast pumping breaks. About 998 valid questionnaires were collected or this study. Their study showed that initially, there were 66.9% mothers were breastfed their babies during 56 days of maternity leave and only 10.6% continued to breastfeed when returning to the workforce after their maternity leave. Despite having policies, aware of breastfeeding friendly workplace and provision of lactation room or even pumping breaks, only 10% mothers continued to breastfeed, employee who were employed for 10 or more years had the lowest continuation rate to breastfeed. (Chem. Wu and Chie, 2006). This points can be related to research gap no 2, where more researches needed to be done to understand working mother’s issues. In this case study stated that they offer breastfeeding-friendly workplace and breast pump break. While this really looks helpful for these working mothers but it is depending on the situation, for instance for shift working mothers for example the fab workers, they needed time to take off and put on the clean room suit and could take 15 minutes to travel from cleaning room and lactation room which

would be a hassle because the mother would rush to pump and get back to work where it shall be noted that pump breaks need to be done calmly as with stress it could affect the volume of breast milk. Thus maybe another reason why some working mothers stop breastfeeding. Breastfeeding is the most effective ways to ensure child health and survival infants are recommended to be breastfeed exclusively for 6 months. (WHO). International labour Organization recommends period of not less than 14 weeks for maternity leave and study stated that Taiwan only provide 8 weeks maternity leave.

4. Research made on working mothers in a Casino in Macao Shuang Liu (2020). Shuang Liu pressed on social support where social support has proven to have positive impacts on people's psychological and physical health. Social support involved with emotional support, through socio-emotional needs support, appraisal and support as well as assistance and these three components of social support were determined as affect, affirmation and aid by Kahn and Antonucci, (1980) and supported by Liu. (Shuang Liu 2020). Cohen and Wills suggested 4 types of support categories, emotional, informational, social companionship and instrumental support. Researchers then assume that TQM tools implementation of policy management will then fall under instrumental support or referred to as tangible aid and the other 3 types could be relate to problem solving. Macao case study applied in-depth interview to working mothers that feed the criteria of having at least one child and work full time on shift in Macao casino for at least one year. Therefore purposive sampling method was adopted and participant were not chosen randomly and investigation were explanatory.

Out of 24 participants only 21 were acceptable considering the time constraint. Out of 21, 15 interviews were conducted face-to-face while the remaining six were conducted via WeChat with average of 1 hr of interview. 76.2% types of job stress were work-family support, 57.1% expectation to be promoted and 28.6% due to management roles where few shared they had work interference with family issues. But from research made the longer the employee worked (over 10 years) in their current position the less stress they feel and some even said no stress at all. Instrumental support as in company policies provided by the casino were to allow swap of schedule among shift workers. Tuitions fees were paid by the company and privilege of selecting specific schedules to facilitate continuing education. But the main instrumental support they perceived were babysitting and these working mothers suggested the government and the company to operate 24h baby-sitting organization specifically for shift working parents. However the longer they work, the lesser stress they have because these working already know what to do and what to expect and how to solve certain problem and issues with their work or family related issues. This might be the answer to research gap 3 on why working mothers with child of age 5years above would be considered taken into the workforce, it is easier to take care of children age 5 years and above because these mothers will not be needing any breast-feeding workplace or breast-pump break.

5. 22 respondents were interviewed by Rabiah Rahman on case study of working women in Brunei Darussalam working in the government sector, one respondent stated that transition into the mother hood have slowed down her career progression. Similar to case study in Macao, social support has been very helpful to this working mothers. Most respondents did mention that after having children, it hindered these working mothers to progress in their career but over time with support from family and friends these working mothers able to purse higher career and at the same time care for their children and set an example to their children. These working claims that they could perform well in their job despite having children. Some of the respondents also mentioned that

> they even decided to hire domestic helper in order to help balance their dual roles as a mother and as an employee. And this strengthen the fact that working mothers would face difficulty initially, but over time they will be able to manage. Similar to above case studies, working with period of 10 years and above working mothers don't feel stress at all. *"She careers desire was that once her children were at the stage they could be independent, Farhana would be able to focus more on her career advancement"* (Rabiah Rahman, 2017)

More than half of the respondents actually have social supports in order to balance their dual role. Social supports would fall under TQM tools that is problem solving. To solve problem that were faced by these working mothers that was to balance their dual role; as mother and as an employee. Even though having children would hinder the advancement of their career but it is not forever, as child grow up they tend to able to continue advance the progression of their career. Rabiah only able to tackle working women in public sector due to time constraint, where she assumed that if research were widened to the whole labor force in Brunei, private sector in particular, the perception maybe different from public sector.

Total Quality Management Tool Adoptions

Problem Solving i.e., Job Satisfaction

Important of total quality management culture is enhanced through its employees' morale and work attitudes, however it has been found that total quality management have very important influence towards individual's job satisfactions which then result to healthier work environment. (Noor, 2016). Prior empirical research by Flynn (1994), Milen (1999) and other researchers has confirmed that the effective implementation of total quality management led to improvements in organizational performance, improved employee job satisfaction as well as lowering cost and improved productivity. (Flynn, 1994; Millen 1999; Anderson and Soal, 1999; Prajogo and Sohal, 2004; Ooi et al, 2007; Noor, 2016).

Problem solving may able to help solve some issues. Some working mothers are not satisfied with their job but have to do it in order to stay in workforce. Problem solving can be applied in order to satisfy this working mother in hopes that, solving any issues would improve their performance.

Policy Management i.e., Company or Government Policies to Support Working Mothers

Work-Family Support Policies can help reduce distress among working mothers. Work-family support policies are formal policies providing tangible support for employee's dependent care responsibilities and helping to manage family demands in the form of time, service, or financial benefits. (Ma, Wu, Yang and Xu (2021)

California (2004), New Jersey (2009), Rhode Island (2014) and New York (2018) are applying Paid Family Leave Policy, similar to Work-family support policies. To provide parents with time away from employment to care for newborn babies by supplementing their income. Brunei is providing maternity leave of 60 days to working mother in public sector to care for their newborn babies.

Child Care policy, In Brunei, when the mother is working, the grandparents and other non-working family members will fulfill the need for childcare. These non-working family members will take over the job of childcare when mother is at work. This is seen as important due to the readily available child support, they don't only understand that the working mothers is an important member of the family and provide necessary support for mother to be able to perform her dual role efficiently (Poduval and Poduval, 2009).

Reasons for Working Mothers to Join Workforce

1. Contribution to the Economy

The main reason for working mothers would be investment for, and contribution to the economy. Investment in early care and education plus stronger labor standards would have tremendous payoff (Low, 2018). Early childhood education can boost children's earning later in life, long-term analyses of economic advisers in US suggest that early childhood education can increase earnings in adulthood by 1.3 to 3.5 percent (Council of economic advisers of US, 2014). Developing of their children might contribute to future economic growth and revenue, referring to vision of Brunei 2035 (Wawasan 2035) that is to have highly skilled population that conform to the highest international standard, with starting to invest in the education of children at an early age may help to achieve 2035 vision hence contribute to the economy.

"Menjelang tahun 2035, Negara Brunei Darussalam berhasrat untuk menjadi sebuah negara yang terkenal di seluruh dunia dengan pencapaian penduduknya yang berpengetahuan dan berkemahiran tinggi yang mengikut piawaian antarabangsa yang tertinggi; kualiti kehidupan yang tertinggi termasuk antara 10 negara teratas di dunia; dan ekonomi yang dinamik dan berdayatahan di antara 10 negara teratas dari segi Keluaran Dalam Negeri Kasar (KDNK) Per Kapita." His Majesty Titah

"By 2035, Brunei Darussalam aspires to be a world-renowned nation with the achievements of its highly knowledgeable and skilled population that conforms to the highest international standards; the highest quality of life including among the top 10 countries in the world; and a dynamic and empowered economy among the top 10 countries in terms of Gross Domestic Product (GDP) Per Capita."

2. Cost of Living

The second reason why mothers are working is because the cost of living. The main reason would be because of the higher standard of living, thus if only supported by family with lower income will be seen as a burden. (Handayani, Dhyah and Primaningrum, 2019). Instead of as single-income family, it is double-income family. (Ajiboye 2008; Ajala; 2016). The cost of living in Brunei have increased over period of time. With the pandemic of Covid-19 currently affecting the world, cost of foods and beverages have increased drastically which forces mothers to earn extra income may it be at work or from home.

3. Savings

Third reason would be savings for future use, education for instance. As a mother of 2 who are currently taking PhD, the journey to reach to higher level of education is not cheap and quite expensive. There are fees that needs to be settled, books that needs to be purchased, online sources that needed to be purchased and some can be downloaded for free, even though it is for free still with the availability of laptops or notebooks could cost a lot. This can be the main reason for mothers to be working too. Savings for future use can also be for different necessities for instance, car maintenance, unexpected car repairs, insurance and road tax expires, unexpected events (funeral, recital and ceremonies). Basically, with savings, it can help protects from any financial emergency, paying large purchases avoiding debt (i.e., marriage without the need to make loan), reduce financial stress (i.e., child care, needs of medical attention immediately and extra funds; operation), leave financial legacy and greater sense of financial freedom. (Be the budget, 2018)

4. Role Model

Forth reason would be being working mother can be role model and help set their children's mind on how their life would be when they are an adult. Having both parents as income earner, making it is easier to understand why having job and earning income is very important. Mothers would be a positive role model for their children. Educated working mothers is under the influence of heavy responsibilities that is related to maternal stress, it is the responsibility of mothers to educate her children according to the requirement of economic and social needs. (Ara, 2012).

Educated working women tend to have a good social exposure has rich experience of modern trends and know how to keep balance between her job and family. Mothers help shape the manners, etiquettes and the behavior of their children. Interviews and observation made by Ara have concluded that working mothers are healthier and less depressive than non-working mothers and better shape their children education and behavior than non-working mothers. (Ara, 2012)

5. Cost of Child Care

Fifth reason is cost of child care. In Brunei, government hospital bills are not that much of a problem since for children age below 12, parents would not have to pay for admission and medicines, even if they have to, the cost would only be as low as BND1. Some parents would prefer to bring their children to private clinics, the awaiting hours for government clinic is very long comparing to private clinic. Imagine having sick son during working hours, mothers have to take half day unpaid leave or full day unpaid leave; in case of private sector. Unpaid leave then results in lesser income to receive at the end of the month. If their children have more than 6-7 appointment in a week, mothers have to ask for more leaves and job security can be at risk (Poduval and Poduval, 2009) and lesser salary. Hence to reduce awaiting time, parents would go to private clinic which will cost them 30 times than the government charges. This may be another reason why mothers are working, to pay for faster consultation that would not take much of their time since time management is very important for working mothers, if 1 child would cost BND 30, imagine having twins for checkups.

6. Settlements and Debts

Sixth reason would be because of settlement of hire purchase, loans, debts or mortgages. When husband cannot fully settle debt, it may be the reason why mothers are working in order to help the spouse settle their debts. As a wife, it is an obligation to help husband who might be working but only with minimal income to support the entire family. Insufficient funds and savings, and paying off current loans or debts make it difficult to secure their finances for the future. (The Star, 2020)

Controversies

Breastfeeding-Friendly Workplace

Few organization in Taiwan are doing breastfeeding-friendly workplace according to Chen, Wu and Chie in their research, in order for their employee to feel at ease and not feeling the pressure to have to come home early to their babies which could affect this working mother performance. This working mother would lose focus hence resulting negative working atmosphere which could force the mother to choose between leaving the job and taking care of their babies. (Chen, Wu, Chie, 2006). It seems that Taiwan is applying tools of total quality management that are problem solving and policy management. The organization is trying to satisfy this working mother needs in order to achieve better performance at the same time applying policy that could help mothers to breastfeed their infants. Few public and private sectors in Brunei are applying this policy but we found out that there are still few mothers who have to go out and pump in their car because such space is not provided.

Unpaid Leave

Unlike Taiwan, U.S did not satisfy the need of this working mothers. Their performance was heavily affected by the fact that their maternity leave were unpaid and also very short maternity leave which then causing 40% of expectant mother ended up leaving jobs. It shall be noted that this level act of 1993 (unpaid maternity and short leave) is required for every organization with 50 or more workers. (Ma, Wu, Yang, Xu, 2021). Public sectors in Brunei are giving a minimal 60 days of maternity leave, private sectors maternity leave is mostly depending to the company itself, even though some of the private sectors are giving minimal 60 days leave, it would cost them lots of money due to replacement.

Dual Role

Most jobs in organization involve both gender. This gender-neutral employment have made working mother to join the workforce for instance; Nigerian industrial setting. With the increase of working mothers in the organization, organization were forced to take into consideration focal point of adult life; work and family (Ajala, E.M, 2017). Dual role is seen as conflicts that are related to outcomes such as job dissatisfaction, job boredom, low turnover rates and psychological distress. Female labor participation has also increases due to educational improvement in Nigeria, shifting from single-income family to a double-income family. (Ajiboye 2008; Ajala; 2016). Similar to Taiwan, labor legislation in South Africa has supported the involvement of women in the workforce by introducing equity of laws and paid maternity leave with intention to lure working mothers to join the workforce even after having children. Exploratory survey design of questionnaires made by Patel, Govender, Paruk and Ramgoon on 123 working mothers in Durban, South Africa have proven that performance of working mother was not heavily affected by dual roles. These researchers stated that there was no effect on performance in relates to family-work conflict. (Patel, Govender, Paruk and Ramgoon, 2006)

Managerial Implications

Findings of this research provide 2 managerial implications. First implication, even with all policies implemented by the company or the organization, not all mothers would feel satisfied and boost their performance. Their concern over performing well over taking care of their child are pretty much a concern.

Second implication, supports are not always from the company or organization, self-empowerment would really help these working mothers to reduce their stress and focus on their performance hence increase job satisfaction on top of that, mothers can feel positive and confidence in whatever they do.

Third implication, policy that are related to self-empowerment. Instead of letting these working mothers to find the time to meditate or yoga at free time, company should organize once a week or once a month program for self-empowerment. For instance, yoga organizes by the company or weekly Zumba every morning to actually help this mother reduce their stress.

CONCLUSION

Total Quality Management have given positive impact to the organization and to the human resource. Researchers from above case studies have proven that applying Total Quality Management tools; policy management and problem solving have made performance of working mothers to remain as it was before having babies but not balance with the ability to caring for child 100%, for instance breastfeeding less than 6 months which according to WHO breastfeeding can actually help with the development of a child physically and mentally. Future research will focus on the working mother's community in Brunei Darussalam, to investigate what the policies are provided for working mothers. Does these working mother able to balance their performance with caring for their infants with all policies implemented?

RECOMMENDATIONS

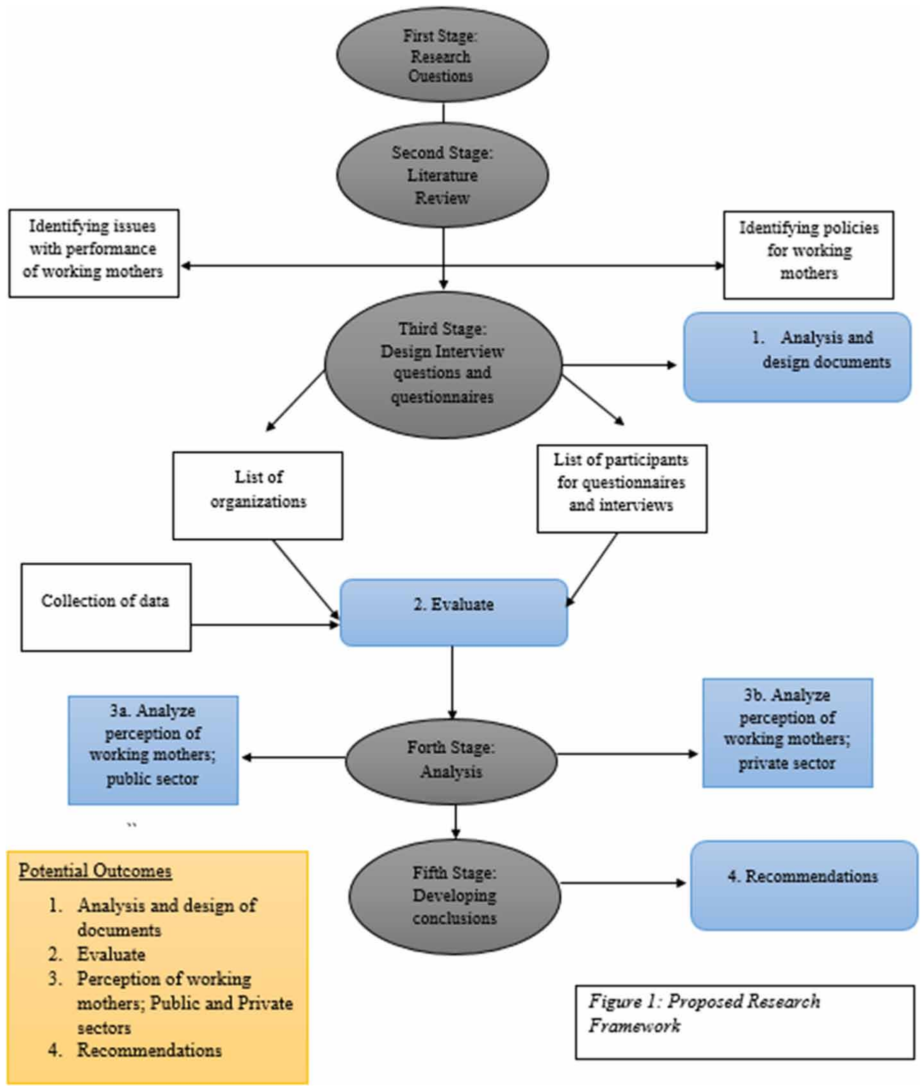
Policies and leniency of organization to working mothers have proven to boost the performance of working mothers at home and at work in the perception of researchers from years before.

Recommendation 1 would be to apply any "light" rules and regulation for organization to company that did not support breastfeeding friendly workplace or breast-pump break or not applying any policy that could help these working mothers to boost their performance even after maternity leave.

Recommendations 2 would be to further focus on this community and further understand the perceptions and for this working mother's community currently, for instance how have the pandemic that the world is currently having actually affect their work. Were this working mothers on the top of the list for downsizing? Or were they happy to be doing work at home? Or was it very difficult to focus when kids are around when you have zoom meeting?

Recommendation 3 would be to Instead of applying qualitative method, quantitative method will be used to tackle working mothers in Brunei Darussalam working in private and public sector specifically. To understand how working mothers in Brunei were being treated and do this working mother feel satisfied with everything that were provided to them.

Figure 1.



FUTURE RESEARCH DIRECTIONS

Framework is a basic structure, or structural that explains sets of ideas and facts. Purpose of this proposed framework is to further clearly illustrate research plan and making it easier for researcher to formulate research questions, relevant issues and gaps as well as solutions and recommendations to address the issues and gaps available for this research. (VanBaren, 2017)

First stage is coming up with research question. To find problems or issues that can be addressed and investigated. Employee performance have always been the topic of researches but researchers mainly focus on all levels of employee and not specifically working mothers. When it comes to working mothers, researchers would focus on the child development, child care and mentality of working mothers and only few discuss on post-labor working performance. With research question, come the second stage of reading literature review in relates to Total Quality Management and performance of working mother pre and post labor.

With more literature review, further issues for working mothers and policies implemented for working mothers will be seen. Interview questions and questionnaire will then be drafted as the third stage in the research framework in hopes to answer questions which solution will then be provided from the analysis of interview questions. After designing the interview questions and surveys, then will prepare the list of participating organizations and also participants that will be used for this research. From this participant's responses then we will proceed to forth stage, evaluate the results from the responses that will be provided by participants.

After evaluating the analyses will take place, analysis will be divided into two; (a) and (b). (a) Will be from the response of working mothers from public sector and (b) will be from the response of working mother from private sector. Then the analysis will be concluded in the fifth stage to see the difference of working mother performance from the perception of working mothers from both sector and not only from the working mother perspective but also the higher level of the organizations which are the superior of these working mother. To further see whether they agree that working mother's performance improve due to the implementation of Total Quality management with mediator policies provided by the organization for working mothers. Recommendation will be provided after conclusion and analysis have been made from the perception of working mothers from public and private sector as well as the superior of these working mothers. Potential outcomes from this framework would be (1) analysis and design of documentation (2) Evaluation (3) Perception of working mothers from public and private sector (4) recommendations from evaluation, analysis and conclusion of questionnaires and interviews from working mothers who work in private and public sector in Brunei Darussalam.

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Chapter 11
Factors Affecting Customer Intentions Toward AI-Made Music:
A Study With University Students in Japan

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ABSTRACT

The purpose of this chapter was to develop and verify a theoretical model to understand the ways that potential customers perceive and act toward AI-made products. The author began the chapter with a review of the existing literature to extract the most fundamental elements, both internal and external to the customers, which can affect their perceptions and behaviours. From there, the author proposed and tested a theoretical model that can explain customer attitudes toward a new type of music: AI-made music. Using data gathered from a young customer sample (n = 219) in Japan, the author found that perceived product/service attributes and customers' personal characteristics had significant impacts on customer purchase intentions, while perceived seller attributes and environment characteristics had not. These findings helped expand the literature on customer attitudes by introducing and investigating an aggregated model on the one hand. They also provided practical support for the commercialization of the AI-made products industry in the future on the other.

INTRODUCTION

Artificial intelligence (AI) is a computer system with the "ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation" (Kaplan & Haenlein, 2019). First created in 1954 (Lungarella, Iida, Bongard, & Pfeifer, 2007; Pan, 2016), generations of AI have been employed in certain industries and life sectors for several decades, for example, in agriculture, engineering, medicine and health care, telecommunications, and transportation, among others (Afan, El-shafie, Mohtar, & Yaseen, 2016; Hamet & Tremblay, 2017; Jung,

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et al., 2021; Liu, Yang, Zio, & Chen, 2018; Mata, et al., 2018; Vaishya, Javaid, Khan, & Haleem, 2020). Today, AI is even creating its own products, such as music and paintings (Hong, Peng, & Williams, 2020; Starkey, Steenhauer, & Caven, 2020). In the near future, the amounts of products created by AI, especially virtual products, will undoubtedly increase. At the same time, the size of the AI-made products market will also expand. Academic research on customer perceptions of and intentions concerning such products, therefore, is especially necessary at this early stage.

To understand customer perceptions and behaviours (or their attitudes; Breckler, 1984), many theories have been proposed and tested. For example, Ajzen (1991) initiated the planned behaviour theory, which takes into account customers' beliefs, perceived subjective norms, and behavioural control. Arnould and Thompson (2005) and Askegaard and Linnet (2011), through the consumer culture theory, added socio-cultural elements of the marketplace. From a different perspective, Sharma, Markon, and Clark (2014) mentioned the impulsive behaviour theory, which explains consumers' behaviours by their situational emotions. In addition, Kim and Lennon (2013) and Sirgy (1985), with the self-congruity theory and the stimulus-organism-response theory, suggested that the characteristics of the sellers and their products or services also have important influences on customers' attitudes. These theories and their theoretical elements, interestingly, seem to be able to explain consumers' perceptions of and behaviours toward certain virtual man-made products, such as game characters, avatar clothing, weapons, furniture, currencies, and tokens (Hamari & Keronen, 2017). However, the factors that might be important for customers' perceptions of and behaviours toward AI-made products still remain largely unknown.

The purpose of the study reported in this chapter is to develop and verify a theoretical model to understand the ways that potential customers perceive and act toward AI-made products. The author begins the chapter with a review of the existing literature to extract the most fundamental elements, both internal and external to the customers, which can affect their perceptions and behaviours. From there, the author will propose and test a theoretical model that can explain customer attitudes toward a new type of music: AI-made music. These efforts will expand the literature on customer attitudes by introducing and investigating an aggregated model on the one hand. The findings will also provide practical support for the commercialization of the AI-made products industry in the future on the other.

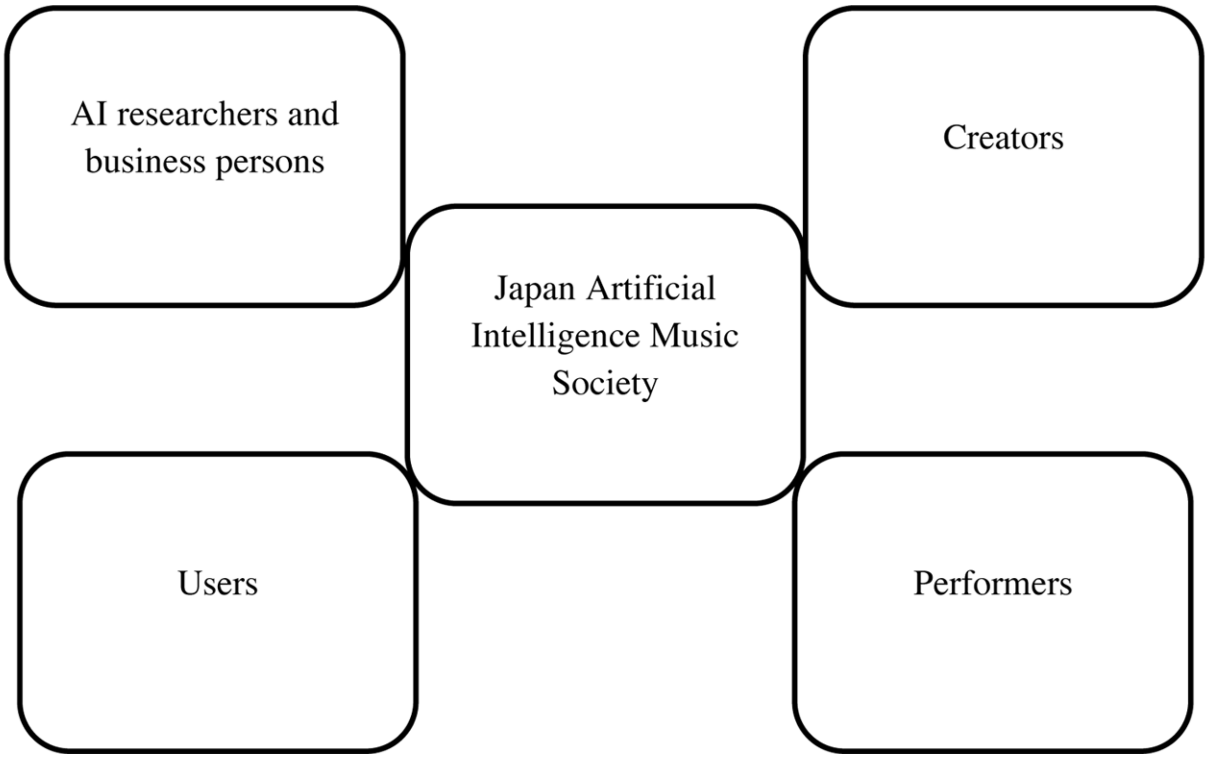
The setting of this study is Japan. As one of the world leading economies, Japan is also a forerunner in the AI industry (Lu, Li, Chen, Kim, & Serikawa, 2018). Robotic and AI technologies will take an even more significant role in the future in Japan due to its serious depopulation circumstances (Master Blaster, 2021). AI-made products, therefore, may find a suitable market in this country. Among the currently available products, AI-produced music has become quite popular in recent years (Sakai & Tomoshige, 2019). The Japan Artificial Intelligence Music Society was even established in 2017 to consolidate the separate operations of AI-linked music creators, performers, users, researchers and business persons (Figure 1). The examination of customers' attitudes toward AI-made music in Japan's setting is, therefore, appropriate.

LITERATURE REVIEW

Major Factors Affecting Customer Perceptions and Behaviours

A review of the existing theories (Ajzen, 1991; Arnould & Thompson, 2005; Askegaard & Linnet, 2011; Kim & Lennon; 2013; Sharma, Markon, & Clark, 2014) suggests that four major elements must

Figure 1. Japan artificial intelligence music society
Source. Author's synthesis



be taken into account when investigating customer perceptions and behaviours (customer attitudes): product/service attributes, seller attributes, environmental characteristics, and personal characteristics. The following subsections will briefly explain these elements.

Product/Service Attributes

Customers buy a product because its attributes suit or can meet their needs. There are sensory product attributes which customers use their five senses to perceive and evaluate, such as design, colour, smell, and taste (Cho, Bonn, & Kang, 2014; Park, Kim, Funches, & Foxx, 2012). There are also functional cognitive attributes which require customers to employ their logical thinking abilities to identify and assess, such as options, prices, product information, innovativeness, ownership, and possession (Hwang, Lee, & Kim, 2019; Lee & Yun, 2015; Park, Kim, Funches, & Foxx, 2012; Watkins, Denegri-Knott, & Molesworth, 2016; Zhou, Leenders, & Cong, 2018). In addition, customers will consider certain psychological cognitive attributes from a non-functional approach, for example, country of origin, product personality, and product naturalness (Berry, Burton, & Howlett, 2017; Guido, Prete, Peluso, Maloumby-Baka, & Buffa, 2010; Wang, Li, Barnes, & Ahn, 2012). However, while almost all the sensory attributes will vary among products, certain functional and psychological attributes may be shared across products.

Seller Attributes

Similar to a product, a seller and its distribution outlets (real or virtual) are also attached to certain attributes. In a sense, the stores or websites will be evaluated through their sensory, functional, and psychological attributes, such as design, staff, usability, atmosphere, convenience, and risk or safety (Badrinarayanan, Becerra, & Madhavaram, 2014; Johnson, Kim, Mun, & Lee, 2015). In another sense, the sellers, their representatives (e.g., celebrity endorsers), and probably their competitors, are mainly assessed by their psychological attributes, for example, ethics, social responsibility, trustworthiness, personality, and image congruence (Limbu, Wolf, & Lunsford, 2012; Mishra, Roy, & Bailey, 2015; Schramm-Klein, Zentes, Steinmann, Swoboda, & Morschett, 2016). The evaluations of these attributes are, undoubtedly, also important for customer attitudes. When there are changes in product and seller attributes (e.g., change of product or store functions or design, or change of celebrity representatives), changes in customer attitudes can also be expected.

Environmental Characteristics

From another perspective, characteristics of the business environment will also affect consumer perceptions and behaviours. Specifically, political conflicts and instability may worsen consumer perception of certain products, and weaken their purchase intentions (Alvarez & Campo, 2014; Newman & Bartels, 2011). In addition, a naturally occurring event may serve as a distinguishing point between customers' pre- and post-disaster consumption attitudes (Frank & Schvaneveldt, 2016; Sneath, Lacey, & Kennett-Hensel, 2009). Moreover, the overall macroeconomic and sociodemographic conditions of a country will certainly have impacts on its residents' consumption modes (Kinugasa & Yamaguchi, 2013; Magueta, Madaleno, Dias, & Meireles, 2018). The development of technology will also bring new opportunities for consumers (Hamari, Sjöklint, & Ukkonen, 2016; Zhang, et al., 2018). Finally, but not least, social norms, which are directed by the historical, cultural and traditional heritages of a given business setting, such as a country or a region, particularly influence consumers' perceptions and behaviours (James, Hu, & Leonce, 2019; Judge, Warren-Myers, & Paladino, 2019). Social norms, as an element of the planned behaviour theory (Ajzen, 1991), have been used in the examination of consumer attitudes for over three decades. However, the tendency to conform to widely accepted social norms is not the only influencer of consumer attitudes. On the other hand, the tendency to resist such norms is another important influencing factor (Kates & Belk, 2001; Ozanne, Hill, & Wright, 1998).

Conversely, customers are actively aware of certain external issues of the business environment, such as sustainable development, greenness, fair consumption, and peer customers (Hu, Huang, Zhong, Davison, & Zhao, 2016; Konuk, 2019; Kumar, Manrai, & Manrai, 2017; Panda, et al., 2020). With the virtual environment in particular, customers also care about their virtual presence (telepresence), interaction, and co-creation, among other things (Cowan & Ketron, 2019; Schnack, Wright, & Holdershaw, 2019). The awareness of the abovementioned issues will affect customer attitude toward the consumption of certain products or services. However, it should be noted that the characteristics of the environment are subject to change, and thus is customer attitude.

Personal Characteristics

From a personal standpoint, many characteristics associated with the customers may also affect their attitude toward consumption. On the most basic level, personal demographic information, such as age, biological sex, education, income and experience, can differentiate certain customer segments (Sánchez, López-Mosquera, & Lera-López, 2016; Zhao, et al., 2016).

On the cognitive level, personal values will have important impacts on customer perceptions and behaviours (Vieira, Santini, & Araujo, 2018; Wu & Yang, 2018). Among the value categories, utilitarian values are those involving the practical functions of a product or service, such as usability and monetary value. In addition, hedonic values are those related to the positive feelings that customers may have when using or encountering a product or service, for example, convenience and enjoyment. Moreover, symbolic values are those that explain other significant features besides the abovementioned thoughts and feelings, for instance, social reputation and position. These values may serve as the motivators or drivers of customers' behaviours.

On the affective level, customers' emotions at the time of consideration or purchase may also influence their attitude toward consumption (Peltier, Visalli, & Thomas, 2019; Wardy, et al., 2018). It should be noted that there seems to be some similarity or overlap between hedonic values and emotions. However, they are two different concepts. Specifically, the former are the feelings that a customer expects from a product or service, while the latter are the feelings that he/she has during the consideration and purchase process.

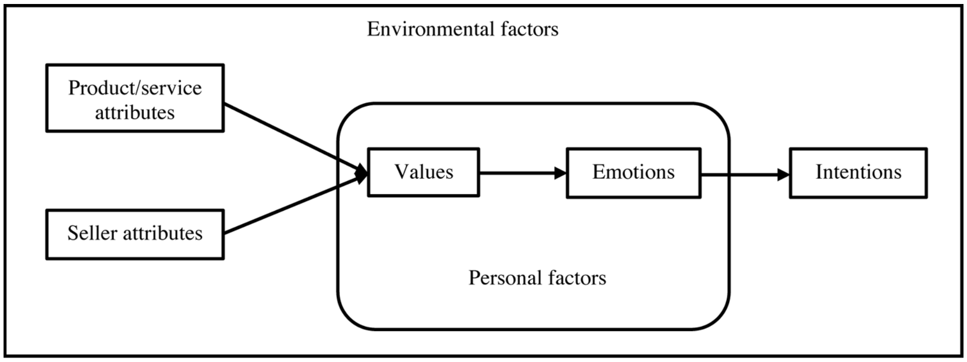
Finally, but not least, on the psychological level, customers' personality traits will also influence the ways they perceive and behave toward products and services (Huang, Cheng, Huang, & Teng, 2018; Islam, Rahman, & Hollebeek, 2017). The combination of all of the abovementioned personal elements (basic, cognitive, affective, and psychological) will definitely define customers' perceptions and behaviours. However, this process is very complicated and subjective, and will not remain constantly stable and static.

The Development of a New Theoretical Model

The review of the literature has revealed that there are too many factors that can affect consumer's perceptions and behaviours, or customer attitudes (Breckler, 1984). A complete theoretical model explaining customer attitudes, therefore, can never be formed and tested. However, four fundamental elements must be taken into account in this examination: product attributes (P), seller attributes (S), environmental conditions (E), and consumer characteristics (C). Based on this observation, a new theoretical mode, the PSEC model, is proposed as the framework to better understand consumer attitudes.

The PSEC model, to some extents, can help explain certain aspects of consumer perceptions and behaviours, or customer attitudes (Figure 2). However, the order of the four elements is indefinite. The order, and probably the components, may change according to each product or service, each seller, each business setting, and each customer. For example, in the consideration stage and with inexperienced customers, perceived product attributes may affect the perceived values. Nevertheless, in the post-consumption stage or with seasoned customers, perceived values may influence the way product attributes are evaluated. In addition, one component may be regarded from more than one perspective. For example, innovativeness may be treated as a functional cognitive attribute of a product or a seller, in a sense. In another sense, innovativeness may also be considered as a psychological trait of a customer.

Figure 2. The product – seller – environment – consumer (PSEC) model
Source. Author's synthesis



AI's Applications and AI-Made Products

Despite its rather short history, AI has been rapidly developed and employed in a variety of fields (Makridakis, 2017). In the 1990s, neural net devices and robots could be able to read handwritten digits, navigate, and talk on their owns. In the 2000s, robots were used to serve in restaurants. In the 2010s, computers could defeat human chess players. In the 2020s, cars could self-drive. During the current COVID-19 pandemic, AI is used for early detection and diagnosis of infections, development of drugs and vaccines, and reduction of health care workers' workload (Vaishya, Javaid, Khan, & Haleem, 2020).

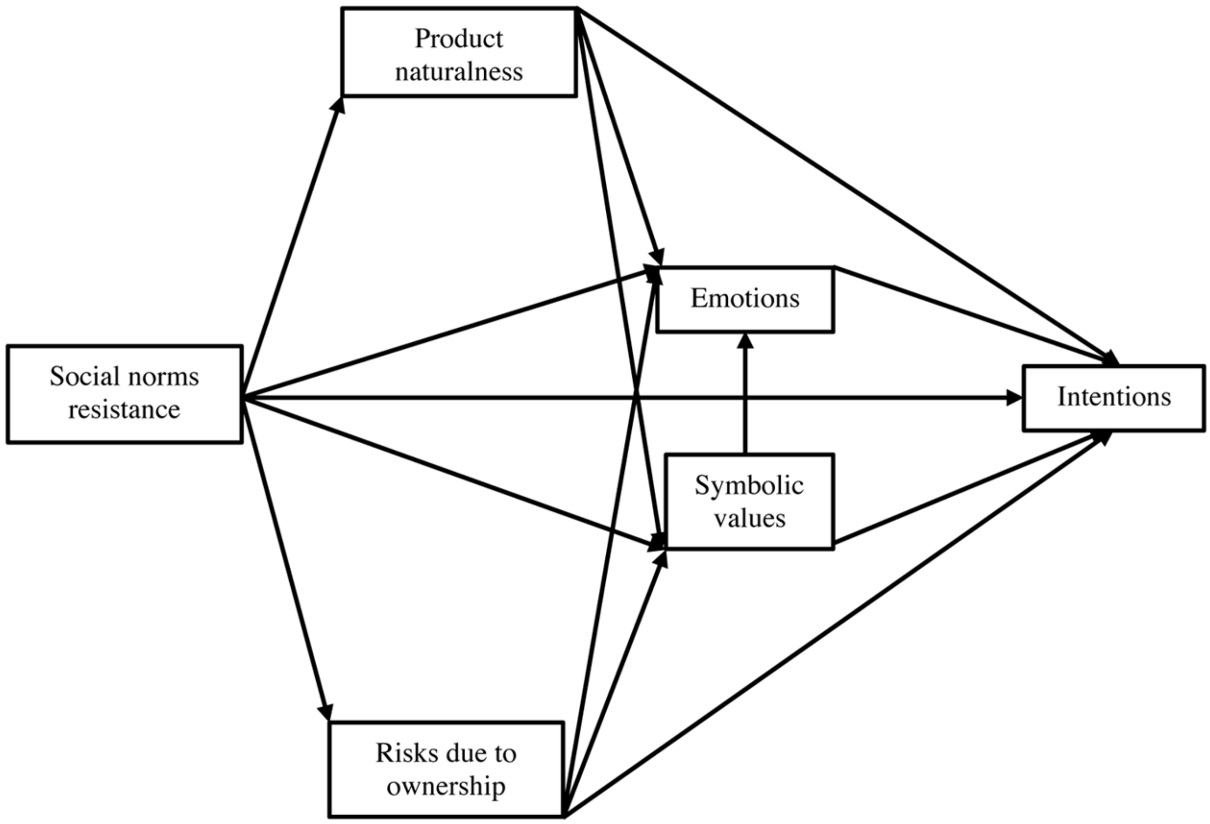
AI programs, thus, have been widely adopted as effective assistants of human workers, from both the cognitive and affective approaches (Huang, Rust, & Maksimovic, 2019). However, certain AI programs can do more than that. For example, in the music industry, AI has been able to compose and perform music, as well as to process digital sound since the 1970s-1980s (Roads, 1985). To some people, AI can even establish higher standards for recordings, and thus, devalue aesthetic human labour (Sterne & Razlogova, 2019). Others encourage the use of AI in music education, too (Shang, 2019). In the retail sector, AI can choose the correct piece of instore music based on facial recognition to make significant influences on customers' perceptions and behaviours (Rodgers, Yeung, Odindo, & Degbey, 2021). The intelligence of AI will definitely equal or even exceed that of human beings in a near future (Makridakis, 2017).

The PSEC Model for AI-Made Music

AI-made products, in general, and AI-made music, in particular, are not man-made products. Consequently, the unconventionality of these products can undoubtedly affect customers' perceptions and behaviours. Under this condition, a specific theoretical model is proposed in this study (Figure 3). The PSEC elements were selected considering their relative relevance to AI-made products. This selection, however, was not exhausted given the limited research resources and the feasibility of a complete model.

The first element of the PSEC model applying to AI-made music is product naturalness (P). Theoretically, certain customers have "the tendency to prefer natural things to otherwise equivalent unnatural alternatives" (Li & Chapman, 2012, p. 2859). Since AI-made music is not man-made, it may be considered as unnatural by many customers at the beginning. It should be noted that perceived naturalness or

Figure 3. Theoretical model
Source. Author's synthesis



unnaturalness can have significant effects on customers' perceived values, especially the symbolic values (Binninger, 2017; Li & Chapman, 2012), positive and negative emotions (Machado, de Carvalho, Torres, & Costa, 2015; Susini, Misdariis, Lemaitre, & Houix, 2012), and behavioural intentions, including purchase and recommendation intentions (Binninger, 2017; Román, Sánchez-Siles, & Siegrist, 2017).

The second element of the PSEC model in the AI setting is product ownership of the seller (S). From a legal standpoint, the ownership of an AI-made product belongs to the owners of the AI (Güner, 2019). However, when it comes to damages, failures or copyright, who should be the bearers of the responsibilities is still a controversial issue. From a psychological standpoint, the ambiguity of ownership of AI-made products can be considered as a risk factor. Perceived risks, in general, can significantly affect perceived values (Chiu, Wang, Fang, & Huang, 2014; de Groot, Steg, & Poortinga, 2013), emotions (Ruiz-Mafe, Tronch, & Sanz-Blas, 2016; Yüksel & Yüksel, 2007), and behavioural intentions (Chen & Chang, 2012; Kim & Lennon, 2013).

The third and fourth elements of the AI-directed PSEC model are customers' perceived values and emotions (C). It has been established through previous studies that perceived values can generate emotions in certain circumstances, and both perceived values and emotions can influence customers' behavioural intentions in almost all cases (Agost & Vergara, 2014; Ladhari & Tchetgna, 2017; Xie & Bagozzi, 2014). With AI-made music, similar relationships can be expected to be established.

Table 1. The hypotheses

Hypothesis	Content	References
H1	Intentions toward AI-made products are significantly affected by a combination of customers' social norms resistance tendencies, perceived product naturalness, perceived ownership risks, perceived symbolic values, and emotions.	Agost and Vergara (2014), Binninger (2017), Chen and Chang (2012), Factor, Kawachi, and Williams (2011), Haslam and Reicher (2012), Kim and Lennon (2013), Ladhari and Tchetgna (2017), Román, Sánchez-Siles, and Siegrist (2017)
H2	Emotions toward AI-made products are significantly affected by a combination of customers' social norms resistance tendencies, perceived product naturalness, perceived ownership risks, and perceived symbolic values.	Machado, de Carvalho, Torres, and Costa (2015), Ruiz-Mafe, Tronch, and Sanz-Blas (2016), Susini, Misdariis, Lemaitre, and Houix (2012), Turgut, Michel, Rothenhöfer, and Sonntag (2016)
H3	Perceived symbolic values of AI-made products are significantly affected by a combination of customers' social norms resistance tendencies, perceived product naturalness, and perceived ownership risks.	Binninger (2017), Chiu, Wang, Fang, and Huang (2014), de Groot, Steg, and Poortinga (2013), Li and Chapman (2012), Oreg, et al. (2008)
H4	Perceived naturalness, and perceived ownership risks of AI-made products are significantly affected by customers' social norms resistance tendencies.	Caldwell and Darling (1999), Pfeifer, et al. (2011)

Finally, the sixth element of the AI-linked PSEC model is an environmental one (E): social norms resistance. Since AI-made music is an unconventional product, customers may need a certain degree of social norm resistance to initially accept it. Unfortunately, direct observations of the effects of social norms resistance tendencies are still lacking. However, several related observations may help explain its role. For example, social resistance, in a general sense, can influence a – usually minor – group's perceptions, and their – usually challenging – behaviours (Factor, Kawachi, & Williams, 2011; Haslam & Reicher, 2012; Lee, Kim, & Wainwright, 2010). In addition, peer resistance can have impacts on adolescents' perception, emotions, and behaviours (Caldwell & Darling, 1999; Pfeifer, et al., 2011). Moreover, change resistance, in a dispositional approach, has a significant correlation with both values and emotions (Oreg, et al., 2008; Turgut, Michel, Rothenhöfer, & Sonntag, 2016). Based on these pieces of evidence, it is reasonable to assume that social norms resistance tendencies may affect potential customers' perceptions of and behaviours toward AI-made music.

METHOD

Hypotheses and Japan's Setting

In this study, the following hypotheses (H) were proposed and tested to verify the PSEC model for AI-made music (Table 1). Japan was selected as the setting of this study.

In Japan, AI is being employed in a variety of sectors, such as arts, automobile and health care (Ahmed, 2020; Hatani, 2020; Kobayashi, Ishibashi, & Kobayashi, 2019). AI, in particular, and the advancement of technologies, in general, have help to create a comfortable living and working environment for people in Japan. However, although it is an early participant in the AI sector, the country is now lagging behind other large economies, such as the US and China, in making and using AI technologies (Hatani, 2020). One of the reasons of this slowness is attributed to the strict regulation regarding the use of big data of the Japanese government (Fujii & Managi, 2018). In addition, customers in Japan seem to be reluctant to accept AI and its applications for concern over AI's effects on their emotional perceptions and behaviours (Ghotbi, Ho, & Mantello, 2021). The current study on customer attitudes toward AI-made music will provide more knowledge about this market to assist the development and diffusion of AI technologies in Japan in the future.

A quantitative method was adopted to achieve the purpose of this study. In addition, a young consumer population (university students) was chosen as the target market due to the novelty and innovativeness of the product (Noh, Runyan, & Mosier, 2014; Rašković, Ding, Škare, Došen, & Žabkar, 2016).

Questionnaire

A structured questionnaire was developed to gather data from the potential customers of AI-created music in Japan. It includes the followings constructs.

Social norms resistance tendency. A social norms scale was originally developed by Momose and Asahara (1996) for Japanese society. The equivalent English version appeared in Asahara, Momose, Murashima, Okubo, and Magilvy (2001). The twelve selected items were measured on a five-point scale, ranging from "disagree" to "agree." To capture the resistance tendencies, the reversed scores of the answers were used.

Symbolic Values: Three items were developed from the original scale created by Kanno (2004). These items were also evaluated on a five-point scale, ranging from "disagree" to "agree."

Emotions: The emotion scale generated by Ogawa, Monchi, Kikuya, and Suzuki (2000) for the Japanese context was employed to evaluate this construct. This scale measured eight positive emotions on a five-point scale, ranging from "I don't feel it at all" to "I feel it a lot."

Naturalness and Ownership Risks: Two items were specifically created by the researcher with reference to the literature (Chiu, Wang, Fang, & Huang, 2014; Li & Chapman, 2012) to capture the perceived naturalness and ownership risks. Each of them was evaluated on a five-point scale between "disagree" and "agree."

Intentions: Two items were also composed by the researcher with reference to the literature (Chen & Chang, 2012; Román, Sánchez-Siles, & Siegrist, 2017) to measure customers' future intentions to buy AI-made music for themselves and for others. And a five-point scale, from "disagree" to "agree," was also used.

In addition to these items, the questionnaire included three questions about the participants' year in school (1, 2, 3, or 4+), biological sex (male or female), and funds available to be freely used monthly (less than 10,000 yen, 10.000-30.000 yen and more than 30.000 yen). The original items that were not available in English were translated from the other language by a group of two researchers, who are fluent in both languages. Mutual agreement between the researchers ensured the validity of the translations.

Survey Administration and Data Analysis

After being created, an online version of the questionnaire was made on Google Forms. This questionnaire was pretested on a sample of first-year students at a public university in Kobe City with which the researcher was affiliated in June 2020 (n = 21). Since the respondents did not report any problems, the questionnaire was retained for the main survey, and the answers were kept for later use.

The main survey was conducted online in January and April 2021. Participants were students at the above-mentioned public university in Kobe and a private university in Saitama Prefecture with which the researcher had a connection. A total of 209 answers were collected, which increased the total the answers to 230. However, 11 of them were removed due to missing or repeated answers. That left a usable sample of 219.

After that, the data was analysed using IBM SPSS in several steps to reveal its various characteristics (Table 2). First, the skewness and kurtosis values of the data were calculated. The outcomes (skewness < 2.0 and kurtosis < 4.0) suggested that the data was normally distributed (Kim, 2013).

Second, independent sample *t*-test and ANOVA (analysis of variance) were implemented to see if there were differences in the perceptions and behaviours of different groups of respondents (male vs. female, number of years in school, and amount of money available to be spent freely). This was done given the normalcy of the data checked earlier. The results show that differences were scarcely observable.

Third, exploratory factor analyses were undertaken for multi-item constructs, including social norms resistance, emotions, and symbolic values. The results recommended four factors for social norms resistance, two for emotions, and one for symbolic values. However, further examination revealed that, after dealing with the cross-loading issues (two or more items loaded on the same factor; Matsunaga, 2010), the first construct might have one big factor and the remaining factors only one item each, while the second construct might have one multi-item factor and one one-item factor. Considering the meaninglessness of the one-item factors (Leech, Barrett, & Morgan, 2005), the multi-factor solutions for social norms resistance and emotions were disregarded, and the one-factor solution was adopted for both constructs.

Fourth, Cronbach's alphas were sought to determine the level of internal consistency among the items of each construct. In the case of social norms resistance, the first five items had low corrected item-total correlations values (CITC < 0.30). They were thus removed to improve the alpha to 0.76 from 0.71, with all the CITCs exceeding the 0.30 threshold (Leech, Barrett, & Morgan, 2005). With symbolic values (0.92) and emotions (0.88), both of the alphas were close to or above 0.90, and all of the CITCs were above 0.50. With these good levels of internal consistency, the average values of each of these three constructs were calculated for use in further analyses.

Fifth, a series of hierarchical analyses was performed to test the hypotheses. This particular technique was employed because it could help reveal the total effect of the whole model as well as the individual effect of each variable in the model. In addition, it could also help expose the changes in effects when a variable was included or excluded. These were made possible since the hypotheses involved linear correlations among the variables.

FINDINGS

The sample collected for this study included 219 respondents. The majority of them (117, 80.82%) were first year and female (128, 58.45%) students. More than half of them reported having between 10,000 and 30,000 yen available monthly to spend freely (140, 63.93%).

The respondents demonstrated a low level of resistance of social norms. They also did not perceive much potential symbolic value attached to AI-made music. In addition, the respondents seemed not care much about the naturalness or the ownership risks of these products although the concern for the second variable (mean value m = 3.20) was larger than that of the first one (m = 2.88). Their emotions were not very positive, and their intentions were not strong, either.

The testing of the first hypothesis revealed that it was supported (Table 3). Overall, the combination of the respondents' social norms resistance tendencies, perceived product naturalness, perceived ownership

Table 2. Description of the measures

					Differences between two sexes		Differences among four years in school		Differences among three amounts of money to spend monthly	
Constructs and items	**Mean**	**Std.**	**Skewness**	**Kurtosis**	*t*	*p*	**F**	*p*	**F**	*p*
Social norms										
Give back	1.79	1.15	1.83	2.60	-1.49	0.14	0.54	0.66	1.20	0.30
Oldest son's inheritance	4.26	0.93	-1.04	0.05	-2.11	0.04	0.36	0.78	0.57	0.56
Child should care for parents	2.32	1.12	0.46	-0.52	-1.19	0.24	1.54	0.21	0.06	0.94
Not to try different behaviour	2.34	0.95	0.86	0.70	0.32	0.75	1.39	0.25	0.61	0.54
Follow conventional ways of doing things	3.64	0.98	-0.42	-0.31	1.04	0.30	0.39	0.76	0.40	0.67
Be careful about behaviour	2.16	0.90	0.99	0.97	1.37	0.17	0.82	0.48	0.99	0.37
Avoid actions to be the target of gossip	2.11	1.04	1.10	0.81	0.79	0.43	0.87	0.46	3.58	0.03
Worry about being seen	2.24	1.10	0.85	0.15	3.25	0.00	2.97	0.03	0.86	0.42
Be careful about dress	1.95	0.89	1.22	1.95	4.23	0.00	0.48	0.70	0.77	0.46
Do not like to feel ashamed	1.61	0.92	1.93	3.93	2.22	0.03	0.55	0.65	0.60	0.55
Worry about appearances	2.15	0.96	0.75	0.27	-0.33	0.74	0.76	0.52	2.24	0.11
Avoid actions to be the target of ridicule	2.32	1.12	0.80	-0.06	1.47	0.14	0.27	0.85	2.19	0.11
Symbolic values										
If I listen to AI-made music, I feel that my status has improved.	2.09	0.91	0.26	-0.96	1.01	0.31	2.21	0.09	0.79	0.46
If I listen to AI-made music, I feel that my abilities are better perceived.	2.00	0.88	0.36	-0.70	1.09	0.28	1.03	0.38	1.59	0.21
If I listen to AI-made music, I feel that I am cooler.	1.98	0.90	0.50	-0.51	0.71	0.48	0.24	0.87	1.35	0.26
Naturalness										
I think that AI-made music is as natural as human-made music.	2.88	1.07	-0.08	-0.51	-0.28	0.78	3.13	0.03	1.32	0.27
Risks										
It's risky to possess AI-made music because its ownership is ambiguous.	3.20	1.06	-0.41	-0.17	1.13	0.26	1.42	0.24	1.62	0.20

risks, perceived symbolic values, and emotions could explain 22.0% to 27.9% of the variances in their

Table 3. Description of the measures (continued)

					Differences between two sexes		Differences among four years in school		Differences among three amounts of money to spend monthly	
Constructs and items	Mean	Std.	Skewness	Kurtosis	*t*	*p*	F	*p*	F	*p*
Emotions										
Lively	2.99	0.85	-0.20	0.16	-0.12	0.90	2.70	0.05	0.56	0.57
Delightful	2.88	0.85	-0.35	-0.11	0.77	0.44	2.55	0.06	0.23	0.79
Fulfilling	2.96	0.81	-0.23	0.25	0.12	0.90	0.64	0.59	0.39	0.68
Cheerful	2.81	0.83	-0.15	0.02	1.23	0.22	2.38	0.07	0.22	0.80
Pleasant	2.82	0.81	-0.07	0.34	2.51	0.01	4.82	0.00	0.54	0.58
Energetic	2.90	0.83	0.05	0.37	1.01	0.31	4.37	0.01	0.00	1.00
Excellent	3.10	0.81	-0.12	0.49	0.05	0.96	3.64	0.01	1.61	0.20
Motivated	2.89	0.89	-0.05	0.18	1.60	0.11	5.20	0.00	0.65	0.52
Intentions										
I want to buy AI-made music to listen to on my own.	2.01	0.84	0.02	-1.49	1.92	0.06	3.12	0.03	0.80	0.45
I want to buy AI-made music to give to my friends.	1.99	0.93	0.41	-0.70	2.27	0.02	3.57	0.01	0.58	0.56

intentions to buy AI-made music for others and for oneself, respectively. The effect that the combination had on intentions to buy for oneself was larger than that on intentions to buy for others, although the sizes of the effects were small in both cases (Leech, Barrett, & Morgan, 2005). When emotions and/or perceived symbolic values were excluded, the effects of the combination of the remaining variables were still significant, although the sizes were reduced. However, when perceived product naturalness and perceived ownership risks were removed, the sole effect of social norms resistance was insignificant. It should be noted that the effect of perceived ownership risks was also not significant in all scenarios.

The testing of the second and third hypotheses also showed that they were supported (Table 4). With emotions (H2), the combination of the respondents' social norms resistance tendencies, perceived product naturalness, perceived ownership risks, and perceived symbolic values could have a small yet significant effect ($R^2 = 0.174$, $p = 0.000$). Even when perceived symbolic values were removed, the significance of the remaining variables remained ($R^2 = 0.107$, $p = 0.000$). With symbolic values (H3), the combination of the respondents' social norms resistance tendencies, perceived product naturalness, and perceived ownership risks showed a very small yet still significant effect ($R^2 = 0.088$, $p = 0.000$). In both cases, the effects might not be significant if the contribution of perceived symbolic values and/or perceived product naturalness was not included.

Finally, the testing of H4 revealed that it was not supported (Table 6). The effects that social norms resistance had on both perceived product naturalness and perceived ownership risks were tiny and insignificant. The unimportance of this variable, however, has also been observed in all of the previous analyses.

The outcomes of the testing of all hypotheses are visualized in Figure 4.

Table 4. Results of testing H1

		Buy for oneself				Buy for others			
Step	**Variable**	β	p	R^2	p	β	p	R^2	p
1	Social norms resistance	-0.041	0.544	0.002	0.544	0.002	0.979	0.000	0.979
2	Social norms resistance	-0.017	0.793	0.129	0.000	0.026	0.691	0.107	0.000
	Naturalness	0.356	0.000			0.319	0.000		
	Risks	0.010	0.873			0.059	0.364		
3	Social norms resistance	0.005	0.939	0.223	0.000	0.045	0.468	0.185	0.000
	Naturalness	0.270	0.000			0.241	0.000		
	Risks	-0.016	0.790			0.035	0.575		
	Symbolic values	0.322	0.000			0.291	0.000		
4	Social norms resistance	-0.022	0.703	0.279	0.000	0.024	0.700	0.220	0.000
	Naturalness	0.205	0.001			0.190	0.004		
	Risks	-0.010	0.866			0.040	0.513		
	Symbolic values	0.251	0.000			0.235	0.000		
	Emotions	0.260	0.000			0.207	0.002		

DISCUSSION

Customer perceptions of and behaviours toward a product are very important to its maker because they will determine the success or failure of the product's life. This study of customer attitudes toward AI-created music confirmed that perceived product attributes (i.e., product naturalness) can significantly

Table 5. Results of testing H2 and H3

		Emotions				Symbolic values			
Step	**Variable**	β	p	R^2	p	β	p	R^2	p
1	Social norms resistance	0.064	0.343	0.004	0.343	-0.088	0.194	0.008	0.194
2	Social norms resistance	0.086	0.185	0.107	0.000	-0.067	0.309	0.088	0.000
	Naturalness	0.322	0.000			0.267	0.000		
	Risks	-0.002	0.975			0.082	0.211		
3	Social norms resistance	0.104	0.097	0.174	0.000				
	Naturalness	0.249	0.000						
	Risks	-0.024	0.699						
	Symbolic values	0.271	0.000						

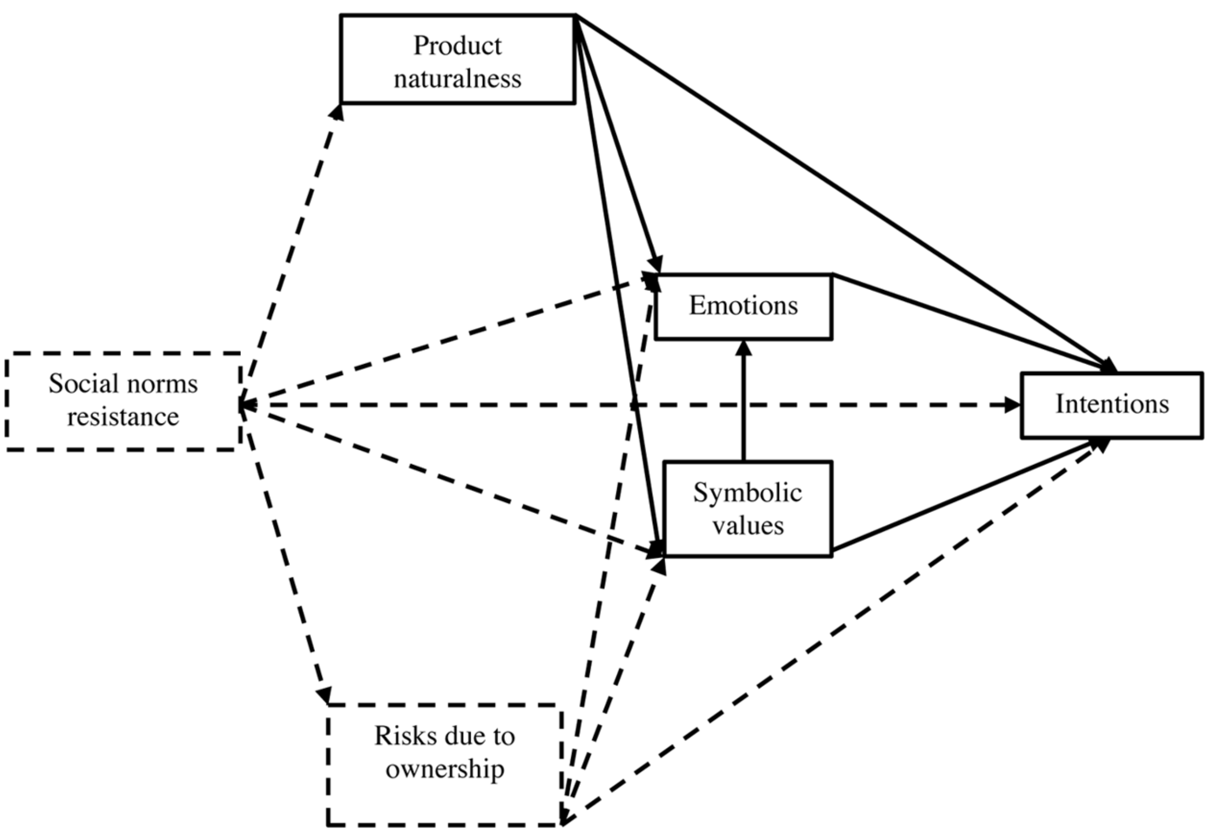
Table 6. Results of testing H4

	Naturalness		Risks	
Variable	R^2	p	R^2	p
Social norms resistance	0.005	0.321	0.002	0.541

influence perceived symbolic values, emotions and intentions (Binninger, 2017; Li & Chapman, 2012; Machado, de Carvalho, Torres, & Costa, 2015; Román, Sánchez-Siles, & Siegrist, 2017; Susini, Misdariis, Lemaitre, & Houix, 2012). In addition, the study verified that the perceived symbolic values of a product can also affect customers' emotions and their intentions, and feelings about the product can further strengthen customers' intentions in a significant manner (Agost & Vergara, 2014; Ladhari & Tchetgna, 2017; Xie & Bagozzi, 2014). The sizes of the effects depend on the direction of the intention, whether it is self-directed (to buy a product to use for oneself) or other-directed (to buy a product to give to others).

This study, however, could not find statistical evidence to support the hypothesized roles of social norms resistance tendencies and perceived seller attributes (i.e., ownership risks). Perhaps the respondents of this study did not have a challenging enough attitude toward the existing norms in their society to be more attached to AI-made music (Factor, Kawachi, & Williams, 2011; Haslam & Reicher, 2012; Lee,

Figure 4. Model of testing outcomes
Note. Dashes line = Insignificant correlation; Solid line = Significant correlation



Kim, & Wainwright, 2010). Or perhaps since AI-made music is still a very novel product and not yet commercialized on a large scale, people can listen to it for free and thus they may not care much about its ownership and related problems (Hong, Peng, & Williams, 2020; Starkey, Steenhauer, & Caven, 2020).

Theoretical Implications

Despite the insignificant impacts of certain elements (i.e., social norms resistance tendencies and perceived seller attributes), the PSEC model proposed in this study was proven to be a valid one. Specifically, this model can explain the relationships among perceived product attributes, perceived symbolic values, emotions, and intentions. The contributions of the insignificant elements might be the direct consequences of the research context (Japan) and the nature of the product (the novel genre of AI-made music).

At the time of this research (2020-2021), AI-made music was still quite novel. Even in a pioneering market like Japan (Lu, Li, Chen, Kim, & Serikawa, 2018; Sakai & Tomoshige, 2019), customer awareness of and interest in this new product were still low, similar to their attitudes toward AI in general (Ghotbi, Ho, & Mantello, 2021). This might explain why the young respondents in this study and others (Moura & Maw, 2021) showed average or below average evaluations of AI-made music, including its naturalness and symbolic values, and feelings of and intentions toward it. However, it is consistently observed that the correlations among the above-mentioned variables were all positive. This optimistically implies that, once customers' knowledge about AI-made music increases, their perceptions and intentions will also increase, and the potential of AI-made music as a commercial product can be expected to improve in the near future.

Practical Implications

With the development of the AI technologies, AI-generated products will become more and more diverse and abundant. Consequently, the commercialization of these products will be activated soon. In order to do so, first and foremost, customers must be educated in order to increase their knowledge and acceptance of AI in general (Hong, Peng, & Williams, 2020). Once customers accept AI's potentials, they may willingly accept AI-made products.

In commercializing AI-created music in particular, makers and marketers can focus on the projection and promotion of product naturalness and symbolic values. A positive perception of these elements will lead to positive feelings of and intentions toward this music. Makers and marketers should be aware that, regardless who the end customers are, intentions to purchase AI-made music are significantly affected by a combination of perceived product naturalness, symbolic values, and emotions. Differentiation of the customer market based on customer types (intermediary or end customers) may not be a necessary tactic to employ.

CONCLUSION

Customers' attitudes, including their perceptions and behaviours, are a complicated yet interesting topic for both academics and practitioners. Despite the fact that many theories have been used to explain customer attitudes, four important elements should simultaneously be examined, including product/service attributes, seller attributes, environment characteristics, and customers' personal characteristics. However, the actual contribution of each of the above-mentioned elements may vary according to the contexts and the products or services. With AI-made music in the Japan's market in particular, perceived product/service attributes and customers' personal characteristics have been shown to have significant impacts, while perceived seller attributes and environment characteristics have not.

A differentiated marketing and management strategy, thus, may necessarily be designed and implemented for each market and/or product/service. However, a differentiation between end or intermediary customers (customers who buy a product to use or to give) may be overlooked.

Limitations and Future Research Directions

The first limitation of this study, similar to other model-based research, was the incompleteness of the model. Only one or two variables were selected to represent each PSEC element in the model. As a result, the whole picture of all the factors that can affect customers' perceptions of and intentions toward AI-made music was not yet painted. However, given the practicality of creating a complete model and the availability of research resources, this limitation was an unavoidable one.

The second limitation of this study involved the Japan context. The weak tendency of respondents to resist social norms, or the strong tendency to conform to them (Norasakkunkit & Uchida, 2014) might unwantedly have affected their attitudes toward AI-made music, a novel product.

The third limitation of the study related to the sample. Only students at two universities in Japan were surveyed. Other young customer market segments were not included. This weakens the generalizability of the study, in certain respects.

Considering these limitations, future studies should retest the PSEC model in different contexts and with different products and services. The components included could be increased to try to identify more potential impacts, and the sample could be diversified to uncover other consumption trends in other markets. A clear differentiation of the total effects of the model as well as the individual effects of each component according to contexts, products/services, and customer types then can be established. As a result, this will help further enrich the literature on the one hand, and better assist the management of customer perceptions and behaviours on the other.

In Japan in particular, the external influence of public regulation on private information collection (E) and makers/sellers' governance of customers' personal data (S) (Fujii & Managi, 2018) may be alternatively selected to replace social norm resistance tendencies and perceived ownership risks when re-examining customer attitudes toward AI-made music. An understanding of these issues may further advance the development and application of AI-made products and AI technologies in this country in the future.

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KEY TERMS AND DEFINITIONS

AI-Made Music: Pieces of music created by AI programs.

Artificial Intelligence (AI): A computer system able to interpret, learn and use external data to fulfil goals and tasks.

Emotions: Feelings generated by listening to AI-made music.

Ownership Risks: Concerns about the ownership of AI-made music.

Product Naturalness: The amount to which AI-made music appears natural.

Social Norms Resistance: The tendency of members to resist the widely accepted norms in a given society.

Symbolic Values: The immaterial values attached to AI-made music.

Chapter 12
Study of the Impact of Emerging Technologies Across the Value Chain Function of Educational Technology (EdTech) Firms

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ABSTRACT

Narrative technology has been a prominent feature in educational value creation. Rapid penetration of internet and better digital infrastructure resulted in adoption of emerging technologies in education sector. As business of EdTech platforms soared up, the purpose of this research was to understand the impact of emerging technologies like big data analytics, cloud-based technologies, blockchain, machine learning, artificial intelligence, augmented reality, and virtual reality on various stages of EdTech value chain. This involved content creation, content distribution, and learning plus management system. A secondary data base case study analysis was carried out of EdTech firms in India. The value factors such as cost, accessibility, ease of use, and updated content came out as main attributes impacting acceptance of EdTech platforms. The mentioned emerging technologies impacted the content creation, delivery, evaluation, and feedback stages which resulted in improved performance across these value factors with lesser associated total costs.

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INTRODUCTION

The introduction of computer-based technology into education could be dated back to as early as 1960s (Haran, 2015). In the past, educational system was only confined to simplistic classrooms with blackboards and quarterly tests to assess students' progress (Mortimore *et al.,* 1988). However, over the years the scenario had changed with the various technologies in the field of education (Bigum & Kenway, 2005). Rapid advancement in technology had provided teachers with the chance to become more collaborative and expand the learning to outside the classroom (Muttappallymyalil *et al.,* 2016). New age emerging technologies technologies such as cloud computing, augmented reality, artificial intelligence (AI), and gamification among others had contributed to make educational experience more engaging and comprehensive (Choudhary, 2020). The widespread availability of low-cost computers, high-capacity networks, and mobile devices had made education technology accessible and affordable across geographies (Dhawan, 2020). The educational institutes all over the world had to be physically closed due to COVID-19 pandemic (Nicola *et al.,* 2020). As a result, the educational ecosystem underwent digital transformations to continue teaching through digital online platforms (Esposito & Principi, 2020). There had been a rapid growth of Educational Technology (Edu Tech) firms prior to the reality of COVID-19, with investments in global EdTech exceeding US$18.66 billion in the 2019 (Li *et al.,* 2020). However, the events of COVID-19 accelerated the space of EduTech firms as most businesses had to be undertaken remotely (Bhattacharyya & Thakre, 2021). This was because of the substantial increase in educational technology users because of the COVID-19 pandemic had given a boost to the sector across the world (Adedoyin & Soykan, 2020).

Global education and training expenditure was expected grow to $ 7.3 trillion by 2025 (Holon IQ, 2021). This would impact the EdTech sector which would grow to $350 billion by 2025 (Li *et al.,* 2020). A staggering two billion more learners would look for attaining education. (Wittgenstein Centre, 2020). This would put a high pressure on the existing educational infrastructure. Digital spend globally on education and training was pegged at $227B that being mere 3.6% of the total expenditure (Holon IQ, 2020). The technologies which would drive the expenditure in global education included AR/VR, AI, robotics, and blockchain (Brothers, 2019). Technologies applied also needed to be humanistic (Bhattacharyya, 2020). Countries such as USA, China, and India were leading the charts in venture capital in EdTech sector in last decade (Holon IQ, 2021). In Indian context, the COVID-19 pandemic brought a golden era for EdTech start-ups (Kamath, 2021). Experts were of view that national education policy 2020 (NEP, 2020) would help EdTech business to grow exponentially (Banerjee, 2020). Market reports forecasted the sector to grow from $117 billion in year 2020 to $225 billion by year 2025 (PGA Labs and IVCA, 2020). Ventures such as Byju's, Unacademy, Vedantu among others were leading the country towards the era of digital learning (Prakash, 2020).

One must note that in the present-day context, technology had been playing a major role in imparting education at various levels (Schmid *et al., 2014*). This combined with the rapid growth forecasted in the EdTech sector made it imperative to understand the value chain (Porter, 1985) of technology based educational products and services offered by EdTech firms. The literature review undertaken by the authors had indicated that there was limited literature available that provided an integrated perspective regarding the deployment of various emerging technologies in the value chain of EdTech firms. The authors undertook this research with the aim to understand the value chain of EdTech sector firms in a holistic manner. The authors created a value chain-based perspective and understood how emerging technologies (like Big data analytics, Cloud-based technologies, block chain, machine learning, artificial intelligence, augmented reality, and virtual reality) had been impacting each and every stage of value chain in EdTech firms. The authors did a secondary case study research (Kyburz-Graber, 2004; Gerring, 2006; Yin, 2011) research on EdTech platform. This helped in gaining insights on adoption of emerging technologies by various EdTech firms. The authors also identified the key attributes which affected the acceptance of emerging technologies on EdTech platforms. These insights would help EdTech firm managers to build a scalable business model. There was a need for study of EdTech industry in India. This was attempted in this study. The authors carried out this research by first reviewing the available literature. The authors in following section discussed about the literature review and the research gaps in literature. Research objectives were derived from identified researchable gaps. Subsequently, the authors did a secondary research and compiled the findings. Based on the key findings, authors discussed about the insights drawn and created a value chain model for EdTech sector. In the subsequent sections, authors talked about the theoretical and managerial implications, and scope of the research.

LITERATURE REVIEW

The authors in this article first discussed about the literature reviewed for the research work in this section. The authors considered 'Scopus' listed journals to review past research studies. Substantive amount of literature was found by the authors while searching keywords such as "value chain of EdTech", "education technology", and "technology in EdTech sector" in the 'Scopus' listed journals database. Regarding the literature review the initial focus was towards studying the article title, abstract and keywords for relevance and recency as advised by scholars (Kitchenham *et al.,* 2009; Verma, & Bhattacharyya, 2019; Bhattacharyya & Verma, 2019) and. Subsequent to this step, the authors studied in detail twelve relevant articles on the value chain of technology in educational products and services. Multiple research articles and journal article based on education technology, value chain and business model were also studied. The study of extant literature helped in gaining insights about the role of technology in education, its usage, and its impact on various stage of value chain. The authors carried out a systematic review of literature on educational technology as advocated by Kitchenham *et al.,* (2009). Summary of methodology and findings of selected articles had been chronologically compiled in table 1.

Given the rapid growth of EdTech sector resulted in substantive surge in number of companies entering the field (Venkat & Banerjee, 2021). These EdTech firms backed by the investments from big corporates had changed the educational technology domain (Peter *et al.*, 2019). Offerings of these EdTech firms varied greatly. The basic offering like language, study notes and tutoring had been present from more than two decades (Mirrlees & Alvi, 2019). The recent surge had been in areas such as upgrading professional skills, international recruitment and creating repository through crowdsourcing (Weller, 2018).

RESEARCHABLE GAPS AND RESEARCH OBJECTIVES

One must note that researchers had been working on understanding the impact of technology on education sector. The scholars had pointed out the benefits and challenges of adopting technologies across the value chain of EdTech. Pierce e*t al.,* (2014) identified eight components in value chain of EdTech sector. Krouska *et al.,* (2017) compared learning management system (LMS) and content management system (CMS) platforms. Bakir, (2016) tried to identify impact of government policies on pace of technology

Table 1. Literature review on educational technology sector

S. No.	Author(s) Year	Research methodology	Key findings
1	Altun *et al.,* (2008)	The authors gathered data through survey statistics, personal interviews, and open-ended questionnaire. They further performed descriptive statistics for quantitative and content analysis for the qualitative data.	The authors found that very few students found it easy and comfortable to use content management system. It was also found that the immediate access to all functionalities saved considerable about of time.
2	Wielicki, (2008)	The author performed comparative analysis of various criteria for technology disabled and technology enabled education.	The author provided a solution based on educational supply chain to overcome technical and financial barriers for implementation of technology in educational institutions.
3	Adzharuddin & Ling, (2013)	The authors performed a literature review on learning Management Systems (LMS) to present insights on LMS.	The authors reported that LMS was beneficial for students as they could be updated instantly about the assignments and coursework. The authors predicted that implementation of LMS across universities could narrow down the communication gap between teachers and students.
4	Mpofu & Chimhenga, (2013)	The authors performed secondary research to analyse the impact of information and communication technologies (ICTs) and digital divide on education processes.	The authors were of view that the quality or rate of education was more for digitally included education than for digitally excluded education.
5	Napoleon & Ake, (2014)	The authors used concept matrix method to collect and analyse literature for study.	The research pointed out that despite widespread use of mobile devices in an individual's daily life, its use was very limited in educational activities. The authors also identified the gap between learning management systems and mobile learning management systems.
6	Pierce *et al.,* (2014)	The authors identified eight components in value chain of EdTech firms. Secondary research was performed to assess the results derived from comprehensive implementation of identified eight components in K-12 education.	The results of the research affirmed that academic performance of K-12 students had improved in subjects like mathematics and science post EdTech implementation. It also pointed out the fact that education technology value chain components were already present in United States of America which made the adoption easier and swift.
7	Bakir, (2016)	The research focused on investigating the impact of initiatives and reforms taken by various national agencies in United States of America.	The authors recommended three-pronged approach for effective integration of technology with teacher education programs.
8	Bull *et al.*, (2016)	The authors summed up the goals decided by the U.S. Department of Education (2016) with respect to teachers' preparation.	The study discovered that technology along could not be deemed responsible for impactful education. Preparedness of educators, and assessment systems along with technology were identified as key factors that could make education impactful.
9	Hassler *et al.,* (2016)	The study report was based upon rigorous educational research including literature review performed by the authors along with examples based on authors' personal experiences.	The authors stated the reasons for the limitations of impact of technology in educational institution. They found that for successful implementation of technology in classrooms the role of teacher was of utmost importance.
10	Badhani & Mut, (2017)	The authors conducted a practice-oriented case study and further applied value network framework and dynamic capability perspective to analyse the company's business model.	The authors categorized five value flow components based upon the functionalities which were value creation, value delivery, value capture, intangible value, and perspective. The authors found that the value network tended to expand more if the business model innovation from within the organization were driven more frequently.
11	Escueta *et al.,* (2017)	The authors reviewed studies to represent Randomized Control Trials (RCTs) and Regression Discontinuity Designs (RDDs) evidence.	Research pointed out that just providing students with access to technology yielded largely mixed results. The effectiveness of teaching mathematics could be increased multi-fold with computer assisted learning. The impact was substantive with effect size of low intensity online program. While it improved the scores of seventh and eighth grade in case of high intensity computer-based program.
12	Krouska *et al.,* (2017)	The author did a comparative analysis on effectiveness of Learning Management Systems (LMS) and Content Management Systems (CMS) platforms in higher education.	The authors found that many functionalities required to support teaching were present by default in LMS as opposed to that of CMS. The variety of modules available in CMS was substantive which made it easier for the educators to choose from the available modules and align it to the requirements.

adoption in EdTech sector. Napoleon *et al.,* (2014) was of view that despite widespread penetration of mobile devices, its use in education sector was limited. The authors during the secondary research came across substantive amount of literature. However, scarce literature was present which could provide a comprehensive view on the subject. The available literature was present in distributed and fragmented manner. There was a gap in available literature. Furthermore, there was limited literature available which EdTech firm managers could refer to understand the technology adoption by competing firms. Thus, the first research gap was that limited research covered the complete value chain of EdTech sector with respect to technology adoption. Second, most research covered the impact of few technologies such as LMS, and CMS only and neglected other technologies. Finally, there was a gap in extant literature which managers could refer to identify challenges proactively before adopting emerging technologies. Based upon extant literature review and the researchable gaps identified, the research objectives were formed. The study objectives were to-

1. Define and understand the value chain of Educational Technology (EdTech).
2. Analyse the components of technology at each stage of value chain of educational technology services.
3. Identify the preferred technology among EdTech firms at various stage of value chain and challenges to its adoption.

RESEARCH METHODOLOGY

In this research study the authors carried out a secondary data-based case research study (Smith, 2008; Kyburz-Graber, 2004; Gerring, 2006; Yin, 2011). Keywords such as 'EdTech', 'value chain', and 'technology in education sector' were used to find out past research articles published in 'Scopus' listed journals. EdTech firms' websites, syndicated reports, and other data available in public domain were collected and analysed as prescribed by researchers (Heaton, 2003; Johnston, 2017). The authors ensured that the context had not been construed to support a particular viewpoint and data points were in line with research objectives as advised by Irwin & Winterton, (2012). The authors collated data points from diverse sources for a comparative analysis to ensure that an integrated analysis could be carried out as suggested by Irwin *et al.* (2012). The authors studied regarding the surge in EdTech firms across the globe. These EdTech firms could be divided in several categories based on its offerings. The major categories identified were language learning software, upskilling platforms, tutoring platforms, management solution systems, jobs and internship platforms, and digital learning environments (HolonIQ, 2020). Details of few representative firms in EdTech sector such as its offerings and valuation were compiled by the authors for better comprehension. These firms were highly valued firms and were leading the sector in its respective geography. Most of the firms that were market leaders were established between years of 2010 to 2015.One could argue that often these firms worked on its long-term vision and were able to leverage the first mover advantage. The list of these EdTech firms has been tabulated chronologically based upon the year of establishment in table 2.

One must note that in the recent years had also witnessed the consolidation in the EdTech sector. The first movers and firms backed by big corporates were acquiring the specialised and focused start-ups to widen its offerings. Thus, the authors studied mergers and acquisitions in EdTech sector. Major mergers and acquisitions in the EdTech sector have been tabulated in table 3 .

Table 2. List of EdTech firms with offerings and valuation

S. No.	Name of Company	Year of establishment	Country of Origin	Offerings	Valuation
1	iTutor Group (iTutor,2021)	1998	China	Language learning platform for chinese students	$1.0B (Bloomberg,2018)
2	HuJiang (HuJiang,2021)	2001	China	School courses in english language	$1.0B (Prnewswire, 2016)
3	Course Hero (Course Hero,2021)	2006	United States	Provide study notes on various subjects	$1.1B (Edsurge, 2020)
4	Doubtnut (Doubtnut,2021)	2009	India	Online solutions for users' doubts	$121M (Economic Times, 2021)
5	Udemy (Udemy, 2021)	2010	United States	Certified courses for upskilling	$3.3B (Forbes, 2020)
6	Byjus (Byjus, 2021)	2011	India	Online tutoring	$12.0B (Livemint, 2020)
7	Duolingo (Duolingo, 2021)	2011	United States	Language learning platform	$2.4B (Reuters, 2020)
8	Labster (Labster, 2021)	2011	Denmark	3D virtual lab for practical experience	$100M (Techcrunch, 2020)
9	Coursera (Coursera, 2021)	2012	United States	Certified courses for upskilling	$2.5B (Classiccentral, 2020)
10	Yuanfudao (Yuanfudao, 2021)	2012	China	Online tutoring	$15.5B (Prnewswire,2020)
11	Newsela (Newsela, 2021)	2013	United States	Education Resources	$1.0B (Pitchbook,2021)
12	Toppr (Toppr, 2021)	2013	India	Online tutoring	$2.0B (Vccircle, 2020)
13	VIPKid (VIPKid, 2021)	2013	China	Language learning platform	$4.5B (Technode, 2019)
14	Vedantu (Vedantu, 2021)	2014	India	Online tutoring	$600M (Livemint, 2020)
15	Tutorful (tutorful, 2021)	2014	United Kingdom	Private tutors for home tuition	$200M (Crunchbase, 2021)
16	Applyboard (Applyboard, 2021)	2015	Canada	Assist in international job search and scale up education business globally	$1.4B (Applyboard, 2020)
17	Guild Education (Guild Education, 2021)	2015	United States	Provide upskilling platforms to companies to train its employees	$1.0B+ (Guild Education, 2019)
18	UpGrad (UpGrad, 2021)	2015	India	Provide certified courses for upskilling	$450M (Inc42, 2021)
19	Zuoyebang (Zuoyebang, 2021)	2015	China	Allow students to upload problems and find solutions	$10.0B (Jumpstartmag, 2020)
20	Bussu (Bussu, 2021)	2017	United Kingdom	Language learning platform to interact with native speakers	$120M (Techcrunch,2020)
21	Amazon Academy (Amazon, 2021)	2019	India	Competitive exam preparation	-

Table 3. Mergers and acquisitions in EdTech sector

S. No.	Acquirer	Acquiree	Offering of acquired firm	Deal valuation
1	Byju's	WhiteHatJr	Teach coding to young school-going kids in India and USA	$300M (Moneycontrol, 2020)
2	Byju's	Osmo	Play based learning for kids of 3-8 years	$120M (Byju's, 2019)
3	Byju's	LabInApp	Virtual lab simulation for practical education	$0.5M (Yourstory, 2020)
4	Unacademy	Mastree	Online preparation for Science Technology Engineering and Mathematics (STEM) subjects	$5M (Ipleaders,2020)
5	Unacademy	Prepladder	Preparation for medical entrance exams	$50M (Ipleaders,2020)
6	Unacademy	CodeChef	Help programmers to improve coding skills	Undisclosed (Entrackr,2020)
7	Course Hero	Symbolab	AI powered calculator-based services	Undisclosed (Yahoo news, 2020)
8	UpGrad	Rekrut India	Recruitment and staffing services	$7M (Economic times, 2020)
9	K12 Inc	Galvanize	Coding boot camp programs	$165M (Geekwire,2020)
10	Coursera	Rhyme softworks	Platform for hands-on projects	Undisclosed (Coursera,2019)
11	Chegg	Mathway	Training and assessment services	$100M (Businesswire, 2020)
12	Campuslogic	RaiseMe	Online scholarship service	Undisclosed (Finsems, 2020)

FINDINGS AND DISCUSSION

In this study the authors carried out secondary analysis to identify a method to create value chain model of educational technology. Authors adopted Porter's value chain model (Porter, 1985). Porter's (1985) value chain model was referred to categorize the EdTech value chain components and derive insights from the same. The authors identified the primary and secondary activities in EdTech value chain. The EdTech value chain has been represented below in figure 1.

The authors identified five primary activities in EdTech sector through secondary research. These activities have been explained below.

1. Education Content Creation: The information had been available at a click with advent of internet. Learning had not been restricted to four walls of classrooms. Plethora of options such as social networking sites, online tutorials, games, and quizzes were present for students (Doyle et al., 2020). Thus, it became important for the educators to be aware about education technology to cater to the needs of their learners. There were wide number of options for content creation available to the education technology providers. Few of them have been represented in table 4.

Figure 1. Value chain model of EdTech (Adopted from Porter, 1985)

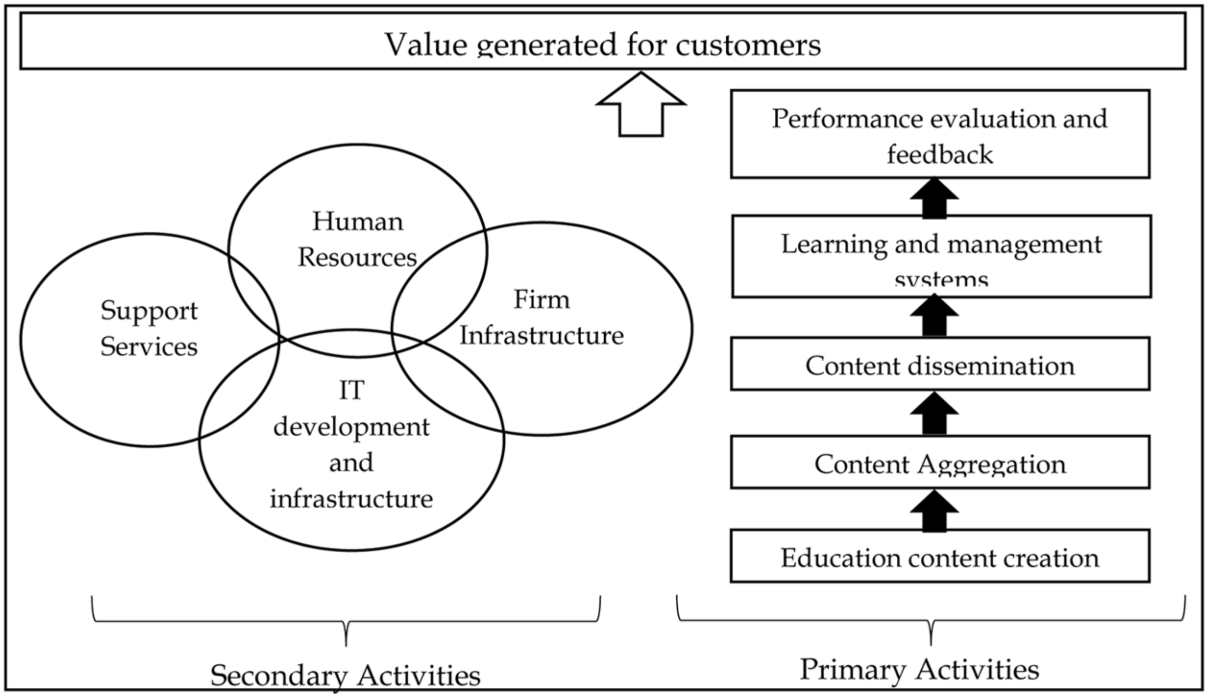

Table 4. Type of content and form of offerings

Content type	Form of offerings
Videos	Videos could be in the form of lecture recordings, lecture slides, project presentations, digital whiteboards, screencasts, and others.
Gamification	It could be text based, audio based or animated form that used game design and mechanics. Students could be awarded points, badges, and scores during the learning process.
Online Courses	Most of the online courses comprised of reading material, video lectures, assessments, and quizzes, followed by certificates on successful completion of the course.
Audio	Podcast or an audio file could be easily downloaded by the users into their devices. Many education technology ventures used podcast to deliver its products.
Books and blogs	Content could be in the form of e-books, blogs, wikis, and others.
Interactives	EdTech provided tools for stimulus based experiential learning. Teachers had unlimited number of tools to design interactive content and real-life based learning for the students (Teras et al., 2020).

2. Content Aggregation: Information and communication technologies (ICTs) had made it possible to access any information from anywhere at any time. The digitization of content led to the emergence of platforms that gather information from various sources and then deliver it to the consumers (Chiou et al., 2015). These platforms acted as aggregators of content and provided consumers with the required information. The aggregation of content from multiple sources to a single destination had lowered the transaction costs, thus making the accessibility of content affordable for the

consumers. In addition, students from rural or even the remotest regions of the world could have access to information with the help of education technology.

3. Content Dissemination: The market of education technology had boomed exponentially with the emergence of Covid-19. The iTunes App Store had over 90,000 iOS applications in the education category, and the Google Play marketplace had over 90,000 android apps in the education category (Lee, 2014). In addition to this, there were hundreds of thousands of desktop app and websites, tools for teachers, students and parents present in education category. Due to this broad range of education technology products available in the market, it had become crucial that the right product reaches the end consumer (Yin, 2020). The delivery of these education technology products could be classified into two categories, that being, direct and indirect delivery.
   a. Direct delivery: Some products were sold directly to the end consumers, that being, students. It had been observed that the content that was accessible directly to the consumers through blogs, websites, e-books, and others was often free or would charge very little fee for its consumption. However, other education technology products/services like tutoring, problem solving, gamification and such others would charge the consumers premium for its services.
   b. Indirect delivery: Some products were sold to schools or educational institutions for consumption by students. This type of delivery was called indirect delivery. The products were also disseminated by exhibiting at conferences, bottom-up sales through teachers, and affiliate marketing.
4. Learning and Management System: Technologies that enabled long-distance delivery of education were commonly referred to as "learning management systems" or with "LMS" (marketsandmarkets.com, 2020). LMS provided with wide variety of web-based tools and software that aided teacher-student interaction, provided interactive learning experience, and automates the management, organisation, distribution and reporting of educational content and results from learners. LMS provided the teachers with unlimited number of tools to design interactive content and real-life based learning for the students (Teras et al., 2020). LMS have provided teachers and students to interact beyond the walls of the classrooms, by connecting them through forum and portals. For instance, LMS platform called International Education and Resource Network (iEARN) operated in more than 140 countries and have collaborated with over 30,000 schools (IEARN Collaboration Centre, 2021). This highlighted the fact that technology had made educational process more efficient, shortened the gap between geographies and made it accessible to everyone at comparatively affordable prices.
5. Performance evaluation and feedback: Educators' responsibility was not only delivery of content. Performance evaluation and assessment of students also formed a significant portion of education value chain. It had been noted that teachers in U.S. have been working around 12-16 hours a day (Glass, 2019). Education technology firms could provide the consumers with options to automate the assessment and evaluation process. The process of assessments and grading could be made centralized with the help of technology, saving significant amount of time and efforts of the educators (Escueta *et al.,* 2017). Further, several education technology platforms had been providing different types of built-in tests so that the teachers could mix and match the right type of questions for summative, interim, or formative evaluations (Office of Educational Technology U.S., 2014). The use of advanced analytics could help keep track of student's performance in class, grades, missed classes and other such indicators (Etemadpour, 2020).

Table 5. Scope of EdTech in learning activities

Sr. No.	Learning Activity	Definition	Scope of EdTech
1	Knowledge Acquisition	Learners acquired information and converted it into knowledge (Kaba, 2019)	The phenomenon of acquiring knowledge had become a non-stop process of one's life (Kiselev et al., 2017). The penetration of internet and mobile devices had made it possible to access incredible amount of information anywhere at any time. The process of learning and knowledge acquisition had been made more interactive through education technology (Lynch, 2019). Learnings in the form of videos, audio, blogs, e-books, and others had been brought into the market by various education technology ventures (Mascarenhas *et al.,* 2021).
2	Reflection	Process of self-examination and self-evaluation carried out by teachers and students on regular basis to evaluate their educational knowledge (Shandomo, 2010).	Education technology had helped the students to self-evaluate their strengths and weaknesses. Tools like google sheets and google docs could help the students track their own academic performance throughout the year. Technologies like virtual reality and augmented reality had enhanced the learning process by providing real-life learning experiences. For instance, tools like google expeditions, merge and such others had been designed to give real life learning experiences to the students.
3	Practice	Process of practicing new skills or behaviour either at work situations or in stimulated environment (Fee, 2019).	Education technology had enabled students to practice their learning in simulated environments that were very close to that of the real world (Glover, 2014). It had been observed that practicing in simulated environments resulted in enhanced thinking and reasoning ability of the students (Raymond *et al.,* 2013).
4	Interaction	Peer to peer learning formed a significant part of effective learning wherein, learners or even workers might compare notes about how to approach or solve specific issues through interaction (Boud, 2012).	Multiple educational blogs and portals had come up that had enabled student to student, student to teacher and teacher to teacher interaction (Mora *et al.,* 2007). Interactions between people of diverse opinions and interests were made possible by the adaption of technology in education. Education technology enhanced the process of collaborative learning with the use of tools like skype, wikispaces, and others (Walsh, 2014).
5	Escalation	Application of the acquired learning to develop or build something (Mpofu, 2013).	Escalation was most evident at the tertiary and post-tertiary levels. It produced research, observations, and new theories. Escalation was simplified with the application of education technology.

One must note that in addition to these primary activities, secondary activities were also present as with any other value chain. Secondary activities did not deal directly with the making of product/services, but it did provide the necessary support to ensure a high-quality product/services were delivered. IT infrastructure and development, firm infrastructure, human resources, and support services fell under the gambit of secondary activities.

Through Porter's value chain, insights about value generating activities of education technology were obtained. However, the learning value that was imparted to the consumers through education technology remained unclear. The authors referred Kenneth Fee's learning value chain model (2009) to understand the impact created by EdTech in learning. The model was based on experiential learning cycle (Kolb, 1984) and value chain model (Porter, 1985). Kenneth model identified five distinct learning processes, which were knowledge acquisition, reflection, practice, interaction, and escalation (Fee, 2009). The authors gathered the data on EdTech impact on each learning process. The authors drawn insights and created table 5 to represent the scope of EdTech in each of the learning activity.

The introduction of technology in the field of education had benefitted the learning process in multiple ways. Firstly, it had reduced the cost of instructional materials. The educational productivity improved by accelerated rate of learning. Finally, better utilization of educators' time led to their contribution in research work. The authors found these three to be true across all geographies.

CONCLUSION

For this research the authors conducted the secondary research (Kyburz-Graber, 2004; Gerring, 2006; Yin, 2011) to create a comprehensive report on activities of education technology value chain. The value addition made by education technology firms at each stage of learning had been analysed and presented in the research work. The authors, to understand the EdTech value chain, applied the value chain model. Extant literature available was reviewed by authors to understand the components of value chain and the recent surge in EdTech sector. This study would be useful for researchers, educators, educational institutions that were trying to infusion technology into their present educational infrastructure. The research would also help entrepreneurs who were trying to venture into EdTech sector with new start-up ideas. Technology had brought in fundamental structural changes that were important to achieve significant improvements in productivity. The wide accessibility to internet, mobile devices, and computing infrastructure, helped education technology companies found its way to remotest of geographies. Mobile devices based like technologies likes Apps have become popular in India specially amongst the youth (Nair & Bhattacharyya, 2019). The acceptance of education technology worldwide could be attributed to various value factors such as cost, accessibility, ease to use, variety, availability of updated curriculum, and others. If EdTech start-up firms catered to an integrated application of technology (Bhattacharyya, 2020) then there could be better integration of digital wisdom in the organization (Nayak & Bhattacharyya, 2019; Verma, Singh & Bhattacharyya, 2020). This would enable better strategy implementation and value capture (Bhattacharyya, 2019a; 2019b). This would also democratize education like it had for other industries (Nayak, Bhattacharyya & Krishnamoorthy, 2019; Verma, Chaurasia, & Bhattacharyya, 2019). This would help the firm not only gain competitive advantage but also social advantage (Nayak, Bhattacharyya, & Krishnamoorthy, 2021).

One must note that though the growth opportunity in the education technology business had been promising, there were significant challenges faced by the industry. The boom in the industry had resulted in ever-rising competition. In the context of the emerging Indian market, profit orientation (Bhattacharyya & Jha, 2014) had become pivotal to achieve higher speed to market (Bhattacharyya, Jha & Fernandes, 2015). Firms had to develop better marketing-operations interface to have competitive aggressiveness (Jha & Bhattacharyya, 2018). Other challenges faced by education technology were resistance by the educational institutions, concerns of student privacy, and policy regulations by the government (Fard, 2019). Web 2.0 had altered most business (Bhattacharyya, 2011). Large number of education technology companies had been trying to enter the market. Thus, it became imperative to understand the value chain of education technology to design an efficient business model. This study would provide education technology ventures with insights about the value chain that education technology provides in learning and education. These insights might help the companies to build scalable business models and create a better strategy to scale up. This study had both theoretical and managerial implications. The research study furthered the value chain framework as presented by Porter, (1985). The authors applied the value chain model for EdTech sector and derived insights from it. Thus, the authors furthered the work of Pierce *et al.,* (2014) and Badhani & Mut, (2017) to identify value chain components of EdTech sector. Past studies were compiled as part of literature review and empirical investigation. This study contributed to theoretical augmentation of a contextualized value chain framework to understand EdTech sector. Researchers could refer to use this research case towards technology adoption at various stages of value chain to identify penetration of emerging technologies in EdTech sector. The research study could help EdTech firm managers in three ways. First, managers could refer to this research to understand the ongoing changes in EdTech sector. Second, the study created a repository of global EdTech firms and the offerings which would help managers to analyse the focus areas for future. Finally, managers could refer to the challenges faced by other EdTech firms in adopting emerging technologies in the education value chain of content creation, content dissemination and feedback. This study had a well-defined research scope and future directions. This research study was done in the context of educational technology (EdTech) sector. The objective of the research was to understand the value chain of EdTech and identify the impact of technology on each stage of value chain. Since the study was based on secondary research, thus certain challenges or issues present were contextual. The authors tried to remove the geography biases to ensure the global acceptability of the findings. Managers should consider the local factors to create a more suited business model. This study could be referred to for getting a bird's eye view of the EdTech sector and how technologies had been adopted in educational technology domain. The research would act as a reference for future research on value chain model analysis and impact of technology in EdTech sector. Researchers could understand the impact of EdTech on learning path. They could further analyse the tweak needed in value chain to create a better learning path for users of EdTech platforms in future.

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Chapter 13
Technology Disruption in the Time of the Digital Ecosystem Society's Adoption:
Cyber Bullying Phenomenon -- The Truth or Hoax?

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ABSTRACT

The internet and technologies are revolving around the world today. Most of the people around this world have access to the internet easily nowadays; it can lead to a most common and dangerous problem, which is cyber bullying. Cyber bullying is considered as a crime which usually occurs among the young people. Cases from cyberbullying have shown that there is a growing significantly which is becoming a worrying topic for the societies to be aware of. This study revealed cyberbullying teen actors involved within the area of Jakarta. The result is very interesting. Parents play a vital role to the teens as they will become a support for them (actor and victim) and also peer groups give the high impact of the actors to conduct cyberbullying to another group. Much cyberbullying happens for the same reasons as any other form of bullying. Generally, the cyber bullies act in such manner due to them being insecure, to gain popularity, social pressure, and jealousy as well as personal grudges.

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INTRODUCTION

As internet keeps getting bigger and more accessible to the people, it produces both good impact and negative impact. These negative impacts are growing threats for the teenagers especially in terms of cyberbullying over the last decade alone. Despite frequent attempt to reduce the chance of cyberbullying, the problem is still intact to this day. It shows that cyberbullying is not a problem or cause that cannot be taken lightly because its effect is somewhat dangerous to the societies. Most of cyberbullying occurs at school where the students mostly become victims. Imagine a classmate posting a photo of a student which is a victim via online. Then other classmates make mean and devastating comments about the photo. Finally, the photos will be shared virtually where thousands of people have seen it. This will be continuously viral which can lead to point where the picture is used as "meme" catch phrase without the victim's consent. This report will discuss about the students; perception and actions towards cyberbullying which is separated into 3 different questions which are the actions when they witness the cyberbullying, the action taken by the students after being cyberbullied as well as their opinions about cyberbullying.

As it is similar to the concept of bullying, it will causes a significant emotional and psychological stress. In addition, cyberbullied children tend to have higher risks of psychosomatic problem than the bystander peers. The psychosomatic problem refers to disorder of individual's mind and body. These cyberbullying can be very harmful to adolescents as it can lead them many negative impact that can affect their way of thinking as well as behaviors. Such impact is that they will feel overwhelmed because people in the whole world knew what is going on with the victims. The victims will feel humiliated and exposed to the world that it can become their trauma until the situation is out of control. Not only that, it is not done by one person only and lots of teens will participating in the cyberbullying. Hence, we do not know the real identity who is the mastermind that can lead to suspicion among peers. Other than that, they will feel powerless and have hard time feeling safe because the cyberbullying has no such boundaries due to future technology. Even at home, they can invade through the computer and phone at any time and there no escaping it. Finally, it changes the behavior of victims to negative side. Such as the student want to avoid school in order to avoid the bullies and feel safe. However, this can lead to high school absenteeism rate. They feel too embarrassed to see their peers as the cyberbullies put shame them on internet. Unable to study in peace and persistent in bullying may cause drop out of school (Chen et al., 2019; Mohiddin & Susanto, 2021; Mohiddin et al., 2021; Susanto et al (2018).

Problem Statement and Significance of the Study

As a modern form of bullying, cyberbullying happens in ordinary routine life as quickly as it does when victims of cyberbullying check their mobile phones, laptops or email. Unfortunately, the victims and those around them may be unaware of the early signs and other factors associated with cyberbullying that can occur in various ways. This paper is designed to understand better cyberbullying, which is becoming more prevalent due to the advancement of the digital ecosystem in this constantly changing environment. Moreover, This study sought to answer the following research questions: (1) How does the constant use of social media contribute to cyberbullying? (2) What are the many methods of cyberbullying used? (3) What are the significant impacts of cyberbullying on the victims and perpetrators? (4) What are the strategies to prevent cyberbullying?

Objectives

The main objective of this research paper is to reveal cyberbullying phenomenon in time of technology Disruption in Asian Societies that occurs over a destructive digital ecosystem among teens. Therefore, to understand the research paper, the followings are the specific objectives of the research: (1) To analyse the use of social media contributing to cyberbullying; (2) To identify the common methods of cyber-bullying; (3) To assess the impacts of cyberbullying from the perspectives of victims and perpetrators;

LITERATURE REVIEW

In the extent, to the world nowadays, cyberbullying has been quite a serious problem. Tokunaga (2010) stated the phenomenon of cyberbullying as any harm done that causing discomfort on others by an individual or groups that communicate or behave in a manner that can be consider aggressive through messages via electronic or digital media. Some adolescents' often misguided cyber-bullying as creating fun of the friends or other people, and abruptly realized about seriousness of the circumstance after the impacts have been finished. As revealed by both cyber bullies and non-bullies, the motivation behind cyberbullying, incorporated an absence of certainty or the longing to feel better about themselves, a craving for control, thinking that it is engaging and retaliation (Chen et al., 2015). Tokunaga (2010) asserts also uncovers that people who are victims of cyberbullying are focuses of conventional cyberbullying as well, yet in customary records of harassing, the forceful practice for the most part happen amid school hours and stop once victims return home. In distinction, cyberbullying is undeniably inescapable in the lives of the individuals who are deceived, in light of the fact they can be come at any given time, along these lines the assurance of the harassing behavior may result in considerably harder negative results than traditional bullying (Arkturk, 2015).

Characteristics of Cyberbully Victims and Perpetrators

Cyberbully Victims

Pettalia et al., (2013) defined victims of cyberbullying as individuals who had reported at least one circumstance indicating that they involved in cyberbullying and at least once when they became one of the victims of cyberbullying. Based on Pettalia et al., (2013), the authors discovered that 44.6% of the respondents consist of teenagers were both experiences as the victims and the bullies. Unfortunately, the result is higher than those victimized, with17.3% and 5% indicating the percentage of teens who cyberbullies. According to Ybarra et al., (2012), adolescent children bullied commonly feel hostile and enraged after being intimidated, which eventually could encourage ongoing bullying behaviour. Consequently, findings from the authors suggest that bullies can turn into victims, and victims can become bullies. A teenager who commits cyberbullying is six times more likely to be a victim of cyberbullying through social media after being bullied (Walrave & Heriman, 2011). On the other hand, teenagers who are victims of cyberbullying are nine times more likely to engage in cyberbullying after being bullied than those who have not been a victim. There are different underlying characteristics among these cyberbully victims based on several types of research. According to a study by Porhola et al., (2006), victims of bullying have relationship problems with peers, with either no or few peers, a sense of not being accepted by friends, inability to maintain relationships, and fear of peers. Victims of bullying are frequent has a high anxiety character and is physically weak. Victims of bullying are also said to have problems in self-esteem, lack of sociality, inability to defend themselves when abused or harassed, restless, feel safe, too careful and close to parents, or overly controlling the victim's parents. While Shafie et al. (2011) stated that victims of aggressive actions from bullies generally have low self-esteem, are easily depressed, and are always worried. With such personality traits, they are targeted easily by the perpetrators.

Cyberbully Perpetrators

According to Eksi (2012), people with narcissistic personalities are more likely to influence others indirectly through cyberbullying. Corcoran et al. (2012) discovered that victims of cyberbullying had considerably higher neurotic ratings than non-victims of cyberbullying. A hot-tempered, irritable, and easily angered person is one of the characteristics of adolescents involved in the problem of cyberbullying. They also find it difficult to follow his rules and wishes to irritate their victims (Kowalski et al., 2012; Bellmore et al., (2016)). In other hand, Carter (2015) stated that individuals might also choose to commit cyberbullying because they know that their identity is anonymous. Furthermore, a study conducted by Ang and Goh (2010) found that teenagers who have unstable and aggressive emotions are more at risk of engaging in cyberbullying. They are also involved with cyberbullying because of a desire for attention and sympathy to not feel it in daily life (Ozden & Icellioglu, 2014). Musharraf et al. (2019) found that selfishness further increased the ability of a teenager to engage in cyberbullying while greed showed results the opposite. The causes of cyberbullying involve the desire to control everything, make oneself more aggressive, gain recognition from friends, try to take revenge on individuals who have wronged him, protect the identity, and not have to communicate face-to-face. Mehari et al., (2014) categorize the causes of cyberbullying into three factors: individuals, families, peers and schools, and situations. Individual factors are empathy, immorality, normative beliefs about aggression, impulsivity, stress, delinquency and drug addiction. Next is the parent's relationship with the child is lacking, the school climate and peer support. The situational factor is like a computer facility in the bedroom. Fanti et al., (2012) support an ecological development model in which the findings indicate that both individual and contextual factors are predictors of cyberbullying and victims of cyberbullying. Individual factors refer to psychopathic traits, while contextual factors are exposure to violent media and low social support levels from peers. He found that teenagers exposed to violent media saw cyberbullying as an appropriate, beneficial, moral aggressive behaviour and would increase their aggressive behaviour. The frequency of exposure to the violent media will lose sympathy and sensitivity towards the victim. However, victims of cyberbullying exposed to violent media will see the world as very scary and increase the fear that they will fall victim to their peers. In particular, psychopathic traits, exposure to media violence and lack of social support from peers are associated with bullying (Susanto et al., 2016; 2021).

METHODOLOGY

Participants

Participants were selected from cyberbullying client's The Southern Jakarta Correctional Center Ministry of Law and Human Right, Indonesia. In other hand as additional comparative study, selected ASEAN country on cyberbullying phenomenon was chosen.

However, The **Correctional Center** / *Balai Pemasyarakatan* (BAPAS) as a technical implementation unit that plays a role in providing guidance to prisoners that may lead to possibility free from prison and back to the community while under supervision and guidance from the BAPAS for 12-24 months. The study gathered a total of 6 participants each from Correctional Center Indonesia and selected ASEAN country.

Procedures

This study using In-depth interview. In-depth interview will be conducted with as many informants as possible until the data obtained was saturated. This interview is to be conducted using semi-structured interviews, namely using interview guidelines where this approach is used to explore the views or opinions of informants related to the purpose of the study. This study conducted within period of January 2020 until August 2021.

DISCUSSION

Cyber Bullying Today: Case Studies from Clients of The Southern Jakarta Correctional Center, Ministry of Law and Human Right, Indonesia, and ASEAN Selected Country: An Explanatory

Based on this study, it found that cyber bullying involved an action being conducted over digital devices such as using mobile phones, computer as well as tablets. Cyber bullying can take place through instant text-messaging, social media applications, online discussions or forums, and gaming where individuals can assess and contribute in the online contents. Cyber bullying also involves in transferring, posting and distribution of destructive, harmful and false contents about a particular individual or group of people. The negative and false contents can lead to embarrassment and humiliation. Cyber bullying has leaded an individual into illegal or immoral behavior. Cyber bullies utilize social media outlets, for instance Facebook, Instagram, Twitter, and WhatsApp.

Ten most popular forms of cyberbullying today are namely: exclusion, harassment, outing, cyber stalking, fake profile, fraping, dissing, trickery, trolling and lastly catfishing. The first form of cyber bullying which is **exclusion** means the act of leaving a person out. Exclusion can occur in several ways. One of the ways is when the person might be excluded from friends' parties or activities. Another alternative of prohibiting is when the individual's friends are having online dialogues and tagging other associates but not them. **Harassment** is one of the most unsafe forms of bullying where it can have grave implications for someone's well-being. The meaning of harassment are continuous, endless and planned form of bullying involving abusive or aggressive messages sent to an adolescent or to a network of people.

Harassment can cause someone to have low self-esteem and confidence as well as make a person fearful. **Outing** means an action to humiliate or publicly degrade someone or a group through web based posting of sensitive, private or shameful data without their authorization. Outing can come about in an assortment of ways such as reading out a friend's protected messages on their gadgets such as mobile phones can be considered a form of outing. Private information should not be public except for the trusted people and if someone discloses private information, it is essential to be sure to know to report this exploitation to the authority as cyber bullying. In othe hand, **Cyber stalking** discusses to the repetition of adults utilizing the Internet to communicate and try to meet youngsters for sexual purposes. This is the most hazardous form of cyberbullying and can have serious penalties to the victims. Cyber stalking can lead someone to make real threats on another person's well-being or safety. The meaning of **fraping** is when a person login to another individual's social networking account and imitates by uploading unsuitable files on behalf of the person's name. Fraping is an intense offense in which numerous individuals believe to be interesting and engaging. Regrettably, it is the most definitely not due to impersonating some individual on the web and ruining their reputation can cause grave consequences. Next, **fake profiles** are the most common and popular type of cyber bullying. A fake profile is formed for the sake of somebody to hide their actual distinctiveness with the purpose of cyber bullying the soul. The cyberbully may likewise utilize somebody's email or mobile phone to cyberbully them. The cyberbully is frightened in the event that their character is uncovered, accordingly they utilize false accounts. This usually means that the cyberbully is somebody that the victim recognizes very well, in light of the fact that in the event that they did not have any acquaintance with them and the culprit would not need to conceal their personality. **Dissing** is the deed of distribution or posting unpleasant information about a person virtually with the intention to ruin his or her reputation. The posting resources include photos, screenshots or tapes. This can cause unnecessary attention being drawn to the victim to humiliate and lower the person's self-esteem. **Trickery** is the act of getting somebody's reliance with the purpose that the cyber bully will reveal the secrets or distressing moments of the victims by sharing those publicly online. Another technique is **trolling**; this is an action of offensive or using ruthless verbal on online mediums and social networking sites. The troll will individually attack the victim and put him or her down. Lastly, catfishing is also the most common way of cyber bullying. This type of cyber bullying occurs when someone else takes your online personality, typically photographs and remake long range interpersonal communication profiles for tricky purposes. A **catfishing** is somebody who needs to shroud their identity. They will have a look and try to figure out at the victim's social networking profile and take any desired private information to make a pretentious persona. Now and another time, the cyberbully will take the victim's snapshots and use fake names as well as information; at different periods they could take the individual data. The common victims of catfishing are the Facebook users.

Motivations and Causes of Cyber Bullying

Many cyberbullying happens for the same reasons as any other form of bullying however it may come off as attractive as cyberbullying can be done anonymously. Cyberbullying can be appealing because it refrains bullies from seeing or facing their victims directly therefore it does not entail them much courage and thinking that they would not be caught. There are numerous aspects that add up to the cause of cyber bullying. Generally the cyber bullies act in such manner due to them being insecure. Cyber bullies will later feel that they can finally cope with their own low self-esteem. While other cyber bullies sees it as a tool to feel secure, and protect their egos, some other cyber bullies do it in order to gain popularity.

Other reasons that cause cyberbullying can also be from social pressure. Cyber bullies believe that their action of cyberbullying as socially normal and acceptable. Besides to feel superior and getting more popular than one another.

Jealousy as well as personal grudge can also lead to cyberbullying. For instance, a male student can misused and humiliated a female student's photos just to make him feel better and powerful from doing such action which can cause the female students to feel ashamed by his actions. This is due to the female student has turned down his relationship proposal which has caused cyberbullying to occur. Differences in culture is also the main reason of cyberbullying in which some cultures feel more dominant over other culture and this has caused another harassment and humiliation of the less dominant culture. Moreover, The extensive use of Internet and social media platform has tremendously contributed to the increase of cyberbullying. Moreover with this digitally run world, the young adolescent prefers less adult supervision on their activities which is why cyberbullying mostly occurs towards the teens or young adolescent. It is also hard to monitor since people or kids nowadays possesses their own mobile phone, tablets or any electronic devices thus this makes the parents or guardians harder to keep track on their activities. Therefore, cyberbullying can be linked to numerous negative impacts, especially actors, such as mental health, substance use, and personal life as well as in terms of academic. These negative impacts not only will affect the victims but also the person who bullies.

According to Setiana et al (2021), study about cyberbullying experience according to Level of Institution. Shows that 14.8% were from the primary level, 54.3% secondary level and 30.9% from a higher institution.

The freedom to use and explore online resources for youth is undermined by cyberbullies. For instance, a scenario when the cyberbullies humiliated the victims (their friends or peers) by posting something inappropriate about them online through social media platform such as Facebook, Instagram or Twitter. There will be pattern arise from this cyberbullies, first they will spread the gossip via text messages then secondly, the text messages will contain harsh words that will have a strong emotional impact towards victims. Thirdly, anger are built up among the victims especially the girls and finally physical and emotional threats are then develop as a mean to "get even". The victims will then alienated themselves and will not make any interaction with anyone in school, even their friends as they have lost their self-esteem. Worst case that can happen as an impact to the individuals who got bullied is suicide.

The Negative Impact of the Bullies between Teens: Family Affected

It is apparent that social media is an easy platform for cyberbullying to take place. Bullies use this opportunity to carry out their action on the victims. However, we often think that only the victims are susceptible to suffer from feeling depressed and anxious but in reality, the bullies themselves does feel and suffers the same way like the victim does. The reason behind them bullying is usually out of their own insecurities. In most cases, the bullies are not able to express their feelings, they are usually treated as insignificant and powerless by their peers. Consequently, this pushes them to live a far more superior and potent life through cyberbullying just because they are feeling inferior towards themselves. With that, cyberbullying do have negative impact on the cyberbullies or the perpetrators in terms of behavioral and psychological. The bullies do not only feeling depressed just like the victims but they can become more aggressive and become less worries about others feelings. They can also stay silent regarding their online activities and may get frustrated if they are unable to use the electronic device such as mobile phones, tablets or computers. Moreover, they may engage in early sexual activity as to compare to their peers due to the psychological distress that they cause by their bullying behavior.

It is common when the kids or child is being cyberbullied, the impact can also be felt by the victim's parent or family. As the cyberbullying is done online and unidentified, there is so little that the parent or family can do anything to handle the situation. Although they can report about the cyberbullying and help support the victim however they are not sure if they can actually put the attack to an end yet. Therefore, when they feel that they cannot do anything about it, this left them feeling powerless and helpless. Parent or family can develop physical symptoms as well such as falling ill because they are too worry about the cyberbullying that their child experiencing. Some may suffer from depression, chronic headaches together with other stress-related conditions. Therefore, parent or family of victims should strive to stay healthy. No one can actually predict when cyberbullies decided to bully their victims again. Thus, when cyberbullies attack their victims again, parent or family most possibly feel or experience the emotions of furious or anxiety. If any family of the victims is feeling angry and anxious, then they should deal with healthier and constructive way to manage anger. From that, family of victims can also become obsessive about the cyberbully situation. Knowing their child is being cyberbullied, parent or family of victims can never put their mind at ease about the situation. Over time, they become so afraid of their child's safety which leads to depressing and limited environment for their child. This is call overprotective parenting. They are too obsess about things that is way out of their control. Additionally, some parents felt a sense of failure when they knew their child is being bullied (cyber). Not only parent but the older siblings felt the same way where they feel like they failed to protect their family from being bullied where as parents, they questioned their ability to parenting. They are constantly thinking if they have monitor enough or they have restricted enough of their child's technology use. In the end, parent or family should never feel that they are responsible for the cyberbullies action.

Ways to Combat Cyber Bullying

There are no easy ways in dealing with cyberbullying as it is mostly done anonymously and online. However there are a few approaches or measures that victims or victim's family can do to cope with cyberbullying problem. Victims or the cyberbullies may start with controlling their technology or internet usage. Spend less time on their smartphones, on social media or text messages and start interacting with people around so it can distract them from going online and also distance themselves from the cyberbullies or from being one. Ways victims or people around the victims can handle or prevent cyberbullying is by seeking support. Talking to parents, the teachers in school, a counselor or reach out for real friends. People can find and make friends through organizations or activity club where they can share hobbies or anything in common. By doing so, it does not only help others but it does make the victims or the cyberbullies feel great about themselves along with expanding their social network. Through this group of friends who do not associate with cyberbullying they can share their feelings about being cyberbullying or being the bully themselves. Additionally, boosting one confidence is a good way to stop or prevent oneself from being a cyberbully or a victim of cyberbully. Exercise can lessen stress as well as boost the person's self-esteem. It is also important that the victim do not respond to any messages or post about them regardless of it being untrue and hurtful. Responding to the cyberbullies provocation will usually exacerbate the situation and if the victim responded, the bullies will get the satisfaction. Consequently, victims should not seek revenge as they will involve themselves in becoming cyberbully. Instead, they may keep all the abusive text messages or any screenshot of their social media page so that it can be the evidence of being cyberbullied and afterward can be reported to the adult or the right authority. However, if it involves inappropriate sexual messages, it is critical to report the threats of harm to the police so the action can be taken to court. The least the victim can do by themselves to stop or prevent cyberbully is by blocking their phone numbers, email address and not have the cyberbullies on their social media contacts. Nowadays, social media do have security in order to monitor or control these cyberbullies. For example, Instagram have this feature where users can report to them if they are being cyberbullied or when other users violated the social media terms of service and the Instagram will take actions and may remove the cyberbullies account from the social media.

Parents' Role in Stopping Cyberbully

As cyberbullies are usually anonymous and good at hiding their identity, it becomes more and more difficult to keep track or monitor who is behind the smartphones or computers. Because the cyberbullies knows how to hid their behavior well from the adults, parent may not notice or aware about their child being cyberbullied. Kids however are always reluctant to inform their parent about them being cyberbullied because of a sense of shame for being a victim of cyberbully. Thus it is vital for parent to play a role in monitoring their children's technology gadget from time to time. Kids might also fear that they may lose their smartphones and computer privileges as a result they always keep their problem of being cyberbully to themselves. No matter what, parent should get involved in the watching their child's use of technology even though their child might be resentful about it. Parent can use a parental control application on their child's smartphone or tablets so they are able to set up filters to block inappropriate web content besides helping them to monitor their child's online activities. Besides that, the parent may limit data access to their child's smartphone by using wireless providers that allows the parent to turn off data access during certain hours. Parent should also insist on knowing their child's password access to their smartphones or computers and they must learn the acronyms that the kids nowadays use in the social media. For example, 'OOMF' which stands for one of my followers or 'Cook session' which means several teens gang up on another teen taking place on social media. Most importantly, parent should be aware of whom their children are communicating with online or on social media and encourage them to share if there is any threatening messages sent by the cyberbullies so that will help prevent them from being victimized by the bullies. In the case when the child is a bully, parent should take steps to end their negative behavior before it affects the child in long-term consequences. It is best to talk to a therapist in order to manage their child's feelings such as anger, frustration or hurt. According to Robinson & Segal (2018), cyberbullies usually learn the aggressive behavior from home. This means, parent sets a bad example for their child at home by abusing the spouse verbally or physically or display bullying behavior in front of the children.

Schools and Teacher's Role

As cyberbullying today mostly takes place in school and among young adolescent, not only parent but teachers in school plays a role in stopping and preventing cyberbullying from happening to the students as well. Cyberbullying can happen at any period of the day and anywhere but the impact is often seen at school which then interferes with the student's educational environment and performance. Students tend to lose focus because they are so worries about cyberbullying. If someone starts the topic of him or her whether inappropriate or embarrassing, the chain of reaction will be spread and this becomes a trend to them. As a result students decided to skip school to be safe. This obviously has become a school climate and safety issues. School should take actions in this cyberbullying matter so that parent can be at ease. For that reason, the school should connect with the student's parents so teachers may share what they know and see of the parents children is doing. Moreover, internet and technology is still fairly new hence cyberbullying is definitely a current issue. Parents should be encourage to participate in their student's online lives and activities by asking them questions and being open with their children. School staff or teachers must not ignore if there is cyberbullying takes place. Students commonly appreciates if there is a support for the victim of cyberbullying. Students will be more comfortable and open up about them being the victim if they know that the teacher has their back. In school, the school staffs and teachers certainly can help in preventing cyberbullying from happening but it is also important to at least appoint student leaders as they can be as influential. Student leaders shall stand against cyberbullying or mean behavior in general and other students are to report any abuses to student leaders. With appointing student leader, it can further help other victims feel more safe and secure by organizing anti-bullying (cyber) club so other victims can share and report to this cyberbullying action as well.

Students' Perspectives

In cyberbullying the subject of reappearance is interrogated, since cyber acts do not inevitably comprise repetition. However, a single action can grasp a huge mass of bystanders once performed and insensitive about it. When inquire about the bullying, it generally includes a few members and not simply the bully and the victims, the networks and its effect received better consideration. Today, there is several growing number of bodies which are being piloted with the pupils' viewpoints as the starting point for this investigation. Students in groups demonstrated that they were extremely familiar with the use of technology. The larger part of them claims mobile phones and having Internet access at home. Another mainstream of female pupils showed that digital bullying was an issue at their schools while male students less likely to come to an agreement that this was an issue. Students' perspectives on cyberbullying are divided into three categories which are pupils as bystanders, clarifications of bullying and lastly on masculinity identity and bullying. Most bullying incidents have involved witnesses which are referred as bystanders. Besides, an observational using video tape examinations, have illustrated that schoolchildren who take the character of bystander rarely intercede to aid the target of bullying. Meanwhile, a study on bystander responses exposes that those who get involved are usually effective in their efforts to lessen bullying. The discoveries confirmed that suggestion about bystanders is "trapped in a social dilemma". In spite of the fact that they comprehend that bullying is not right, and may wish that they could accomplish something to stop it, they are intensely mindful of their own requirements for security inside the companion gathering. Their inaction backings the bully and undermines the victims. Their sentiments of disgrace and blame are superseded by the need to have a place in the group and keep the bully on side. In the present investigation, there was no exhibition of charitableness in the bystander group until they were required to achieve a goal of the issue, and soon thereafter some acknowledgement of the mental misery to the victim became superficial.

Especially for female students, they view cyber bullying as an issue yet one infrequently examined at institute, and the pupils do not see the school region work force as supportive assets for managing cyberbullying, students are right now encountering the dominant part of cyberbullying cases outside of school day, with the conceivable exception of content informing by methods for wireless. It is possible that with better and easy access to social application such as MySpace and to the Internet by and large with progressively advanced phones, this can lead to an expansion in digital bullying amid the school day using such phones. It is suggested that school area that permit personal devices on site plan for this conceivable by ensuring that cell phone arrangements are approved with consistent results for pupils who utilize their telephones amid the school day. It is also suggested that institute regions have guardians and students read and sign the school districts' approaches in regards to adequate utilization of technology and accompany these policies with writing for guardians on cyber bullying. At last, institutes are urged to embrace cyber bullying preventive action programs that incorporate classroom exercises on cyber bullying to guarantee that students comprehend that focusing on colleagues through harmful posts or pictures on the web or through personal digital assistant devices is a typical type of harassing. Classroom exercises ought to incorporate steps that observers can take to report and react to cyberbullying, regardless of whether it happens around school compound or in the network of community.

From the students' point of view, it seems that if bullying conjures a great number of sensitive reactions where the pupils by majority express their views that they need to mediate and protect the victim in light of the fact that bullying is seen as rather unlawful which brings out sensitivity towards the victims and the bully. As for a bystander comeback, the widespread is when students look at social pyramids as essential barricade affecting their bystander reactions. As an illustration, pupils educated that they have battle interceding in the event that they have lower down position than the harasser, which thusly has been found to present self-ensuring and detached onlooker reactions as opposed to mediating to encourage the victim. Next is students' explanations of bullying, in this context, students are enquired the reasons why cyberbullying occurs and the concerns of peers as well as social hierarchies are once again recognized as vital. It gives the idea that just as persistent gathering strategies and social chains make tormenting the standard, and when anticipated that pupils need would fit in among their partners, they come to secure harassing. As such, bullying can be identified as a crowd process where companionship and social hierarchies create bullying. Two common explanations about bullying are it is define as occurrence due to the victims and the bully. When ascribing the causes of bullying to the victim, pupils describe the victim as being peculiar, diverse from the rest or divergent and this is why bullying occurs in the first place. In this case, bullying is depicted as a social development that put on the use of labeling when the victim is not up to the normal standard. Lastly, regarding gender identity and bullying, as mentioned before, bullying has comprises of varieties of expressions such as physical, verbal by name-calling and indirect via rumours or social exclusion. Females have been found to view indirect violence as more harmful in comparison to males. In the research on various kinds of bullying, young mean have been observed to probably participate in bullying as bullies and victims especially to take part in and encounter physical harassing, while young ladies are thought to be associated with, and regularly encounter in indirect bullying. Hence, gender variances have been interrogated due to mixed where in certain cases females have been found to use physical bullying. Bullying and pupils' perceptions on bullying should be assumed as complexity where these should be addressed from several perspectives. Students may also define cyberbullying differently as opposed to what the society's definition of it.

Technology as the Leading Cause for using Social Media

The study results also showed that counsellors cited technology to blame as the leading cause of the increase in cyberbullying. Although it is not accurate to blame anyone, technology should be blamed as the leading cause, especially if the perpetrators are not using technological advances properly. People should utilise phones and other means of communication for essential purposes, and if people value them, incidents such as cyberbullying will not occur. This suggests that human error with technology is leading to an increase in cyberbullying. It is incredibly alarming that problems such as slanders are transmitted easily through smartphones or images as a result of the technological revolution. As a consequence, with the significant changes in technology that have taken place over the past two decades, technological tools, including the internet, offer a very different daily relationship with societies and the world than has ever been seen before.

Identify the Common Methods of Cyberbullying

The second objective of this study was to identify the common methods of cyberbullying. Based on the results, the most common forms of cyberbullying were text messaging, followed by online harassment on social media, text messaging, and isolation. Text messaging and phone calls are often the most common methods of cyberbullying, which is consistent with the findings of this research. Typically, teenagers may now access text messaging and the internet more easily because of smartphone use. Thus, cyberbullies can harass at any time of day using electronic means as opposed to traditional bullying. Moreover, it is evident that the worst type of bullying is teenagers who are victims of anonymous bullying. However, according to this study, some victims have reported knowing the perpetrators but chose not to speak about it.

One of the perpetrators said that she began attacking the victim on social media because the victim was envious of her boyfriend's friendship with the perpetrator and talked behind her back. The perpetrator impersonates the victim on her Facebook account and posts insulting comments out of dissatisfaction and a sense of being challenged. She also stated that doing so gives her a sense of accomplishment. Females prefer to respond to pain and suffering or rejection with verbal outbursts rather than physical violence because words appear to be even more forceful than physical aggression. Another perpetrator indicated that she began harassing the victim on social media after refusing to give a presentation in class. Out of anger, the perpetrator posted mean comments, name-calling, and criticism about the victim. This suggests that these female's psychological development is somewhat strong during the teenage years, which is the time of most significant risk for females compared to males. Hence, this corresponds to the findings of the study, which show that the majority of cyberbully perpetrators are female.

The phenomenon mentioned above of spreading false rumours, gossiping, and reinforcing drama is an exciting example of how females bully in a much subtler way than males. Instead of just confronting their targets directly, female bullies more often create issues in the social circles of victims from behind the scenes, fabricating false and painful stories and allowing the ongoing drama to play out to the victim's detriment. Due to such incidents, people could be examined that bullying could take two forms: direct bullying, which involves relatively obvious attacks on a victim, and indirect bullying, which involves social isolation and intended expulsion from a group. It is equally important to understand the strength and danger of the second, less visible form of bullying.

Assess the Impacts of Cyberbullying from the Perspectives of Victims and Perpetrators

The third objective of the study was to assess the impacts of cyberbullying both on the cyberbully victims and perpetrators. The findings of the study reveal that cyberbullying has serious consequences, such as humiliation, loss of interest in attending school, anxiety, and depression for the victims. These consequences, for both victims and perpetrators, result in ongoing social and economic costs for the community, mainly as a result of technological penetration, making it nearly impossible for victims and perpetrators to escape reality. Moreover, these impacts on victims, in particular, can be long-term, and in some circumstances, they could last throughout their early adulthood. On the other hand, the perpetrators are more likely to experience positive changes in behaviour and harmful isolation. The victims who reported experiencing severe humiliation were recorded at a percentage of 44%. The impacts of cyberbullying experienced by them are always enormous, and they are noted in the literature. Some of the impacts mentioned involve negative emotional experiences, sadness, rejection, stress and anxiety, poor academic performance, skipping schools and suicide attempts. The findings of this study also discovered similarities in the previous research among the impacts reported in the literature. This study found that the majority of respondents felt humiliated and, thus, low self-esteem. Respondents reported having lower self-esteem after becoming a victim is in accordance with previous studies (Brighi *et al.,* 2012). Teenagers who declared to have been victims of cyberbullying also reported having more inadequate self-esteem, which happened because of offensive posts, messages, or texts shared with many people. Hence, the sheer number of people who are aware of the bullying can cause intense humiliation. Information transmitted through electronic systems or the internet is usually permanent and open. As such, any harmful sharing on this site will always haunt the victims. This causes prolonged trauma for the victim of bullying and forgetting this bullying incident will be more difficult.

Refusal to Attend School

About 24% of respondents in this study reported feeling sad and unwilling to go to school. Apart from that, the respondents also often felt scared and anxious every time they were at school. Because of that, it makes it difficult for them to be actively involved in the learning process. Even worse, they felt ashamed and eternally humiliated by the messages published online. Due to extreme fear, victims of cyberbullying will skip school to avoid being bullied. There are several effects of bullying incidents on students and schools; among them, the relationship between students and students and the school will be affected, and the level of absenteeism of bullied students will increase. The victims are also unable to focus on their studies at school. Bullying problems caused an unhealthy and unfavourable learning environment to those involved, whether they were bullies, victims of bullying, or spectators of bullying incidents.

Anxiety and Depression

Anxiety and depression reported at 32% in this study. According to the respondents, the added stress of dealing with cyberbullying on a regular basis has taken away their joy and contentment. From the researcher's point of view, victims frequently believe they are to blame for the bullying they are experiencing. These beliefs have an impact on their self-esteem, which leads to stress in their lives. Many researchers have shown that both cyber victims and bullies had the highest rates of anxiety, depression, and school absences compared to those not involved in cyberbullying. These people are most likely to have the highest self-esteem and also, fewest symptoms of health issues. This study also found that being a bully and a victim of bullying is a vital factor in the tendency of high self-stress results and found a significant relationship between measures of psychological anxiety and the number of bullying behaviours experienced by perpetrators. In addition, the frequency of becoming a victim had a negative impact on the mental health of victims. From the perpetrators' perspectives in this study, cyberbullying has impacted their behaviour. It has opened their eyes, and they are no longer engaged in cyberbullying due to the experience. This demonstrates that, despite their terrible actions, these perpetrators nevertheless still have some empathy. According to the findings, half of them admitted to being guilty, wrong and apologised to each other. This can also be seen from the victim's perspective, as they acknowledged that the conflict between them arose because of their unethical behaviour. The participants expressed that they had moved past the cyberbullying and were now in a better mental and emotional condition, feeling more robust and empowered. Although there is currently no literature that supports the beneficial results correlated with cyberbullying, it is impossible to guarantee that everyone will have a positive sense of self-worth following such a traumatic event.

Being Isolated

Isolation and rejection are not just experienced by victims but also by perpetrators. According to the findings of this study, the perpetrators have trouble getting along with others. The issue occurred primarily due to people in their immediate environment, particularly classmates who were aware of their story, isolating themselves from the perpetrators out of fear that they would do the same thing to them. Besides that, they are most like to feel embarrassed after bullying others, and in some circumstances, there is a high chance of them being expelled from school. Consequently, a student's academic development can be affected by a poor record. For example, because of previous bad records, future bully applications may be rejected by other institutions. Some of the perpetrators in this study have been rejected by their peers and transferred to different schools due to their actions. The new school, on the other hand, is aware of their predicament. The perpetrators, being themselves and engaging in unethical behaviour, were unconcerned. This is due to the fact that indefinitely displaying abusive words can provide the perpetrator with immediate satisfaction, but this satisfaction is only temporary. As a result, the perpetrator will become addicted to committing the act repeatedly and are often irresponsible. The takeaways from both perspectives are that their experiences are somewhat encouraging and, again, may demonstrate one's ability to deal with the damaging issue.

Discover Strategies to Prevent Cyberbullying

The final objective of this study was to discover possible strategies for preventing cyberbullying. It is critical to learn about the victim's effective and ineffective coping strategies in order to reduce the overall prevalence, poor health outcomes, and other impacts of cyberbullying (Davis, Randall, Ambrose, & Orand, 2015). The findings of the study indicate that the victims have strategies for coping with or preventing cyberbullying, such as seeking adult aid, saving evidence, and never sharing personal social media passwords. The counsellors also offer some suggestions on how parents can be more involved.

Seek Help Sooner

The respondents of the study reported utilising a variety of ways to cope with cyberbullying victimisation. Cyberbullying victims should report the abuse and seek assistance from adults, as this may aid in the prevention of the issue through increased awareness, monitoring, and education. However, most of the respondents did not seek help from others due to many reasonable factors, such as they felt embarrassed and fear of being scolded by their parents. Approximately about 57% of the respondents stated that they should seek help earlier, especially if the behaviour is causing them great suffering. They knew they needed help and needed to find someone who could listen to them, help them process what was going on, and help them work through it. Some of the respondents reportedly blamed for cyberbullying by their parents. Some attempts at intervention by parents in response to reports of cyberbullying and attempts to involve teachers were successful, while others were not. This is because there is no evidence reporting the victim to an adult will successfully resolve the problem. In this finding, few of the respondents notified the adults, and as a result, immediate action was made to make solutions to address the issue.

Keep Records of Evidence

Furthermore, based on the findings, any pieces of evidence have been saved by the respondents. The only good news regarding cyberbullying is that it can usually be recorded, preserved, and shown to someone who can assist. When things have gotten out of hand, they used the evidence in this manner, which appears to be effective in this situation. Keep as much evidence as possible. Take screenshots of every email, SMS, WhatsApp message, social media chat, and keep track of the date and time. All screenshots can be saved to a computer's hard disk by copying and pasting them into a text document. The goal is to collect as much data as possible regarding cyberbullying activity that will assist the victim in determining the best solution to the problem.

Avoid Sharing Passwords with Others

Despite the fact that these respondents had previously failed to seek help, this study revealed that some chose to actively oppose cyberbullying victimisation by claiming to protect their social media accounts by never sharing passwords with others. According to the findings, the victim shared her social media account password with her perpetrators, allowing the perpetrator easy access to the social media account. As a result, the victim realized she should not share her password with anyone. She was humiliated by immoral and negative comments about her on her social media account.

These findings can also be learned from Malaysia. According to Tan Sri Mohd Azumi (2013), the practice of sharing pin numbers and passwords with spouses is blamed for the majority of cybercrime involving ATM cards, cell phones, etc. computers, emails, and social media accounts. Consequently, it shows that sharing a password with others brings negative impacts. In these findings, this approach serves as self-action, and it may not be effective in some cases despite the fact this approach can be considered the most common strategy in dealing with the issue.

Awareness Raising Programs

The findings also revealed that parents should take an active role in helping their children. There are numerous methods that schools, parents, and students may work together to combat cyberbullying and react when it occurs. For example, teachers and parents are educated about cyberbullying, and teachers should limit mobile phones by students in the school environment. A total of 75% of the counsellors in the study suggested parents should monitor their child's gadget activity or control their phone usage. For example, limit the amount of time or days that children are allowed to spend online. A previous study also discovers some similarities with the findings where she, for example, could limit their children's usage of social media by limiting their access to gadgets or only giving them away at specific times. Apart from that, the schools need to organise a talk or awareness-raising program to provide parents with sufficient knowledge of cyberbullying. With this initiative, parents can be alert, and they should be more involved in the children's daily lives by having a heart-to-heart conversation such as asking how their day was, what happened at school, etc. It can help make their children feel comfortable to have a conversation with them, especially to talk about their problems.

CONCLUSION

In conclusion, cyberbullying is a new sensation that is only worsening the non- virtual bullying issues. cyberbullying is directed at a distance, leaving zero physical mark and facilitated only by words, and images or any other online mediums, it appears that tutors, parents and policy-makers have shown deliberate recognition towards the potential severity of the consequences of this action faced by the victims. Cyberbullying has put an individual's life to experience from anxiety, depression, stress and loss of confidence. With the expansion of the Internet and more social networking sites, cyber bullying has become more common and more serious issues worldwide. Cyberbullying can also influence the exhibitions, participation in school, self-assurance, well-being and the reputation of a person. Cyberbullying can occur at any place even at home by means of electronic mail, SMS, cell phones and internet based websites in our everyday lives and numerous individuals are included in which majority of it are the youths. It is apparent that cyberbullying on social media among high school students is a problem that needs immediate attention. The high school administration, other private organizations, university officials should address this serious issues because the increase in technology where it constantly changing and instances of cyber bullying.

The most effective way to tackle the issue is for the representative high school to actually work collaboratively with active counseling institutions or other community agencies. Counselors can help these schools to develop interferences and prevention strategies. Examples of the strategies are cyberbullying prevention in educational ways such as creation of posters, brochures, conferences, and web page announcements about the danger of cyber bullying. Educators are advised to closely monitor the students especially those who do not get socially defamed by other pupils. Another means is for the high school to introduce intervention strategies. It is no doubt to combat the cyber bullying, every single person's efforts should be considered to take part in institutes, among the families, pupils and humanity.

Since cyber bullying can also occurs at the external of school borders, school may direct such issues back to guardians, informing that they have zero legitimate jurisdiction. It is also imperative for the country councils or any agencies to educate the societies on the seriousness of cyber bullying. Students or youths can create a group in fighting cyberbullying by utilizing the technology available and also to learn the responsibilities of helping the victims of cyberbullying. Awareness of the consequences should be improvised at a young age starting 4^{th} grader to make them understand the impacts of misusing the technology to hurt other people. These kinds of promotions should be implemented to all schools. Students should also understand the importance of seeking help from liable adults such as parents or guardians and teachers when cyberbullying occurs. Students should also be persistent when seeking help not just from one party but also to other people if the cyberbullying has become severe.

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Chapter 14
Challenges of Digital Transformation:
Impact on Culture and the Role of HRM

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ABSTRACT

Digital transformation has been gaining attention amongst organizations, especially in keeping up with the demands and changes posed by COVID-19 pandemic. However, the pandemic introduced challenges to organizations in the context of digital transformation and caused human resource management (HRM) to deal with such a challenging environment, impacting their practices and the workforce. The chapter intends to uncover the challenges of digital transformation following the COVID-19 crisis which is affecting the culture of one's organization. It also aims to provide insights of how HRM can play an important role in addressing these challenges. The result is promising. Digital transformation affected to HRM with challenging business processes within the organization. The study will be valuable for organizations to understand the issues surrounding digital transformation in Asia and comprehend the potential means of managing these issues, especially for the HRM, and it contributes to knowledge in the area of digital transformation, information technology, and innovation.

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INTRODUCTION

In recent years, digital transformation has been increasingly becoming the focus of business contexts, especially in keeping up with the demands and changes that exist in the ever-changing world of modern technology. With the growth of these new technologies, companies began to seek for ways to not only adapt and survive in this digitalized environment, but also to work on enhancing their business operations with the utilization of the available technologies, so as to promote a wide range of innovations in the digital field to the customers, employees and the workforce. Additionally, the use of internet and information technology are common for the human resource management (HRM) to function in the workplace, particularly in terms of storing and securing data and company's files, analyzing performance of the employees and managing their payrolls, any administrative work as well as the process of recruiting of new employees or trainees into the company. HRM plays significant role in the process of digital transformation in terms of facilitating the managers in adapting new digital technologies, enable the firms to see the opportunities offered by these technologies and adapt to changes as well as assisting employees in applying new business models (Mitrofanova et al., 2018).

What is more, the Covid-19 pandemic has been on-going since its first outbreak in China in December 2019 and organizations, businesses as well as individuals have been experiencing difficulty in adjusting their life to the new normal. Following that, authorities from different parts of the world, including Asia, have addressed to the effect of this pandemic by enforcing travel restrictions, inducing lockdowns, implementing work from home basis and online education system, closing down of facilities and shopping centres and so on. The emergence of this pandemic added new challenges to a number of organizations as it forced them to establish IT solutions, going towards digitalization and subsequently, further develop remote work. With this pandemic, it is now a substantial requirement for any firms to take into account the application of technology into its operations as traditional approach is no longer adequate to keep up with the new changes that are brought by Covid-19. Also, there has been an apparent escalation in the usage of electronic and digital platforms among organizations and firms in carrying out their daily work activities during the pandemic. As such, most organizations are now forced to perform meetings, communicating with one another and sharing information among colleagues through the utilization of digital tools and internet platforms including Zoom, Microsoft Teams, Dropbox and so on.

Furthermore, this pandemic has caused the HRM to deal with such a challenging environment, impacting both of their practices and the workforce. If digitalization is not taken into consideration, especially during this pandemic, handling a number of employees and personnel within an organization and managing the business operation would be a hassle. Also, the key to digital transformation is believed to be related more to the people as opposed to the technology (Frankiewicz & Chamorro-Premuzic, 2020). As such, it is the culture that drives the success of digital transformation (Hartl & Hess, 2017). Thus, as a central pillar of the people in the workplace, it is crucial for HRM to take into account digital transformation to lead the organization and to assist these people in coping with the difficulties resulted from the abrupt changes in the environment.

Impact of Covid-19 in Asia Regions

In March 2020, the World Health Organization (WHO) has declared Covid-19 outbreak as a pandemic that posed substantial threat to global population. As such, there were about 118 000 reported cases of Covid-19 affecting more than 100 countries at times of the declaration, by which majority of these cases comes from China, the Republic of Korea and two other countries. In addition, it was also recorded during the pandemic declaration that more than 4000 people have died and it had risen significantly in early April 2020, exceeding 85 000 fatalities globally ("WHO Director-General's opening remarks at the media briefing on COVID-19 – 11 March 2020,"2020; UNDP, 2020). Following that, lockdowns have been induced in a number of affected countries and subsequently, the rapid increase in number of covid-19 cases have also led more countries in Asia to close their borders and restrict internal and external movement. As a result, the pandemic caused countries to experience economic shock, severely affecting many industries and sectors including financial markets, education, healthcare industry and so on, yielding to disruption in regional supply chain, global recession as well as an increase in the number of unemployment and income losses in the Asia and Pacific region (UNDP, 2020).

Since the first outbreak in China has taken place, Chinese-centred manufacturing value chains have been intensely affected, followed by those in the Asia Pacific region and other parts of the world. Additionally, the pandemic has created such a challenge to the global supply chains, putting countries with large export shares to be at risk. This includes countries in the Asia Pacific region such as Australia, India, Japan, Macau (China), Mongolia and the Philippines, where their overall export values were revealed to have reached double-digit negative growth rates in the first three quarters of 2020 (ILO, 2020). Not only that, the international tourism is hit hard due to the travel restrictions imposed by the authorities from different parts of the world to control the spread of Covid-19. As compared to 2019, it was reported that the international tourist arrivals has reduced by more than 50% in the following year among the Asia Pacific regions, including China, Japan, Republic of Korea, Thailand, Australia, Indonesia, Singapore, Vietnam, New Zealand, Sri Lanka and Maldives (ILO, 2020).

What is more, the lockdowns and movement restrictions imposed in various countries in managing the effect of Covid-19 pandemic have severely influenced firms and business, especially the micro, small and medium enterprises (MSMEs), putting them at the verge of bankruptcy. These enterprises are known to provide noteworthy contribution to the economies in the Asia Pacific region in terms of economic growth, employment and trade. However, the internal and external movement restrictions challenged the MSMEs, not only in getting access to the resources, but also to continue with their business operations. For instance, reports indicated that between January and May 2020, 18% of the SMEs in the region had to shut down their business operations due the pandemic, relative to the 26% of the global average (Khatun, 2020).

Furthermore, it was revealed that Asia Pacific region have experienced losses in working hours as working from home basis was practiced and strengthened at a great extent during the Covid-19 pandemic. In particular, it was reported that during the first quarter of 2020, 7.3% of working hours were lost and this corresponds to 125 million full-time equivalent jobs relative to pre-pandemic levels. Moreover in 2020, the employment levels in the region experienced a substantial drop of about 4.2% in comparison to pre-crisis numbers, which further indicated that the pandemic has resulted an estimated loss of 81 million jobs across the region (ILO, 2020).

Nonetheless, there has been a prominent growth in demand for medical and health services due to the Covid-19 crisis. Moreover, the restriction of activities involving interaction and gathering among individuals have caused internet-related technologies and digital platforms to gain substantial attention, where people are moving towards adopting these technologies for implementation of electronic commerce, online learning system, online communication among employees in various organizations, online delivery services and so on.

Aims of the Study

Previous studies have discussed how different organizations and firms were affected by Covid-19 pandemic, especially education, trading, tourism and healthcare sectors. However, limited focus has been placed on HRM and the extent to which HRM are addressing the challenges posed by the pandemic concerning the process of digital transformation. Thus, the chapter intends to uncover the challenges in the digital transformation following the Covid-19 crisis which affecting the culture of one's organization. Specifically, the study aims to contribute to human resource literature by examining the role of human resource management in helping to tackle the challenges involving agility, skills and competencies; and leadership capabilities as well as investigating into the current actions taken by organizations to navigate through the crisis, especially in the Asia Pacific region.

Research Objectives

The specific objectives of this research are elaborated as follows:

1. To identify the challenges of digital transformation in the time of Covid-19 in Asia Pacific region.
2. To investigate impact of these challenges on organizational culture within the digital transformation in terms of agility, skills and competencies; and leadership capabilities.
3. To examine the extent to which HRM can address the challenges posed by the pandemic concerning the process of digital transformation.
4. To examine the current actions that have been taken by organizations to navigate through the crisis, especially in the Asia Pacific region.

Research Questions

Based on the research objectives, the following research questions have been formulated:

RQ1: What are the challenges of digital transformation in the time of Covid-19 in Asia Pacific region?
RQ2: What are the impact of these challenges on organizational culture within the digital transformation in terms of agility, skills and competencies; and leadership capabilities?
RQ3: How can HRM address these challenges posed by the pandemic concerning the process of digital transformation?
RQ4: What are the current actions that have been taken by organizations in Asia Pacific region in order to navigate through the crisis?

Methodology

To account for the above-mentioned research objectives and research questions, the present study is implemented based on analyzing multiple sources including recent news, articles, reports, journals and conference proceedings concerning the process of digital transformation in the time of Covid-19 in the Asia Pacific region as well as the role of human resource management. In particular, the study investigates through these sources the difficulties experienced by the HRM in a number of organizations during the pandemic hit and examines how HRM are responding to these challenges in the transformation. With that being said, the chapter is structured in the five consecutive manners. Firstly, the paper discusses the general overview of the role of HRM in an organization. Next, information related to digital transformation is elaborated with an inclusion of the discussion on digital transformation strategy. Thirdly, the paper identifies the challenges of digital transformation in the time of Covid-19, especially in the Asia Pacific region and highlights the impact that these challenges have on the organizational culture within the digital transformation in terms of agility, skills and competencies; and leadership capabilities. Following that, the paper discusses how HRM can address the challenges of digital transformation throughout the pandemic and fifthly, it further examines the current actions that have been taken by organizations to navigate through the crisis, especially in the Asia Pacific region. Apart from that, future research directions are also presented, followed by the conclusions of the study at the end of the chapter.

Significance of the Study

The study will be valuable for organizations and firms to understand the issues surrounding the process of digital transformation in Asia and comprehend the potential means of managing these issue, especially for the HRM. Not only that, researchers and other stakeholders can gain meaningful insights on how various organizations are responding to the new normal and the current actions that they have taken to navigate through the crisis. Furthermore, conducting this study to address the concerns related to digital transformation would fundamentally contribute to knowledge in digital transformation area as well as information technology and innovation.

THE ROLE OF HUMAN RESOURCE MANAGEMENT

Human resource management (HRM) plays critical role in not only managing the people in an organization, but also ensuring that this organization can accomplish its missions and achieve success through its people. Apart from organizational effectiveness and human capital management, HRM also keeps its eyes on their goals to provide relevant support and development of knowledge and skills of their employees, rewarding them to value their achievement, satisfying diverse needs as well as reducing the gap that exist between rhetoric and reality (Armstrong, 2006).

What is more, Armstrong (2006) emphasized how HRM is concerned with the total interests of an organization at which it is being represented by its people and members employed in the organization. Thus, it can be comprehended that HRM binds its significance towards strategic integration and the management of culture, by which it streams from the beliefs, values and vision of the leaders or the top managers and their leadership to their subordinates (Armstrong, 2006). These beliefs subsequently mold the perceptions and understanding of the employees and hence, affecting their behavior and the extent to which they approach their job tasks. Additionally, this further requires its people to commit, adapt and fit into the culture (Armstrong, 2006).

One can understand the life of an organization through its culture. The culture that is embedded in an organization provides the basis for the employees to function, in terms of leadership, communication, interaction and knowledge management as it involves with a set of beliefs, assumptions and meanings that contributes to one's interpretation, actions and thus, behavior for different situations (Alvesson, 2012; Ravasi & Schultz, 2006). Besides, HRM also contributes meaningfully to organizational culture in such a way that it is the people in the organization or employees, whom the HRM has to deal with, who are involved with encapsulating and enhancing a specific culture. With appropriate HRM practices and strategy, organization can be surrounded by a strong culture to not only accomplish organizational mission and goals, but also to succeed and survive the challenges in the era of advanced technology.

In addition, technology and culture is connected to one another in such a way that the adoption of new technology or digital transformation in the workplace can produce an impact to the organizational culture either positively or negatively, and vice versa. Furthermore, as people behaves differently in the workplace in times of crisis, a culture should be moving towards promoting changes to adjust to the evolving environment, especially in this rapid technological change era. Also, HRM is responsible to facilitate, handle and keep up with these changes so as to progress successfully in the transformation and drive the cultural change within the organization. Therefore, it is crucial for human resource management pay attention the people of the organization that shapes the organizational culture as well as the need for formal strategic planning when it comes to digital transformation (Kane et al., 2015).

DIGITAL TRANSFORMATION

In business contexts, digital transformation takes into account the process where technology is being utilized to facilitate one organization in establishing new models for its business, transforming processes, products, software, systems and other organizational aspects. This enables the organization to not only enhance customer experience and acquire valuable revenue, but also to attain greater competitive advantages as well as achieve better efficiency and performance (Schwertner, 2017; Bekkhus, 2016; Piccinini et al., 2015). It is also claimed that digital transformation is where organizations are driven by digital technologies that can aid in implementing responses to earn or sustain the competitive advantage, by which the efficacy of these responses depends on the extent to which the firms able to discern disruptions, seize them as well as adjust their business models correspondingly (Vial, 2019). These technologies can include, but not limited to, mobile, social media platforms, internet of things, cloud, analytics or embedded devices that allow businesses to progress well in terms of its performance and operations (Horlacher et al., 2016; Singh & Hess, 2017; Nwankpa & Roumani, 2016). In addition, digital transformation further benefits people and the organization that they are currently working in, by playing its role in boosting their productivity and creativity, which can be in the terms of decision making, innovation, augmentation and connectivity. As such, it promotes organizations to meet the market needs as well as foster higher levels of cooperation for sharing information at a short period of time (Demirkan et al., 2016).

In spite of these positive impacts, digital transformation also give rise to a number of threats for individuals and organizations. Traditional approach to job task execution and the normal means of managing the processes and business operation in an organization are no longer sufficient to progress within this transformation. As such, introducing new technology to the workplace requires a range of skills and expertise to respond to changing business conditions as employees are now exposed to new ways of working, and the organization experience changes in its processes and systems. Moreover, this also can result in a potential decline in employees' performance and productivity during the period of transformation process if they are not prepared for the change. Also, not only the presence of skill gap among the workers, the lack of commitment and support from leader and top management can also lead to resistance to change and implement the new technology. In addition to that, budget constraints and security issues can potentially hinder firms from entering and progressing successfully into digital transformation.

Digital Transformation Strategy

In order to move forward into effective digital transformation, it is fundamental for organizations or firms to spend a considerable amount of time to plan out and establish a strategy that permits people, processes and technology to unite together to expedite the favorable social impact and progress towards sustainable development, to take into account the crucial aspects that can affect business operations prior to its implementation.

Firstly, there is a need to outline the goals of the transformation or the reason behind its implementation for the organization. In business contexts, digital transformation is commonly carried out by firms with the objective to attain greater competitive advantage, strengthen customer experience, introduce innovation culture, improve efficiency, productivity and performance (Schwertner, 2017; Bekkhus, 2016; Piccinini et al., 2015; Demirkan et al., 2016). It is the role of HRM to ensure that the digital transformation strategy is consistent with organizational targets and goals, especially in time of changing environment to progress well in the transformation. Failure to do so can promote additional risks to organizational culture and thus, affecting performance. Apart from that, digital transformation requires the HRM to revise and comprehend the culture of organization as it is the culture that acts as a driving force to digital technology adoption and contributing significantly to the success of business transformation following digitalization (Hartl & Hess, 2017). Organizational culture includes values and assumptions that directs and affect employee's behavior and the extent to which they approach their job tasks (Armstrong, 2006; Alvesson, 2012; Ravasi & Schultz, 2006). Not only that, as it is the employees who are involved with encapsulating and enhancing a specific culture, therefore it is necessary to look into the factors affecting their willingness in adopting the new technologies such as skills and capabilities, well-being and mental health, motivation, support, confidence and so on. What is more, the current state of the organization need to be understood prior to executing digital transformation, especially its financial capabilities in introducing the new technologies to their employees. In particular, the extent to which the organization is able to accommodate the technology financially affects the process of the transformation, for instance, the insufficiency of financial capability restricts organization to perceived urgency to act (Matt et al., 2015).

The following section of this chapter further discusses the challenges of digital transformation following the Covid-19 crisis in terms of agility, skills and competencies; and leadership capabilities which further affecting the culture of one's organization.

CHALLENGES OF DIGITAL TRANSFORMATION

Digital transformation is no longer thought of as a choice to apply technology in supporting business operations, but it is now considered as a requisite to the organization's innovations, specifically in surviving with the disruptive environmental changes caused by Covid-19. The pandemic has not only affected the way that people communicate with one another within an organization, but also transformed the way organization operates in terms of its system and processes on a daily basis, thus challenging HRM to revise their practices and strategies to achieve organizational goals.

As organization varies in terms of their cultural content including beliefs, values and assumptions, thus deploying and handling digital transformation requires the human resource management to review the culture of organization as it is the culture that acts as a driving force to digital technology adoption.

For instance, a number of scholars from diverse backgrounds and fields acknowledge the fact that culture can contribute significantly to the success of business transformation following digitalization (Hartl & Hess, 2017). In particular, it is the culture that enables the firm to deal with dynamic changes and cope with the demands so as to progress towards gaining competitive advantage in all of its operations (Osibanjo & Adeniji, 2013). Reviewing the organizational culture includes understanding of the internal values and behaviors, specifically involving a group of shared mental assumptions that further direct the interpretation and actions in the firms by identifying relevant behavior for diverse circumstances (Ravasi & Schultz, 2006).

Despite the fact that it is typically addressed as a driving force to digital transformation, organizational culture tend to promote challenges to the organization with respect to this transformation. As it is previously mentioned, technology and culture is connected to one another, and hence, changing or adopting technology will alter the culture within the organization at which the adoption takes place. The challenge here is related to the extent of which organizations are able to balance its effort in the transformation with people's values and behaviors. As such, McKinsey survey results have revealed that cultural and behavioral changes has led organizations to be restrained from meeting digital priorities and attaining success in digital world (Goran et al., 2017). The study focuses on three main challenges of digital transformation posed by Covid-19 pandemic in Asia Pacific region: agility, skills and competencies; and leadership capabilities. Additionally, this section will explore the impact of these challenges on organizational culture within this transformation.

Agility

It is necessary for the human resource management to look into the relevant approaches to promote and boost agility as it is considered as one of the key factors in accelerating digital transformation. Organizational agility can be thought of as a core competency that takes into account the ability to reconfigure processes, structure, strategy, people, technology as well as adapting to dynamically changing environment in a short period of time so as to attain competitive advantage and progress towards achieving organizational effectiveness and better performance (Harraf et al., 2015; Gupta, 2018). An organization is said to be in agile state when it has the ability to respond quickly in dynamically changing environment. This include making decisions speedily and perform their tasks at a fast speed (Minami, 2020).

Lack of agility has been one of the top concerned challenges identified by business leaders when it comes to digitalization (Kane et al., 2016; Gupta, 2018). Traditionally, decisions are made physically through face-to-face meeting or within groups to discuss about the relevant issues being encountered in the workforce. Nonetheless, as Covid-19 caused individuals to practice social and physical distancing and employees are compelled to work remotely on a daily basis, decisions are now made online through video conferences and via other digital platforms (Minami, 2020), which in turn alters the culture of one's organization. As such, the delay in the process of decision-making can result in extension of time for a particular task to be completed, and thus not only affecting the organization to make progress within the digital transformation, but also contributing to low level of: employee engagement, innovation, adaptability and organizational performance.

Due to the lack of digital agility, it was reported that majority of the organizations in Asia Pacific region, including Australia, New Zealand, Malaysia, Indonesia, Singapore, Japan, Korea, Thailand and Hong Kong, faced difficulty in adjusting their financial plans for the year, reorganizing their organizational structures as well as managing new approval and business processes (Yee, 2020). In addition to that, there has been deficiency in an enterprise-wide culture of agility among 69% of the organizations in Malaysia in the sense that their processes are found to be not entirely adaptive and agile following the pandemic effect (Yee, 2020). In Japan, the local subsidiaries are also experiencing a tough time in handing work from a distance. What is more, issue related to the process of decision-making among these subsidiaries has been arising since before the pandemic hit the country and it has become aggravated since then. According to Minami (2020), it was reported that originally, there has been an absence in visualization or streamlined of the work process in the sense that the job tasks were carried out differently depending on the individual as they lack of information regarding the approval of their work. In addition, getting these approvals take up a great deal of time to be spent, as the approval power can only be obtained from those in the high ranking positions, thus slowing down the decision-making processes and reduce the speed of task execution. Apart from that, the presence COVID-19 pandemic has further added new difficulties to these organizations as it forced them to establish IT solutions, going towards digitalization and subsequently, further develop remote work (Minami, 2020), which subsequently challenging the employees to adjust themselves in the new normal.

Skills and Competencies

Another threats to digital transformation is that people are lacking of the crucial competencies in terms of skills, knowledge and attitude to respond to these transformation (Rees, 2020). In order to gain competitive advantage, organizations require competent individuals who possess the ability to comprehend the meaning and intricacy of digitization (Vey et al., 2017). In the time of Covid-19 crisis, it is crucial for employees to know and understand how to work with new technologies and digital tools that are used in their organization processes in order to work flexibly in approaching and performing their tasks individually or within their team as the pandemic has led to limited physical face-to-face interaction and work has been conducted on a remote basis.

However, reports indicated that organizations, including Asia Pacific region, are lacking of skills and capabilities required to adapt to changes in times of crisis within the digital transformation. In Malaysia, it was reported that there has been lacking of skills and expertise among the employees in majority of the organizations (Yee, 2020). In particular, only less than 50% of them are prepared with digital skills and capabilities, whereas about 13% of the employees have little or no digital experience or skills. Similarly, a shortfall of digital skills has also challenged the organizations in Hong Kong in times of the pandemic following the digital transformation. As such, reports have shown that a high percentage of Hong Kong's organizations indicated that there are about more than half of their employees are not fully equipped with the relevant digital skills and capabilities and approximately 11% of them have no experience or skills appropriate for digital technologies (Chan, 2020). The potential reason behind this lack of digital skills is believed to be due to the presence of such mindset among the organizations which projecting towards the fact that talent is not accounted as an asset contributing to competitive advantage, thus less emphasis was placed on digital skills development (Yee, 2020; Chan, 2020).

The changes to the nature of workforce brought by Covid-19 pandemic produce challenges as digital skills, technology, digital tools, online communication and remote working has now become increasingly crucial to organizations, especially for economic recovery. What is more, organizations are now facing difficulties in fostering and organizing workforce training due to the lockdown and the practice of virtual work environment during the pandemic. Furthermore, organizations are inclined to experience slow progression or failure to embrace digital transformation if the employees are unprepared to these changes due to lack of skills necessary to understand and apply the adopted technologies effectively. This shortage of skills can consequently increase employees' resistance to digital adoption in the workforce and hence, impacting their engagement in digital transformation processes.

Leadership Capabilities

In order to transform digital investment into digital advantage, there must be a capable and competent leader that provide the relevant support for the subordinates to progress towards effective digital transformation. Gupta (2018) highlighted that management need to put extra effort, not only in gathering the right people in a team and assigning them with the appropriate roles and responsibilities, but also designating a competent leader for the team, especially during the process of digital transformation. Recruiting individuals with digital talents can also help the organization to cope with these transformation.

Yet, the presence of individuals who are experts in IT and digital tools will not be sufficient to contribute to transformation success. Instead, support and motivation from the leader and top management together can promote a corporate culture that productively directs the digital transformation. Leadership commitment to digital transformation is considered as one of the key factor contributing to the effectiveness of this transformation. However, due to Covid-19, leaders and managers now have to deal with new obstacles following digital transformation as according to Kniffin et al. (2021), they now have to supervise and foster the development of their subordinates virtually and remotely. Given that people are now facing different challenges and circumstances in their lives in relation to pandemic effects, leaders not only have to strive in ensuring that their teams are engaged with one another while working virtually, but they also have to make substantial efforts in motivating and comforting their subordinates in order for them to attain productivity and accomplish job tasks following the digital transformation carried out in their workplace. Leaders now have to clasp their roles as drivers of the new patterns of development resulted from the crisis, in particular, becoming the supporters of on-going innovation processes. Following that, concerning the understanding and organizing the technology adoption processes creates additional challenges for leaders, especially in times of the pandemic, as according to Andersson and Rosenqvist (2018), there is a need for leadership orientation to be updated, internal processes to be revised as well as reconsideration in new structures, interactions and capabilities.

In Asia, it was discovered that majority of the organizations are still in the early stage of their digital transformation journey (Microsoft Asia News Center, 2017). In particular, there is scarcity in the number of business leaders who have a full strategy relative to this transformation (Microsoft Asia News Center, 2017). Furthermore, it was implied that business leaders in the regions including Japan, Hong Kong and India have demonstrated a greater level of discomfort with ambiguity that obstructed them in coping and adapting to the changing digital environment (Korn Ferry Institute, 2018). This can produce an impact not only on their leadership capabilities, but also their subordinates' motivation, engagement and performance. Thus this provides the reason for the current threats faced by various organizations in Asia, especially for the leaders in keeping up with the pace of digital transformation following the Covid-19 pandemic.

Apart from that, in times of Covid-19, lack of digital mindset is reported to be one of the top three challenges in digital transformation faced by a number of small and medium-sized businesses in Indonesia, South Korea, Vietnam and New Zealand (2020 Asia Pacific SMB Digital Maturity Study, 2020). Leaders who are unable to promote digital mindset among their employees can cause the latter to feel reluctant to learn and adopt the new technologies being introduced in their workplace, hence challenging the organization to progress in the digital transformation, especially responding to the Covid-19 pandemic. Due to the changing in the work condition, the pandemic has further contributed to high risk of job stress, exhaustion as well as distant attitude towards work among the individuals in the workplace (Kniffin et al., 2021). What is more, the lack of support and concern that leaders supply to their subordinates can further complicated this issue, thus affecting their performance.

DIGITAL TRANSFORMATION: A CASE OF BRUNEI DARUSSALAM

Unexceptionally in response to the Covid-19 pandemic, Brunei Darussalam through its recently introduced Digital Economy Masterplan 2025, are currently working to progress towards digital transformation into becoming a Smart Nation that not only has a vibrant and sustainable economy, but also encompassed of society that is future-ready and digital driven as well as a conductive digital ecosystem (Digital Economy Council, 2020). The implementation of the five-years masterplan is anticipated to be making fundamental contribution to the nation's socio-economic growth through the process of digital transformation, which subsequently leading to a promising support towards the goals of Brunei Darussalam's Vision of Wawasan 2035 constituting of highly educated and skilled workforce, high quality of life as well as dynamic and sustainable economy. As such, one of the four strategic thrusts, industry digitalization intends to promote awareness on the Fourth Industrial Revolution (IR4.0) technologies among stakeholders, particulary the MSMEs to provide further understanding on digitalization; foster its adoption through training programmes, application and project showcases; and also to examine the readiness and capabilities of stakeholders in adopting the IR4.0 technologies (Digital Economy Council, 2020).

Following the industry digitalization, the manpower and talent development thrust is currently serving to provide an assurance on human resources in Brunei with the appropriate skills and capabilities that are necessary for dealing with the rapid technology advancement. In particular, its attention is not only projected to the matter of analyzing the need for digital jobs in various industries, but also to enhance education programmes and develop capabilities among the locals and existing workforce through re-skilling and redeployment of human capital. In reference to the masterplan, the government also plays a subtantial role in the digital transformation journey of the nation. The goverment digitalization thrust focuses on pursuit of a digital identity ecosystem, public experience innovation and evolvement of cloud usage. In addition to that, to accelerate towards a thriving digital industry, the masterplan puts an emphasis on the ICT sector to expand its effort in addressing the application of technologies for the purpose of cultivating and sustaining growth among the local digital sector.

To date, several initiatives have been taken by authorities and organizations in Brunei in relation to move forward into digital transformation during the pandemic. For instance, a statutory body called Darussalam Enterprise (DARe) established an online platform known as the Industry Business Academy that aims to provide opportunities for organizations, specifically the local MSMEs, to accelerate towards sustainability through its business capacity building courses and developmental programs involving accredited experts worldwide. Such courses also cover the domains on human resources, business skills, innovation and design; and technology skills necessary for businesses to expand their knowledge to confidently regulate their business and attain their goals (DARe, 2020). Not only that, a regional initiative introduced by The Asia Foundation, known as Go Digital ASEAN, has also been implemented in Brunei in 2020 to assist the society in responding to the Covid-19 pandemic (Wong, 2020). This digital platform serve to equip local youth and business owners with fundamental skills and knowledge, including enterpreneurial and digital literacy skills, through training programs to facilitate them in the process of initiating their own businesses and further strengthening their ventures, especially to cope with the changing environment posed by Covid-19 (Wong, 2020). On the other hand, the Authority for Info-communications Technology Industry of Brunei Darussalam, AITI is currently directing its focus on expanding the application of digital technology among local MSMEs in moving forward to drive the digital transformation journey of the nation. With its vision to transform Brunei into a ‘Connected Smart Nation’ by 2025, AITI’s five-year strategic plan laid out on three key outcomes: thriving digital industry, a connected nation, and a digitally-enriched society. Their initiatives include conducting training to equip individuals with future-ready digital skills, ensuring the adoption of targeted tchnology among MSMEs, making progress towards developing at least a quarter of 110 digital businesses by 2025, securing the readiness of 5G spectrum bands by 2022 and ensuring the adoption and practice of personal data (The Scoop, 2021; AITI, 2021). With these initiatives, Brunei would be able excel in its digital transformation journey throughout the dynamically changing environment, especially to cope with the challenges posed by Covid-19 pandemic.

HOW HRM CAN ADDRESS THESE CHALLENGES

HRM should ensure that organizational processes are consistent with digital transformation. As such, they should spend a considerable amount of time in revising and amending the organization’s strategy and practices in order to align with the organizational goals in times of Covid-19 pandemic. Without a clear strategy, leaders are inclined to face difficulty in driving digital transformation across the organization, thus affecting both individual and organizational performance. Therefore, communication is key to HRM for transmitting the information regarding the organizational needs and goals following the Covid-19 pandemic in terms of its digital transformation strategy among the leaders or top managers in the organization so that leaders can comprehend and follow through those information and subsequently enable them to outline a digital vision for their team members. When it comes to effective digital transformation, it is fundamental for HRM to firstly take the responsibility in spreading the digital mindset across the entire organization as it is the mindset that shapes the organizational culture, thus influencing the employees to commit, adapt, be agile and fit themselves into this culture. In particular, this mindset flows from leaders to the rest of the people in the organization to entirely embrace a digital experience and provides them with clear direction and vision towards transformation. With this mindset, employees become inspired and motivated to engage in the transformation journey and able to view this transformation as an opportunity for them to be innovative and embrace change.

There is a need for the leaders to not only have the agile mindset and vision to drive their teams, but also be flexible in stepping up their leadership capabilities to provide the necessary guidance to their teams and the organization to nurture the new ways of working and the excel in the digital transformation. Therefore, it is the role of HRM to ensure that leaders and managers have the right capabilities for them to effectively lead the digital transformation among their team members. With that being said, HRM can invest in virtual leadership development program that enables managers to enhance their level of confidence, agility, leadership quality and hence their commitment to motivate and lead their team members towards achieving success in the changing environment. Additionally, HRM should establish a means of measuring the level of digital maturity of the leaders, especially in terms of utilizing the new technology being adopted in the workforce, thus lower level of maturity calls for further training to be implemented.

Not only that they have to have the leadership capabilities to lead the team effectively in the new normal, it is also necessary for leaders or managers in the organization to ensure that their subordinates possess the skills and competencies required to adapt to this changing environment. In this context, HRM should play its part in providing the relevant support needed for the employees to cope with the effects of Covid-19 in terms of upskilling and reskilling, and organizing training so as to maximize employees potential and drive workforce development in digital transformation. Additionally, moving towards effective transformation requires employees to be exposed to training programs that promotes learning opportunities in the form of virtual team-working, project management and innovation that can guide them on how to respond well to the new settings caused by the pandemic. Not only that developing skills and capabilities among the employees can help organizations to survive in these difficult times posed by Covid-19, it can further promote employees engagement and retention, strengthen collaborations between different departments and accelerate the process of digital transformation within the organization in the long run, thus sustaining strong organizational culture.

Moreover, internal career mobility can also be pursued by HRM to combat the challenges in response to the Covid-19 crisis in such a way that employees are provided with the opportunities to experience and engage in different roles and responsibilities other than their current duties within the organization, thus enabling them to actively grow and improve their skills, knowledge and build their professional experience. As the pandemic gives rise to financial strain and uncertainty within the firm, implementing career mobility internally can save the cost and time needed to search and train new hires as well as increase flexibility of the company not only in terms of dealing with current Covid-19 environment, but also different circumstances that may arise in the future.

Apart from that, HRM should also take the lead in monitoring the conditions of their employees in the form of mental health and well-being as Covid-19 pandemic has forced the latter to adjust themselves to the new normal as well as to adapt and embrace the digital transformation happening at their workplace. These conditions can significantly influence their motivation at work and their job performance. For instance, HRM need to establish a measure to examine the mental health and well-being of their employees and gather these information in order to comprehend not only how well they are coping with the digital transformation, but also the extent to which they are adjusting their work and lives throughout the new normal. It is critical for HRM to also listen to employees' feedback during these difficult times to seek for additional help and support that they may needed. Additionally, HRM can implement gathering among the departments virtually to recognize and appreciate the effort of the employees in contributing to their performance, individually or within their teams, during these challenging period. Organizing virtual team-building activities can also be considered to raise motivation, encourage engagement and collaboration to promote comfortable virtual work settings, hence reducing the risk of high job stress, anxiety and distant attitude.

WHAT HAS BEEN DONE SO FAR

Based on the McKinsey Global Survey, it was revealed that a number of directors and executives of various organizations have come forward to effectively lead and assist their companies in response to the changing work environment posed by the pandemic. As such, they have been enhancing their collaborations with the management team in order to help the organizations to survive in the crisis including realigning themselves around a shared vision for the company's future and making adjustments to their responsibilities (Huber et al., 2021), thus in turn accelerating agility. Additionally, directors have been making some changes to their structures and processes so as to respond better to the crisis and therefore, promotes greater flexibility in their agenda setting which includes strengthening their investment in technology and tools to encourage more digital collaboration as well as introducing ad hoc crisis committee members. For instance, they have consistently focus on innovation and growth during their board agenda and increasingly driving their attention towards corporate resilience (Huber et al., 2021).

What is more, it is substantial to invest in leaders to strengthen company's agility, especially during the Covid-19 pandemic. Greene (2020) highlighted that leaders should possess critical skills to navigate through the times of the pandemic and remain agile. These skills include the ability to be innovative not only in terms of embracing creativity, but also promoting innovation and creativity among the employees; fostering collaboration and communication; empowering and inspiring others; and think strategically (Paulise, 2020; Greene, 2020; Sherwood, R. & Tsahakis, S., 2020). To survive in the crisis, it is fundamental for HRM to spread their focus on realigning and restructuring the workplace, their strategy and work styles, including employee's learning and development as well as understanding the employees sentiments, well-being, security and safety, which consequently can aid in accelerating the agility of their organization. For instance, VCCP, a creative agency in Singapore have established internal and external support networks to enable individuals can obtain meaningful advice and relevant support based on their situations following Covid-19 as well as strengthening their online staff development platform known as Thrive. This platform serves to provide the agency with information related to the latest technology, software and platforms to not only for communication, but also for enhancing confidence and monitoring well-being of their employees. The agency also promotes complementary training that focus on leadership, personality profiling, data analytics as well as insights and incentives obtainable from industry leaders from different parts of the world (Lim, 2021).

In a similar way, a technology company in Japan known as the Anymind Group has been working towards providing employees and fresh graduates with relevant tools to help them manage the new normal effectively. For instance, they have introduced a virtual three-week training program for the fresh graduates who are interested in working with their company. Apart from that, they have been utilizing a tool established by Human Capital Technology Co., Ltd. called Geppo to facilitate their human resource team during the crisis in enhancing their work styles especially to better comprehend the mental health of their employees including their feelings relative to their work, relationship between their colleagues and motivations in the virtual environment (Lim, 2021).

Accordingly, the Human Resources Development Fund (HRDF) Placement Centre in Malaysia has been working with employers, employers' associations and career strategic partners nationwide towards supplying 50 000 job placements to their citizens in order to promote development of skills and capabilities among their people in response to the Covid-19 pandemic difficulties. In particular, Malaysians are sought to access the HPC portal, a platform that provides information on the relevant placement, training and courses opportunities available for them to not only develop their skills, but also enhance the workforce via upskilling, reskilling and competencies training as well as improve the nation's labour market (Lee, 2021a). Additionally, 100 million Ringgit Malaysia has been supplied by Malaysia Digital Economy Corporation as an initiative to drive the reskilling and upskilling among their citizens, especially for jobs in the digital economy in coping with challenges posed by the pandemic (Lee, 2021b). Besides, the latest McKinsey Global Survey on digital strategy indicated that top-performing organizations have daringly made substantial investment in digital and technology at times of the pandemic which subsequently led to stronger overall capabilities that set them apart from their competitors and progress ahead during the crisis (Williams et al., 2021).

FUTURE RESEARCH DIRECTIONS

It is the duty of HRM to ensure that the organization can progress successfully in the transformation and drive the cultural change within the workforce during these difficult times. Additionally, effective digital transformation can be achieved by taking into account a thoroughly planned strategy that enables people, processes and technology to unite together to expedite the favorable social impact and progress towards sustainable development. Nonetheless, without appropriate HRM practices and strategy, strong culture cannot be attained and digital transformation process will be disrupted. Further studies are encouraged in order to investigate and focus on the digital transformation strategy to help mitigate the challenges of these transformation in Asia Pacific regions as organizations are still dealing with the on-going effects imposed by the pandemic. For instance, a comprehensive structured framework can be designed to aid organizations in effectively addressing these challenges throughout the crisis. Also, other aspects of digital transformation barriers such as the financial capability, the size of the business and the background of the organization can be considered for future research. Additionally, similar studies can be carried out to further identify and comprehend the challenges of digital transformation among a particular industry for different countries as well as to compare the threats of these transformation on a number of countries following the Covid-19 pandemic.

CONCLUSION

Digital transformation has been gaining attention among st organizations, especially in keeping up with the demands and changes posed by Covid-19 pandemic. Digital transformation is no longer thought of as a choice to simply utilize technology in supporting business operations, but it is now considered as a requisite to the organization's innovations fundamental to survive in the disruptive environmental changes caused by this pandemic. The study aims to identify the challenges of digital transformation following the Covid-19 crisis. As such, the pandemic has caused organizations to transform its business operation, including system and processes, on a daily basis which significantly produce an impact on their culture. As a result, this has challenged HRM to revise their practices and strategies to achieve organizational goals.

In addition, the emergence of this pandemic posed threats to various organizations in many parts of the world, including Asia. As such, it was discovered that majority of the organization in Asia Pacific region struggled to adjust their financial plans, recognize their organizational structures and handle new approval and business processes due to the lack of agility. Not only that leaders have been facing difficulty to keep up with the changing environment, reports also indicated that shortage of skills and competencies has further challenged most organizations across the regions in progressing effectively towards digital transformation in times of Covid-19 crisis. The presence of these challenges in turn influence employees' engagement, resistance to change and adapt to new normal; and their well-being and mental health, and hence not only threatens organizational culture, but also level of productivity and company's success.

Nevertheless, Covid-19 pandemic is still an on-going phenomena and the information and resources regarding the means of combating the challenges effectively throughout the crisis are still considerably deficient. This calls for a need for future research to be conducted to investigate more into this matter to help organizations, specifically HRM and practitioners, in responding efficiently to Covid-19 in the workplace settings. Despite that, organizations in the Asia Pacific region have been taking measures and initiatives to better respond to the Covid-19 situation following the digital transformation. Moreover, the current challenge remains in ensuring that organizations are able to balance its effort in the transformation with people's values and behaviors.

The study will be valuable for organizations and firms to understand the issues surrounding the process of digital transformation in Asia and comprehend the potential means of managing these issue, especially for the HRM. Not only that, researchers and other stakeholders can gain meaningful insights on how various organizations are responding to the new normal and the current actions that they have taken to navigate through the crisis. Furthermore, conducting this study to address the concerns related to digital transformation would fundamentally contribute to knowledge in digital transformation area as well as information technology and innovation.

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KEY TERMS AND DEFINITIONS

Digital Technologies: A platform or system that allow data to be stored or processed electronically such as mobile, social media platforms, internet of things, cloud, analytics or embedded devices that allow businesses to progress well in terms of its performance and operations.

Digital Transformation: A process where technology is being integrated to facilitate one organization in establishing new models for its business, transforming processes, products, software, systems, and other organizational aspects to sustain competitive advantage.

Digitalization: The process by which information are being transformed into digital format by employing digital technologies in order to enhance activities and processes across an organization.

Human Resource Management: A central pillar of the people in the workplace that only manage the people but also ensures the accomplishment of organizational goals and mission through its people, provides relevant support and development of knowledge and skills as well as responsible for supplying rewards, benefits, and compensation to the employees.

Organizational Agility: A core competency that involves the ability to respond, make decisions, reconfigure processes, structure, strategy, people, technology and adapt to dynamically changing environment in a short period of time in order to attain competitive advantage, achieve high level of productivity and organizational effectiveness.

Organization Culture: A set of internal values, assumptions and behaviors that drives and molds the extent to which an individual interprets and acts within their workplace.

Virtual Work Setting: An environment where the people of an organization are working via internet platforms or through the utilization of digital technologies. As such, communication, meetings and sharing of information among employees are done remotely, can be at their own homes or private spaces.

Chapter 15

Crowdfunding for Infrastructure Project Financing:
Lessons Learned for Asian Countries

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ABSTRACT

Infrastructure plays a pivotal role in national development. However, financing infrastructure projects becomes a major hurdle as it is often considered unbankable, high risk, and requires a long payback period. The use of crowdfunding as an alternative source for infrastructure project financing is flourishing, especially in European and American countries. In contrast, the utilization of crowdfunding for such purposes in Asian countries is very limited. Hence, this study reviews four crowdfunding platforms in Europe and America that have successfully raised capital for infrastructure projects which are Oneplanetcrowd, Convergence Finance, Citizenergy, and Infrashares. Learning from best practices of those platforms, policies, and regulations, the study proposes four crowdfunding business models to be implemented in Asian countries including (1) blended finance, (2) cross-border citizen funding, (3) commercial infrastructure financing, and (4) within country crowdfunding.

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INTRODUCTION

Inevitably infrastructure has a vital role in a nation's economic development. Numerous studies, both theoretically and empirically, have strongly supported the notion. From various countries' experiences, Kessides (1993) comprehensively found that infrastructure has a positive impact on cost reduction, production, investment, employment, international competitiveness, domestic market development, economic diversification, the structure of production and consumption, personal welfare, wealth, productivity, and the environment. In Asia, by taking cases of the Philippines, China, and Pakistan, Cockburn, Dissou, Duclos, and Tiberti (2013) conclude that spending on public infrastructure plays a critical role in promoting economic growth and poverty alleviation.

Although it provides many benefits for economic development, infrastructure project requires a considerable amount of capital investment. McKinsey Global Institute (2013) estimated that accumulated capital required up to 2030 for infrastructure projects reaches USD 57 trillion. Some of the factors affecting the investment gap are 'unbankable' projects, hardship in managing macroeconomic and political risk, and mismatch between offered investment instrument and the requirements of investors (Tyson, 2018). This challenge even heavier for low income and lower-middle-income countries. Investors tend to put their money in countries with strong fundamentals and politic stability.

Concerning this financing gap issue, infrastructure project needs an alternative source of funding, diversified investors, and innovative financing process and intermediary. One of the alternative sources that has vast potential is through Financial Technology (FinTech). The rapid development of technology has also revolutionized financial services. FinTech is a financial service that combines modern financial services with innovative technology (Dorfleitner, Hornuf, Schmitt, & Weber, 2017). Generally, FinTech attracts consumer through its Internet-based products or services usually using a web or more efficient, transparent, and automated. Those features are aspects that make FinTech differ from conventional financial services.

One of the FinTech services that has grown remarkably is capital raising and financing. Peer to peer lending FinTech has been widely used around the world, even in low income and lower-middle-income countries. It has served various consumers ranging from personal consumers to large corporations. Another financing FinTech service with notable impact is capital raising and public financing through crowdfunding. Crowdfunding has become an effective method to raise capital and finance projects and other purposes. Currently, it has been widely used to fund creative projects and social purposes. For instance, up to June 2020, Kickstarter as the most popular crowdfunding platform to fund innovative projects has successfully funded 182,795 projects and raised more than USD 5 billion from nearly 18 million funders (Kickstarter, 2020). However, most crowdfunding platforms for infrastructure projects operate in western countries mainly in Europe and America, while in Asia, it is not developing yet.

Therefore, this study aims to provide policy recommendations on how to optimally utilize FinTech as an alternative project financing method for Asian countries. The policy recommendations are mainly based on an in-depth review of the successful case of crowdfunding platforms engaged in infrastructure project financing. The selected platforms are OnePlanetCrowd (Netherland), Convergence Finance (Canada), Citizenergy (Europe), and InfraShares (USA). They are chosen by considering their business model, number of projects funded, and the amount of capital raised. Based on these, the authors formulate crowdfunding models and make an adjustment for Asian countries' context. Following this introduction, the chapter comprises another three sections, which are a literature review of crowdfunding, a review of each selected platform, as well as conclusion and policy recommendations.

LITERATURE REVIEW

Definition, Characteristic, Mechanism, Types, and Potential of Crowdfunding

Crowdfunding has a long story, but since the internet boomed in the 1990s, it gained popularity to fund specific purposes. Further, crowdfunding has grown significantly since the 2000s aligning with digital platform developments. Besides, with the near-collapse of the financial system, fundraising becomes harder. The addition and renewal of risk-assessment procedure and regulation, low liquidity of banks, and lack of trust in financial institutions, have made crowdfunding an alternative and became more widespread (Blace & Grubisic, 2016). Crowdfunding attracts a wide range of fund seekers and contributors, and its existence has disrupted traditional financial institutions. In this regard, crowdfunding offers funds to entrepreneurs who own young ventures with limited financial resources and face significant challenges accessing capital from bank loans, venture capital, or angel funds (Mitra, 2012).

This mechanism is also known as a form of collective action (Toxopeus & Maas, 2018). The emergence of crowdfunding indicates changes in the entrepreneurial finance landscape to which it is no longer the focus only on business angels and venture capital (Wright, Lumpkin, Zott, & Agarwal, 2016). In terms of definition, crowdfunding is a method of funding that raises a relatively small amount of fund from a large number of individuals or legal entities to fund projects, businesses, individuals, social charities, and other purposes (Jenik, Timothy, & Nava, 2017). There are three characteristics of crowdfunding which are: (i) raising a small number of funds, (ii) raised from many funders to many individuals/businesses/projects, and (iii) utilizing digital technology.

As depicted above, crowdfunding platforms play a similar role to traditional financial institutions as intermediaries between the entrepreneur or entrepreneurial firm and their investors. Besides, as a platform facilitating startups, crowdfunding's role is identical to angels or venture capitalists, but they do not provide mentorship to entrepreneurs (Mitra, 2012). Furthermore, by utilizing web interface and social media platforms, which is less costly to operate financial services. In other words, crowdfunding has a large dispersed audience, collecting small sums of money to fund a project or a venture (Lehner, 2013). This opportunity allows crowdfunding platforms to increase their market capitalization as well as outreach. Besides, crowdfunding, particularly the debt crowdfunding category, provides opportunities for entrepreneurs with different objectives and ventures at a different level of development to access capital that was previously unavailable (Wright et al., 2016).

REVIEW OF CROWDFUNDING BUSINESS MODELS FOR INFRASTRUCTURE PROJECT FINANCING

Oneplanetcrowd

Overview

Oneplanetcrowd, founded in 2012, is a Dutch crowdfunding platform and a 100% subsidiary of One Planet Crowd B.V., focusing on projects related to social sectors and/or sustainable development goals (SDGs). The company is one of the first pioneers in the Netherlands, and it has become one of the largest European crowdfunding platforms for societal-impact focus and sustainability. Oneplanetcrowd offers an investment that provides attractive financial returns and positive impact on people and the environment. In response, connecting innovative entrepreneurs to future-oriented investors is the primary mission of the company to accelerating the transition to a sustainable economy.

In achieving the company's long-term goal, Oneplanetcrowd has been synergising with the financial group StartGreen Capital that has experience in investing in sustainable companies and energy projects since 2006. Other financial institutions collaborating with Oneplanetcrowd are ASN Bank, Rabobank, and DGI Europe. To support its operation, Oneplanetcrowd has a collaborative partnership with Econnetic, The Next Women, Oost NL, Energy & Environment Investment, Inc., StartLife, BerendsenVisser, and 7Doors. Besides, Oneplanetcrowd has been certified as a B Corp, a company that meets the requirements of social and environmental achievements, transparency, and liability. As a result, in 2018, Oneplanetcrowd was awarded as the market leader venture capital by CrowdfundingCijfers.nl.

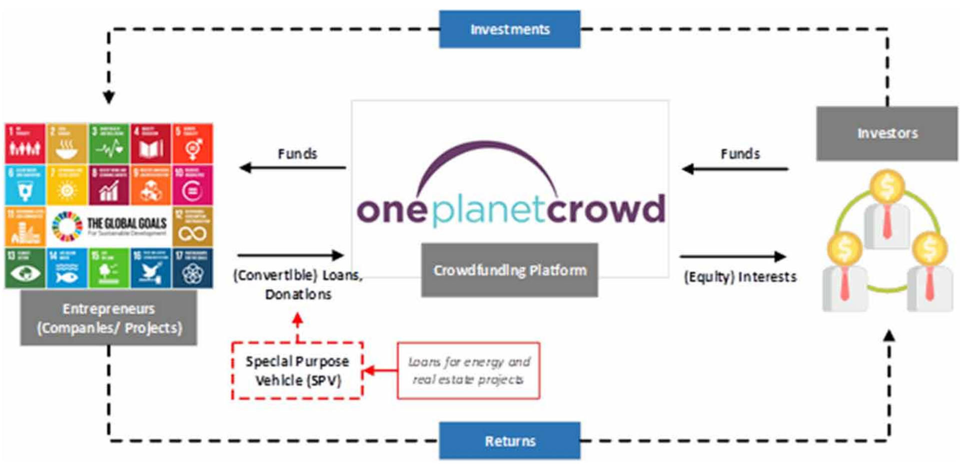
Business Model

With respect to its operation, Oneplanetcrowd adopts the concept of sustainability represented in the theory of change emphasising on integrated activities done by companies, sectors, and investors that can generate particular outcomes and social impact on the short and longer-term. This is underlying Oneplanetcrowd's business to achieving the transition to a sustainable economy by putting forward for circularity and inclusiveness aligning with the SDGs. Oneplanetcrowd offers a financing scheme with various financial instruments to companies that can be mixed depending on their characteristics and provide supports related to business, network, knowledge, publicity, ambassadors, and strategic consulting. The focus of Oneplanetcrowd is to develop the 'impact investing' sector by encouraging companies to be sustainable and innovative and promoting their vital role in the economy and increasing transparency of the financial industry by offering 'Direct Matching'. Besides, Oneplanetcrowd facilitates the crowd with investment opportunities that offers a double dividend——financial and social or the environment; and help the crowd with professional supports in terms of management, information, and transparent communication. Oneplanetcrowd expects to provide investments to a wide range of audiences with transparent and reliable information so more efficient and more accessible investment as well as sustainable returns, and successful exits can be achieved.

In terms of business, besides donations, Oneplanetcrowd adopts lending-based crowdfunding in which investors are offered two types of investment with different return and risk. The first type is a loan which is generally subordinated and provided to a company that has already existed and made a turnover requiring additional capital for financing particular projects, such as a sustainable energy project with relatively predictable cash flows. For this type of investment, the interest rate offered is ranging from 4% to 10% with the duration of one year and ten years. To be more flexible, repayment can be made in three ways, such as linear, bullet, and annuity. Like common practice, borrowing companies are required to provide collateral in the form of the company's assets or a guarantee provided by the director(s). In the case of the proceeds are not sufficient to repay the loan partially or entirely, the collateral will be foreclosed to pay the remaining amount. For the risk profile, the loans are not covered by a deposit guarantee scheme; thus, the interest rate is generally higher compared to savings accounts with banks. The borrowing companies can reschedule their repayment due to poor financial results, or even a company could go bankrupt during the term of a loan.

However, investors can opt two types of loans to fit their risk appetites, namely SME loans and loans for energy and real estate projects. SME loans are designed to companies that already generate cash flow and have sufficient capacity to repay the loan with interest. Meanwhile, loans for energy and real estate projects are provided to a separate entity, that is a special purpose vehicle (SPV). The SPV is also needed for cross-border funding depending on the country conducting a joint force[1]. Since the underlying asset is the project itself, the financiers can only claim the generated cash flows and the assets of the project, but they are also exposed to the risk of the project. The second type is a convertible loan which allows the investors to become a shareholder of a company. A convertible loan can also be categorised as the equity-based crowdfunding model. This type is often provided to relatively new companies that are expected to grow fast potentially. Since these companies have limited transactions leading to less predictable future cash flows, the expected return could be considerably higher than ordinary loans. Since the company is young, the offered collateral is limited because the products are still in the development phase.

Figure 1. Oneplanetcrowd model
Source: Adapted from Oneplanetcrowd (2020d)



Furthermore, there are some requirements to become investors. Firstly, an investor is required to create an account on Oneplanetcrowd and complete the account information. However, to minimise fraud and abuse[2], a private investor must have a bank account with a bank in the Single Euro Payment Area (SEPA), be at least 18 years old and be a resident in the SEPA area or the Caribbean Netherlands, and/or have the nationality of a country in the SEPA area or the Caribbean Netherlands while a business investor must be a Dutch legal entity in the form of a sole trader, foundation, BV, or VOF, and established in the Netherlands. This must be supported by the investor's identity verification. On the other hand, entrepreneurs who are interested in obtaining loans from Oneplanetcrowd must be assessed. An initial exploratory conversation will be conducted to screen the company, whether the criteria comply. Start Green Capital will do a risk assessment for a project based on several subjects, such as market risk, structure risk, operational risk, and management risk following to the information provided in the financial and business plan.

Table 1. Oneplanetcrowd performance per March 31, 2020

No.	Finance type	Description (in EUR)	
1.	Loan	Total balance loans No. of loans Total sum mediated Total interest Total repaid Total outstanding Total written off (> 90 days) In the restructuring process No late payment (up to 45 days) 45 to 75 days late payment 75 to 90 days late payment	32,099,614 104 27,164,396 4,935,218 9,512,661 21,910,092 676,861 175,347 21,533,505 201,241 0
2.	Convertible loan	Total balance convertible loans No. of convertible loans Total sum mediated Total interest Total repaid Total conversion completed Total outstanding Total written off (> 90 days) In the restructuring process No late payment (up to 45 days) 45 to 75 days late payment 75 to 90 days late payment	30,587,147 32 24,911,079 5,676,068 688,559 7,716,195 19,586,880 32,778 5,069,210 14,517,670 0 0

Source: Oneplanetcrowd (2020b)

Performance and Impact

As a business entity, Oneplanetcrowd has shown excellent performance in terms of the amount invested and the number of financed projects. Oneplanetcrowd started its business with pre-sales campaigns of circa EUR 25,000 in 2012, while the amount increased to EUR 7.5 million in 2019 (European Commission, 2020). In 2016, Oneplanetcrowd succeeded to raise $2.2 million in just one weekend from more than 1,000 individual investors in which all funders of a car-sharing initiative (Snappcar) were invited to invest in a tool sharing platform (Peerby) (Cohen, 2018; Toxopeus & Maas, 2018). According to Cumming and Johan (2020), Oneplanetcrowd became the second-largest crowdfunding platform in the Netherlands with 3,700 Twitter followers, EUR 11 million invested in 120 companies, and 18,000 prospective investors. Besides, Oneplanetcrowd has become one of the largest green crowdfunding platforms in Europe, with EUR 30 million invested (Dorfleitner & Braun, 2019).

According to its website, Oneplanetcrowd has financed 324 projects consisting of 32 convertible loans, 115 loans, and 177 donations per March 31, 2020, and the total balance loans including interest were EUR 32 million with 104 loans while the overall balance convertible loans including interest was EUR 30 million with 32 convertible loans (see Table 1). In relation to infrastructure projects, Oneplanetcrowd mostly financed projects related to sustainable energy, the transition from using fossil fuels to renewables, dan sustainable construction (see Table 2).

Table 2. Selected infrastructure projects financed by Oneplanetcrowd

Finance type	Project			
	Name	Successfully funded (in EUR)	No. of investors	No. SDGs
Convertible loan	Citi Hub Utrecht	0.7 million	448	8, 9, 11, 13
	Solease – solar energy	1.0 million	291	7, 13
	Solesta Zonneboiler	0.2 million	45	7, 13
	Qugo	0.1 million	88	7, 13
	PowerPlane® van Ampyx Power	0.3 million	272	7, 13
Loan	Agradu B.V.	0.6 million	270	7
	Donkey Republic	0.7 million	515	3, 11, 17
	BeGreen Arenapark B.V.	0.5 million	299	7, 9
	Windcentrale II	0.9 million	833	7, 13
	de Windcentrale	0.7 million	421	7, 13
	Enie.nl	0.1 million	92	7, 13
	Blue Current	0.2 million	141	11, 13
	Enie.nl	0.2 million	162	7, 13
	ECONNETIC	0.3 million	187	7, 13
	Peters Biogas	1.2 million	542	7, 9, 12
	Kuster	0.5 million	202	7, 13
	Van Eijck	0.1 million	37	9, 12
	Energy Floors	0.2 million	169	9, 11, 13
	Agro Giethoorn	0.6 million	334	7, 9
	Zonnepark Apeldoorn	0.2 million	181	11, 13
	Amarenco Crowd	0.1 million	106	7, 13

Source: Oneplanetcrowd (2020f)

Convergence Finance

Overview

Convergence is the global network platform for blended finance. It is based in Canada and was founded in 2015 initiated by Addis Ababa Action. It was launched and designed by a core group of partners including Canada's Department of Foreign Affairs, Trade and Development (DFATD), the World Economic Forum, Dalberg Global Development Advisors, and the Global Development Incubator. It is part of the Redesigning Development Finance Initiative led by the World Economic Forum and the Organization for Economic Co-operation and Development (OECD). As for the catalytic funding, DFATD has committed to pledge USD 18.5 million for the platform (Convergence, 2015).

The platform aims to reduce UN Sustainable Development Goals (SDGs) funding gap, which is approximately USD 2.5 trillion annually. Most of its fund beneficiaries are developing countries. The concept built by the platform is through networking and collaborations of several actors from the public,

Table 3. Types of blended finance structure

No	Structure	Description
1	Concessional capital	Public or philanthropic investors provide funds on below-market terms within the capital structure to lower the overall cost of capital or to provide an additional layer of protection to private investors. In this scheme, concessional fund acts as seed capital to attract private investment.
2	Risk insurance	Public or philanthropic investors provide credit enhancement through guarantees or insurance on below-market terms. This scheme aims to lower the risk for private capital.
3	Technical assistance funds	The transaction is associated with a grant-funded technical assistance facility that can be utilized pre- or post-investment to strengthen commercial viability and developmental impact. Grant funding from public or philanthropic used for investment capacity building to improve project quality.
4	Design-stage grants	Transaction design or preparation is grant-funded (including project preparation or design-stage grants). The concessional fund is used for designing projects to attract private funds from institutions.

Source: Convergence (2020)

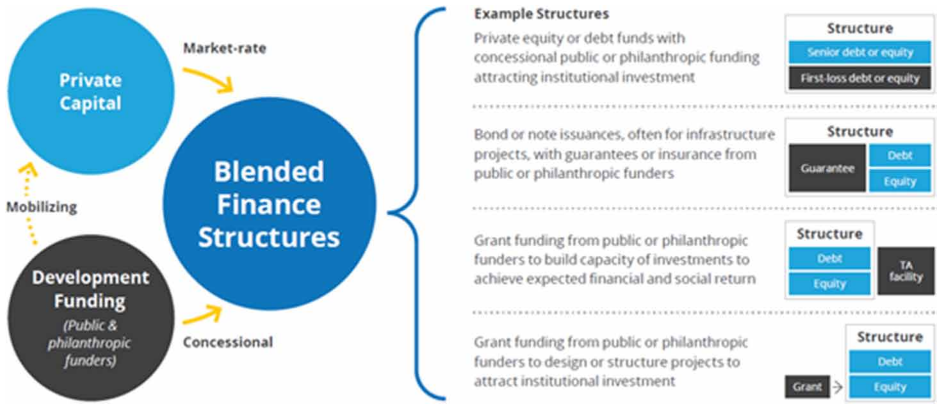
private, philanthropic funds, and sponsors. Some notable institutions have become members including Melinda Gates Foundation, the Government of Ethiopia, MasterCard, Standard Chartered, Rockefeller Foundation, and other stakeholders. Convergence helps to connect private investors, public, and philanthropic investors. By using blended finance that aims to disrupt traditional development finance, they target to attract private sector funds to developing countries for development purposes which majorly in the form of infrastructure projects. By doing so, magnifies the impact of investments economically, socially, and environmentally.

Business Model

In achieving its goals, Convergence has four main features in its operation consisting of: (i) Global Network, (ii) Data and Intelligence, (iii) Deal Flow, and (iv) Market Acceleration. All of these features are to support SDGs financing, which a large portion of them are infrastructure financing. *First*, the global network is the key feature for convergence members to connect to each other and collaborate. Currently, it has more than 200 members around the world consisting of public, private, and philanthropic organizations including USAID, IDB Invest, Credit Suisse, Government of Netherlands, and other institutions. Furthermore, blended finance that is used by Convergence as the method for capital raising is a structuring approach that facilitates organizations or institutions with different purposes and goals to invest collaboratively while achieving their objectives whether it is financial return, social impact, or the combination of both. There are three key characteristics of blended finance including: (i) aims to achieve SDGs, (ii) is targeted to yield a positive financial return (iii) concessional capital from public and/or philanthropic used as catalytic to lower investment risk and improve the financial return in order to attract investment funds from private institutions. In short, blended finance is mixed of seed capital, which generally is concessional, from philanthropic and public organizations that will be amplified with private funds which usually expect a market-rate return. Moreover, convergence diversifies blended finance into four structures, as presented in Table 3 and Figure 2.

Furthermore, Convergence classifies project feasibility level into three types which are bankable, near-bankable, and unbankable. Convergence blended finance only mobilizes investment to projects in the category of bankable and near-bankable. It does not consider to fund unbankable project since one

Figure 2. Blended finance structure
Source: Convergence (2019)



of the blended finance characteristics is to expect positive financial return (Convergence,2020). Further elaboration on the three project feasibility categories is as follows:

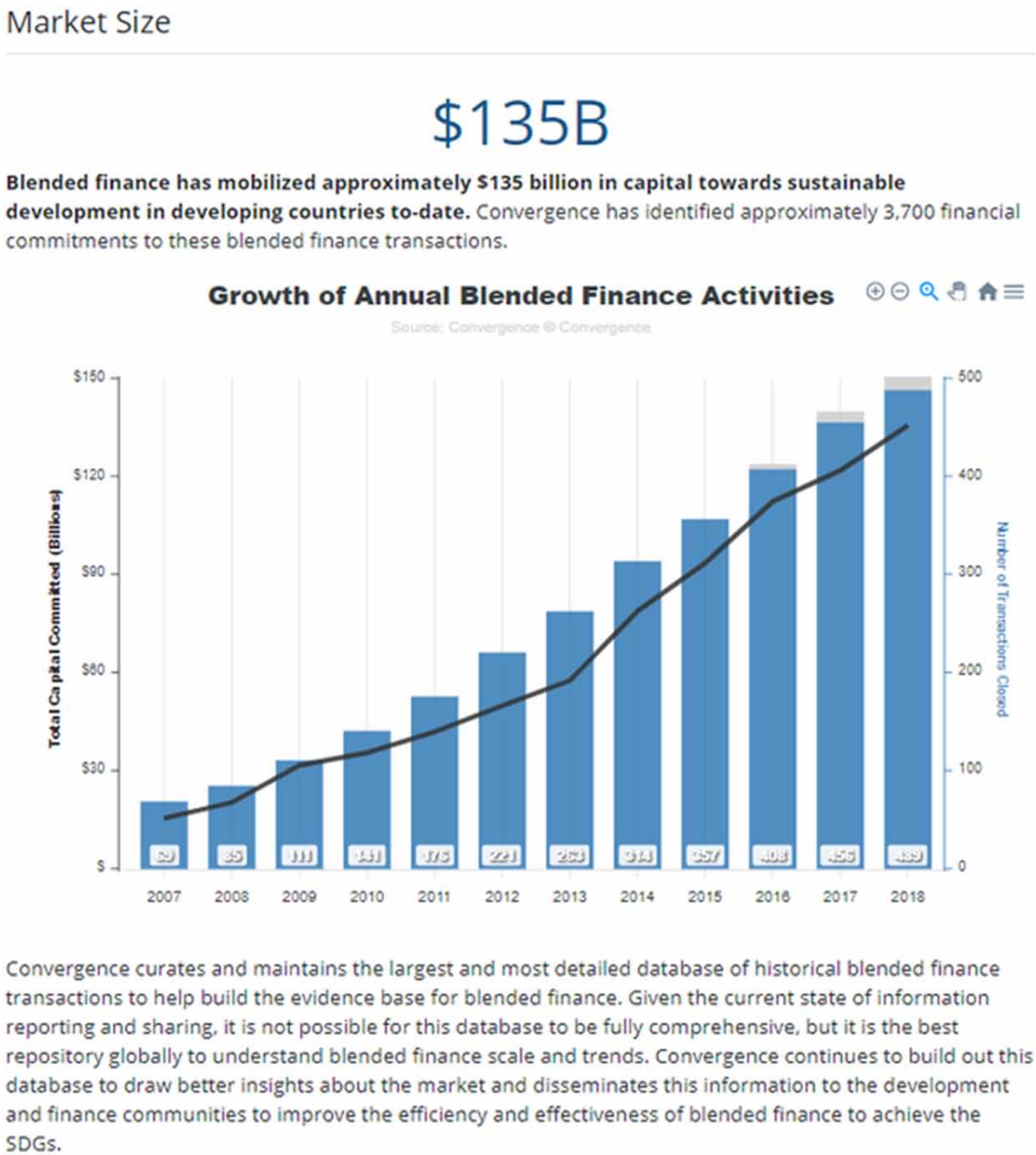
1. Bankable: the project is commercially feasible, but it is unfinanced because of lack of funding. Converge finance acts as an intermediary to increase the supply of capital by raising funds from institutional funders and channel them to SDGs project; hence more projects can be funded and implemented.
2. Near-bankable: The project needs extra risk mitigation to become bankable. Without a certain level of risk mitigation, the project is not feasible to be funded. Therefore, some of the funds from blended finance will be used to mitigate and lower the risk so that the project can be feasibly off the ground.
3. Unbankable: Probability of failure resulting in financial loss is high, blended finance is not suitable to fund this type of project.

Performance and Impact

Up to June 2020, Convergence is supported by 1218 unique investors involved in one or more blended finance projects. The number is composed of 59% of private institutions, 22% of public, and 19% of philanthropic. By looking into the investor composition, the authors can see that the blended finance structure is successful in attracting private investment, considering the majority of the investors coming from private. This means that concessional capital from public and philanthropic can effectively be catalytic capital to mitigate investment risk and improve financial yield. Furthermore, the top five most active private investors, in order, are Ceniarth LLC, Calvert Impact Capital, Standard Chartered Bank, Deutsche Bank Group, Société Générale (Convergence, 2020a).

In terms of capital mobilization, in 2018, blended finance has channelled around USD 135 billion, with approximately 3,7000 financial commitments to the transactions. The trend for blended finance activities is continually increasing each year, as presented in Figure 3. Regarding deal size, the amount of transaction varies from a minimum of USD 110,000 to a maximum of USD 8 billion. The median amount is USD 64 million. Furthermore, the majority of them are in the form of debt funds, equity funds,

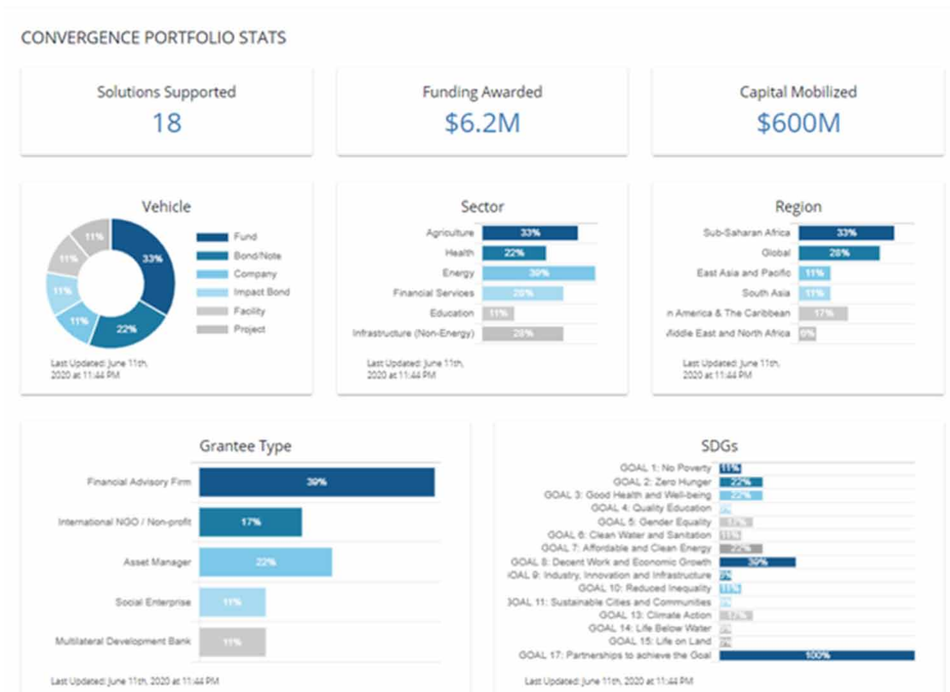
Figure 3. Growth of annual blended finance activities 2007 – 2018
Source: Convergence (2020a)



and funds of funds. For blending archetypes, the proportion of concessional capital, technical capital, and guarantee or risk insurance is 44%, 24% and, 22% respectively, whereas the remaining are in the form of a design-stage grant and result-based financing.

In terms of beneficiaries regions, most of the funds are transmitted to Sub-Saharan Africa (43%), while the remaining is channelled to South Asia (17%), Latin America and the Caribbean (17%), Global (15%), East Asia and Pacific, (14%), Middle East and Not Africa (13%), and Europe and Central Asia (4%). Lastly, is the performance and impact of the design funding. Design funding is an offer of catalytic capital from public and philanthropic as a grant for development practitioners or facilitators to concept a stage design funding to attract private funds. There have been 18 solutions supported with USD 6.2 million of financings awarded and, USD 600M of capital mobilized. Most of the vehicles are in the form of fund (33%) and bond or note (22%). The summary of the performance and impact of design funding is presented in Figure 4.

Figure 4. Performance and impact of convergence design funding
Source: Convergence (2020a)



Citizenergy

Overview

Citizenergy is the first European crowdfunding platform for European citizen investment in renewable energy source (RES) projects that co-founded by the Intelligent Energy Europe Programme of the European Union. Starting in 2012, three Portuguese had the idea to create their country's first crowdfunding platform to fund sustainable energy projects. Having a barrier of no legal framework in Portugal at that time, the entrepreneurs started to look at other ways by cooperating with crowdfunding platforms from across Europe (Citizenergy, 2020b). Then in 2014 Citizenergy was founded, and officially launched in November 2015 and May 2016 for the second website version.

This European crowdfunding was created by the idea of having cross border investment in supporting sustainable energy crowdfunding platform and energy cooperatives. This is because the energy revolution should also be taken on the international level without being confined by national borders. Citizenergy fortifies the country's platforms in financing community energy project by enlarging their outreach throughout Europe while promoting transparency. It accesses EU funding and encourages public as well as individuals' investor to get involved in the energy transition. Citizenergy cooperates with platforms that working to promote sustainable energy projects and have been authorized by the financial authorities, where the platforms need to have at least one successfully funded project.

Business Model

Citizenergy offers a unique opportunity for European citizens to invest in RES projects all over Europe. It creates an EU network where RES promoters (platforms and developers), citizens and authorities can collaborate in RES projects. Citizenergy also supports local renewable energy projects and their promoters as well as providing information on sustainable energy opportunities. It matches citizens with the projects, identify barriers to citizen investment and provide recommendations (European Commission - Intelligent Energy Europe, 2020). One of the uniqueness of Citizenergy is that the platform offers a funding scheme with various financial instruments to firms and individuals (citizen). Citizens may choose the business model suited for them depending on their risk appetite, preferences, and motivation of funding. Table 4 elaborates nine business model in the platform for citizen interested in RES project as well as the description, term, risk level, and return types of the model.

Performance and Impact

Citizenergy has shown excellent performance in terms of amount invested, the number of financed projects as well as the number of participating investors. At first, there were six pilot RES projects established in Germany, Spain, France, Netherlands, Portugal, and the United Kingdom. The projects then developed until there were 41 community energy projects registered in the platform, from 15 countries and 16 RES promoters, as of March 2017 (Table 9). Overall, total crowd investment target in the platform is EUR 27.350.832, which accounts for 14,6% of the total investment of projects. EUR 14.797.071 has been successfully crowdfunded, or 54,1% of total crowd investment target. The recorded number of investors is 9.487, and average investment per participating citizen was EUR 1.891. Meanwhile, using the most updated data, currently, there have been 73 RES projects with total EUR 41,936,545 funded by Citizenergy that cooperated with 33 platforms across EU (Citizenergy, 2020a).

Moreover, although there are seven types of citizen' participation to invest in energy projects, only five types are recorded (Figure 5). A loan is the most common participation type, used in 70% of projects registered in the platform. Meanwhile, bond, reward, cooperative and equity compositions are almost similar with around 2 – 4 projects from 41 projects registered under the platform. In addition, Figure 6 describes the average number of citizens investing in the projects by the country where the project is located. Most investors are from the UK with 672 citizens while the least investors are from Portugal with 38 citizens.

Table 4. Types of business model and description

No	Name	Description	Term	Risk Level	Return Type
1	BM 1 – Cooperative: Equity	A cooperative which is jointly owned and controlled by its members, can finance the project with a combination of debt and equity from their members as well as from outsiders (bank loans, grants)	Long-Term	Medium, depending on cooperative's credit quality, revenue model of the projects (feed-in-tariff), type of energy, the priority of the stocks (preferred versus normal)	Dividends (or interests in the case of deposits and also personal satisfaction to promote RES projects
2	BM 2 – Corporate Firms or Companies: Equity	Investors provide funds to the project, in exchange for shares, thereby becoming a partial owner of the project.	Long-term	High, depending on: type of stock, the financial position of the company and its credit quality, revenue patterns of the RES projects, type of energy, etc	Dividends and growth of capital invested, and also a satisfaction to promote RES projects
3	BM 3 – Cooperative: Equity/ Customer	Cooperatives sell green energy to their members in which the members (customers) financing with the price they paid for the energy. Cooperatives do not have to pay interest or dividends for using retained profits.	medium or long-term	Low, (the deposit/ stock is refundable), depending on: the green electricity price, the amount of money paid to be a cooperative member and the duration of the supply contract.	Green energy (no monetary return) and personal satisfaction
4	BM 4 – Mezzanine Financing	A hybrid funding that combines features of debt and equity. The primary forms of mezzanine financings are subordinated debt (bonds or loans) and, less frequently, preferred stocks.	medium-term	Medium-high, depending on: type of stock or bond, the financial position of the company and its credit quality, revenue patterns of the RES projects, maturity in case of bonds, etc	- Coupons (interests) from debt securities and the option to convert to stocks - Dividend from preferred stock and option to convert into ordinary stocks
5	BM 5 – Debt: Bonds	Bonds are fixed-income securities that incorporate a part of a collective credit constituted by a corporation.	short, medium and longterm	Medium, depending on Bond Issuer and RES project, collateral, priority, and options.	Coupons (interest) over a period of time or at the end of the project; and satisfaction
6	BM 6 – Debt: Loans	Investors lend their money to the project and get paid in return over a period of time. The interest rates and the period of loan vary from project to project.	short, medium and longterm	Low-medium, depending on RES project (quality of management, corporation's ability to pay, changes in the regulatory environment, revenue patterns), collateral, and priority.	Interests and personal satisfaction
7	BM 7 – Donation	Investment of money to a project by individuals for social or charity reason without expecting a material reward.	Short or medium, long-term	Negligible	Personal satisfaction and could be a non-material reward (gratitude email or acknowledgement, etc.)
8	BM 8 – Reward	A variation of BM donation, where donors/ funders receive a material reward as an acknowledgement of their support but in a lower amount than the money they donate.	Short-term	Negligible	Satisfaction and a material reward (mostly exclusive items)
9	BM 9 – Crowdfunding Through Crowdsourcing	A person or institution participate by voluntary to complete a task (not with money)	Short-term (depending on the task)	Negligible	Satisfaction and possibly material or non-material reward (acknowledgement; prizes such as electricity price or discount etc.)

Source: Citizenergy (2017c)

Furthermore, from its RES project, Citizenergy also helps to achieve EU targets. Table 10 elaborates Citizenergy's direct contribution to EU 2020 goals regarding green electricity and emission reduction, citizen investment and long-term investment culture, as well as job creation from a greener economy.

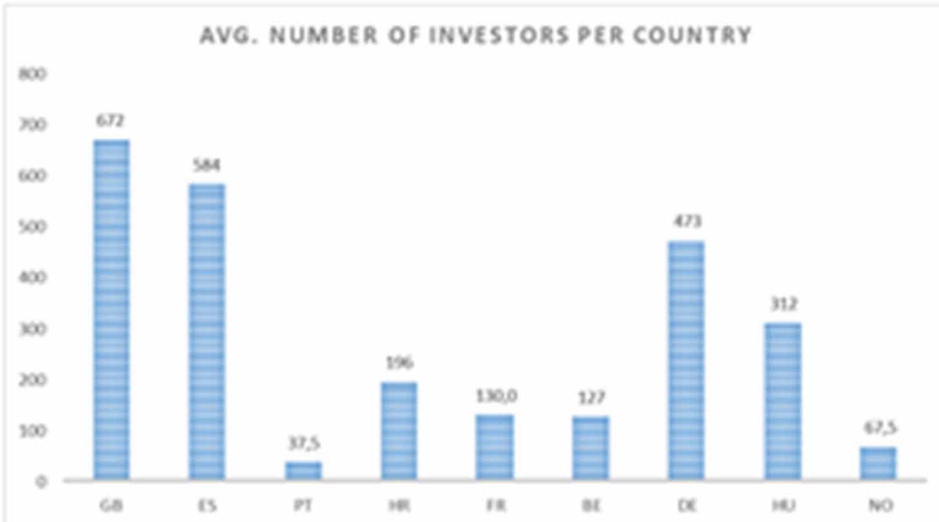
Table 5. Citizenergy performance per March 2017

Performance Indicator	Amount
Number of RES projects registered	41
RES promoters	16
Energy cooperatives	5
National crowdfunding platforms	11
Countries where project were initiated	11
Project location countries	15
Number of projects in Europe	11
Number of projects in Africa	4
Total investment	EUR 184.113.487,00
Total crowd investment target	EUR 27.350.832,00
Successfully crowdfunded	EUR 14.797.071,00
Total power capacity	111.200 kW
Total expected energy generation	243.263.296 kWh/yr
Number of investors *Data for 32 projects	9.487
Average investment per citizen	EUR 1.891
Average period for project to be funded *Data for 33 projects	135 Days

Source: Citizenergy (2017b)

Figure 5. Number of projects by participation type

Figure 6. Avg number of investors by country
Source: Citizenergy (2017b)



From the Table 5, it can be seen that Citizenergy brings a significant contribution to the environment, economy, and social impact.

InfraShares

Overview

InfraShares, founded in 2017 by Brian Ross, is an investment crowdfunding platform in the US that allows individual investors to participate in the financing of infrastructure project through Public-Private Partnerships (P3s). The company is focusing on all types of infrastructure projects, including smart cities technologies, infrastructure assets and renewable energy. This platform provides investment opportunities for individual investors an entirely new asset class while providing infrastructure owners with low-cost capital that promotes community engagement, social equity and economic prosperity (Ross, 2020a). Furthermore, this mechanism can also give incentives to citizenship to take ownership of crowdfunded infrastructure among communities.

InfraShares is the first platform that raises private equity and debt investment in public infrastructure projects and provides cost efficiency, economic impact, and community engagement (Ross, 2020b). It allows communities to co-invest in their infrastructure by investing online. For companies, it gives simplify and speed up the fundraising process and access of network of investor focused on smart cities technologies, infrastructure assets, and renewable energy projects. To support its operation, InfraShares has a collaborative partnership with companies of multiple structures such as C-corporations and limited liability companies (LLCs) or companies incorporated in the U.S.A. However, InfraShares only work with companies organized in the U.S.A. and Canada.

Table 6. Strategic objectives and long-term impacts of citizenergy' action until 2020

No.	Strategic Objectives	Expected Impact by 2020	Citizenergy's Direct Contribution
1	Contributing to achieving EU 20-20-20 target	282 MW of installed capacity from the projects funded by citizens through the platform	77.851 MW of installed capacity projects (27.6%)
		Generate 522 GWh green electricity	106,327 MWh green electricity (20.4%)
		Reduce emission for 161,820 tCO2/ year	32,961 emission reduction (20.4%)
		The project will give a significant impact on increasing RES project promotion	Number of CF platforms in Europe increase from 19 in 2014 to 37 in 2016 (an increase of 194%)
2	Preparing the creation of an EU framework for CF investment	288 new energy projects are registered in the platform	14 new projects registered (14.2%)
		Similar initiatives in other aspects are created, from crowdfunding in general to environmental safeguard or social projects.	
3	Developing a long-term investment culture	EUR 351 million amount of investment from project registered in the platform	EUR 35 million invested in the project (10%)
		Citizens will be more aware of the sustainability and real added value of long-term investments	4,039 citizens directly informed about Citizenergy in over 40 events with more than 25,000 visitors (offline); 12,880 new visitors online
4	Creating jobs through the implementation of a greener economy	1,147 green jobs are created directly during the project's implementation period	313 jobs created
		399 long-term green jobs are created as the need of O&M of the projects	108 long term jobs created

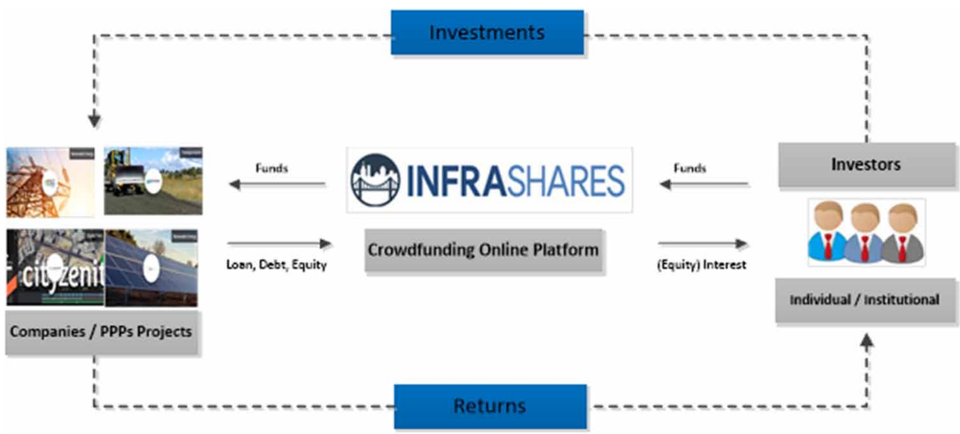
Source: Citizenergy (2017a)

Business Model

InfraShares is implementing an innovative concept in which small investors, especially local communities, can make direct equity investments in privately financed infrastructure projects. Besides, this offers increased community engagement and decreased cost of capital for issuers and provides investment opportunities for individuals that want to support specific infrastructure projects. Thus, crowdfunding can be a primary source of non-bank financing and create opportunities for additional transparency and enhanced public engagement in policy.

In terms of business, InfraShares adopts lending-based crowdfunding in which investors were offered three types of investment with different return and risk. The first type is a common stock which is the simplest form of equity. This type of shares is ordinary company shares most commonly held by founders and employees. Holders of common stock exercise control by electing a board of directors and voting on corporate policy (Farajian & Ross, 2016). Common stockholders are on the bottom of the priority ladder for ownership structure. The second type is a preferred stock a class of ownership in a corporation that has a higher claim on the assets and earnings than common stock. The third type is a convertible preferred stock which includes an option for the holder to convert the preferred shares into a fixed number of common shares, usually after a predetermined date (Farajian & Ross, 2016). Preferred stock is the most likely security to be offered. However, the preferred stock will naturally offer lower equity returns than common stock (Farajian & Ross, 2016).

Figure 7. Infrashares business model



Everyone can sign up on InfraShares as an investor. Furthermore, there are two types of investors. First, an "accredited investor" is defined by the SEC as individuals who consistently earn more than \$200,000 per year, coupled with a consistent combined income of more than \$300,000 per year, and individuals whose net worth (excluding primary residence) is at least \$1 million (U.S. Securities and Exchange Commission, 2016).

Impact and Performance

Within the last few years, InfraShares has started to showcase civic projects to provide public goods to communities. The investment raised through crowdfunding has been successful at fundraising for community centre renovations, renewable energy and public transportation. The local infrastructure projects within the community, thereby increasing the economic impact of the infrastructure development in the region.

Table 6 shows that Regulation D Rule 506 (c) are suited for large regional projects that may serve multiple states, such as, power generation, renewable energy, toll road, oil and gas. These projects typically require larger capital raises and will have a risk on return profile and more suitable for accredited investors (Farajian & Ross, 2016).

Table 7. Infrashares existing projects

No	Project	Sector	Cost (in USD)	Minimum Investment (in USD)	Project Status	Outcome
1.	SDSF Solar Fund IV	Renewable Energy	5 million 506(c) Offering	25,000	Still offering	Solar Fund offers a triple play of benefits: it lowers taxes, offsets dirty fossil fuels, and helps mission-based organizations acquire clean, cost-effective solar.
2.	ESG Clean Energy	Renewable Energy	5 million 506(c) Offering	25,000	Still offering	Attractive and predictable income returns included electricity sales, transmission, capacity and alternative energy credits
3.	Cityzenith	Digital Twin	33 thousand 506(c) Offering		In Progress/ Under Construction since 2020	Advanced Digital Twin Solution for Infrastructure
4.	The Gateway Opportunity Fund	Real Estate Development	33 million 506(c) Offering	100,000	In Progress/ Under Construction since 2020	Using a crowdfunding platform as a part of their fundraising enables individual community members to actively participate in the economic and physical redevelopment of their city.
5.	Matrix Materials	Transportation	40 thousand 506(c) Offering		In Progress/ Under Construction since 2020	Working Capital Loan for Fairfax County Pilot Project

Source: InfraShares (2020)

CONCLUSION AND POLICY RECOMMENDATIONS

Financing gap still becomes a significant issue of infrastructure project considering that it is a considerably high risk, requires a large amount of capital, and long term which takes a long time to get the financial return. Because of these reasons, large portions of infrastructure projects are lack of finance and cannot be tapped by investors. Relying heavily on government budget would not be able to close the gap. To do so, we need an alternative source of financing. This paper shows that financial technology, particularly crowdfunding, is viable to become an alternative method in financing infrastructure by matching funders and project owners through technology which has some benefits compared to other traditional financing methods. The advantages include tapping a wide range of investors and projects regardless of geographical borders as well as minimizing risk through comprehensive risk assessment using artificial intelligence (AI)and other means of technology. The use of AI and machine learning by using big data is generally used to improve risk management. It uses various data such as official statistics, social media, internet, and other data from numerous sources to calculate project risk and its probability of success . It is not solely the method to reduce risk, but it is utilized as a complementary to improve risk assessment other than conventional method (Polishchuk, Kelemen, & Kozuba, 2019).

Referring to the four platforms discussed in this paper, crowdfunding platform has been proven successful in raising capital to finance various infrastructure projects whether the purpose is commercial, social, or combination of both. However, majority crowdfunding platforms for infrastructure project financing are operated to fund projects in western countries such as Europe and America. Therefore, by learning from successful crowdfunding platforms and the best practices of crowdfunding regulation from several countries, the authors propose specific policy recommendations for Asian infrastructure project financing. The recommendations are classified into two categories which are business model and policy. From the business model aspect, the authors identify four scheme of business models that can be applied both for the scope of individual Asian countries and Asia as a region.

The first model is **"blended finance"** which adopts the business model of Convergence. The success of Convergence in blending sources of finance from investors with two different purposes (social and commercial), can be applied to the Asia region. In this case, the Asian Development Bank (ADB) as the Asian development institution, the government of each Asian countries, and philanthropic institutions concerning Asian development could be the initiators. Like Convergence, funding from public investors and philanthropic institutions acts as concessional capital. This capital is used as catalytic to lower investment risk by providing an additional layer of protection for private funds and improve financial return to attract investment funds from private institutions. Other than concessional capital, it also acts as risk insurance which provides credit guarantee in case the financial gain was not as expected. The catalytic capital can also be used indirectly to the project ground-breaking such as for technical assistance and design stage grants. In short, the concessional fund is used to amplify the financing by the additional fund from private institutions. The difference between convergence is in its focus; this model will focus on financing project in Asian countries.

The second model is **"cross-border citizen funding"** adopting Citizenergy crowdfunding platform. In this scheme, the main funders are citizens of Asia. The concept is raising small capital from a large number of citizens from all Asian countries to fund infrastructure project in Asia. In short, the concept is "From Asia for Asia". In terms of the instrument, similar to Citizenergy, to make it has a wide coverage of projects and investors, the form of investment is as various as possible including debt, bond, equity, cooperative, donation, and reward. The interesting concept in this scheme is cooperative, which is a company that is jointly owned by its members with the same vision regardless of the scope. It can be the same neighbourhood or consisting of various countries with the same goal. Cooperative offers benefits to members exclusively as well as shared investment opportunities. In addition, to amplify the financing coverage, it can also receive funds from institutions with the same vision. Furthermore, to make this scheme feasible Asian countries should jointly set up a common regulation for cross-border crowdfunding in Asia.

The third model is **"within-country crowdfunding"** adjusting from Oneplanetcrowd platform. This scheme prioritizes domestic funding for domestic infrastructure projects. The critical concept applied by Oneplanetcrowd is through impact investing that the investment made is not only yielding financial return but also impacting the development of people and planet. This campaign can attract a broader target of investors, especially those who are concern with people development and environmental aspect. By learning from Oneplanetcrowd, a factor that makes the platform one of leading crowdfunding platform in Europe is through collaborative partnership and networking with financial institutions, organizations concerning on sustainability of people and planet, consultants, and other relevant institutions. The success of its capital raising is also supported by comprehensive and clear information on its website both for prospective investors and for the beneficiaries including the risk, information for screening and

Table 8. Proposed crowdfunding business models for infrastructure project financing in Asia.

Business Models	Uniqueness and Description	Investment Instrument	Targeted Investors	Purpose/ Orientation	Region Scope
Within Country Crowdfunding	Prioritizes domestic funding for domestic infrastructure projects. Strengthen with collaborative partnership and networking with financial institutions, organizations concerning on sustainability of people and planet, consultants, and other relevant institutions.	1. Debt 2. Bond 3. Equity 4. Cooperative 5. Donation 6. Reward	1. Domestic individuals Institutional investors	Combination of: 1. Social so-called impact investing for people and the planet 2. Commercial	Within individual Asian countries
Commercial Infrastructure Financing	This scheme orientation is majorly commercial. The main goal is to raise capital for commercially viable infrastructure projects and to provide an attractive financial return for investors. This scheme aims to promote infrastructure financing through a public-private partnership by using financial technology.		1. Individuals around the world. 2. Private Institution investors	Mostly commercial	Asia
Cross-border Citizen Funding	The concept is raising small capital from a large number of citizens from all Asian countries to fund infrastructure project in Asia. In short, the concept is "From Asia for Asia"		2. Mostly Individual citizen of Asia	Combination of social and commercial	Asia
Blended Finance	Funding from public investors and philanthropic institutions acts as concessional capital. This capital is used as catalytic to lower investment risk by providing an additional layer of protection for private funds and improve financial return to attract investment funds from private institutions.	1. Grant, in the form of: a. Concessional capital b. Guarantee/ insurance c. Technical assistance d. Design stage 2. Debt 3. Equity	1. Philanthropic Institutions 2. Public investors consisting of: a. Asian countries government b. Multilateral Institution concerning Asian countries development such as ADB, USAID, OECD, etc. 3. Private Institutions	Mostly social that is mixed with commercial purposes for private institutions.	Asia

choosing the project, detailed of contract, and post-investment. In addition, the difference between this scheme and the business model of Oneplanetcrowd is on investment instrument. While Oneplanetcrowd only provides two instruments which are loan and convertible loan, this scheme allows various kinds of investment instruments as also applied on the second model (cross-border citizen funding).

Lastly, the fourth model is **"commercial infrastructure financing"** which observes from the business model of Infrashares crowdfunding platform. Unlike the other schemes that mostly focused on social purposes and dominated by energy investment as well as to achieve SDGs, this scheme orientation is majorly commercial. Therefore, the main goal is to raise capital for commercially viable infrastructure projects and provide an attractive financial return for investors. This platform aims to promote infrastructure financing through a public-private partnership by using financial technology. With this platform, even individual can invest directly in infrastructure projects and have his/her own shares in public infrastructure. The uniqueness of this scheme compared to the three previous models is that this model is specific for construction technology start-up and infrastructure projects. The project scope is also broad, not only the energy sector but also all other areas of infrastructure projects including transportation, water, communications, and other infrastructure sectors. Not only for a large-scale infrastructure project, but this scheme also allows even small-scale project such as the renovation of a small road. The difference of this model to Infrashares is that the types of investment instrument provided by this scheme are various just like two other previous schemes. This is meant to attract broad coverage of investors and projects. Moreover, those four schemes are summarized in Table 7.

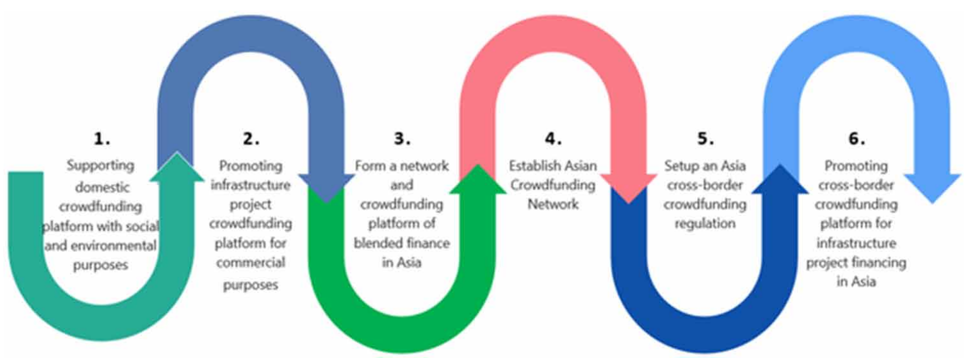
Furthermore, regarding policy recommendation, to make crowdfunding becomes a viable alternative source of infrastructure project financing in Asia, the authors propose a roadmap consisting of six sequential steps. *First* is promoting domestic crowdfunding platform in each Asian country. For a start, it is better to promote infrastructure project financing for the combination of social and commercial motives such as renewable energy and SDG purposes. The reason is that, looking from global experience, crowdfunding with such purposes is more popular and easier to raise capital from extensive coverage of investors considering that nowadays many people and institutions are concern with impact investing both for people development and environment issues. To accelerate the process, each Asian country should formulate facilitative regulations such as simplifying requirements for the establishment of the crowdfunding platform, providing incentives, and other supportive policies. For instance, to attract foreign investors operating crowdfunding in Netherland, the Dutch government provide various tax incentives and favourable policies for foreign investors planning to run a crowdfunding business in the country as discussed in the previous section. In addition, it is important to promote the establishment of a national crowdfunding association as it can help businesses to share knowledge and resources among them. It is also beneficial for today's FinTech regulation trend that is semi-regulatory and self-regulatory, where the association has an active role in proposing and formulating regulations together with the authorities. For instance, in Indonesia, peer to peer lending FinTech Association set up its own business code of conduct. To ensure its sustainability and consumer protection, the association even set up its own ceiling even though the Indonesia Financial Services Authority (OJK) does not regulate it. The existence of association is also later will be the basis of crowdfunding network at the Asian level.

Second, after crowdfunding with social and environmental purposes becoming more popular and familiar in Asian countries, we should step to the next area by promoting infrastructure project crowdfunding platform for commercial purposes like Infrashares. Therefore, capital raising can reach wide coverage of infrastructure projects. *Third,* is to form a network and crowdfunding platform of blended finance, which combines public funds as concessional capital with private funds like Convergence but focusing on the development projects in Asia. The establishment of this scheme is critical because it has significant impact considering that, in terms of amount, the capital raises in this mechanism is enormous. In this step, the authors consider that even the cross-border regulation has not yet formulated, it still can be running, bearing in mind that all this time financing of national development projects has been done collaboratively involving government, multilateral organizations, philanthropic institutions, and private entities. The difference is that in the funding matchmaking and risk assessment process, it uses technology so that it can reach a wide range of investors and projects. Therefore, it can lie on the current regulation.

Fourth, to improve the ecosystem and knowledge sharing at the Asian level, the authors believe that the establishment of the Asian Crowdfunding Network is essential. The experience and governance of the European Crowdfunding Network can be an excellent practice to be adopted for Asia crowdfunding development. Furthermore, the European Crowdfunding Network was established in 2017 to encourage cross border investment, they adopt a single set of EU regulatory framework applicable for crowdfunding is expected to reduce the costs of conducting business, make the process of licensing become more straightforward and more transparent in which can boost the confidence of crowdfunding platforms and investors. EU framework opens access for all European Citizen to participate in the project and be the investors in the crowdfunding platforms.

Fifth, in this borderless era, funding from domestic sources only is far from sufficient. Therefore, it is crucial for Asian countries to formulate cross-border crowdfunding regulation. With this regulation, resource sharing for infrastructure project among Asia region become more effective and efficient. The Asia cross-border regulation can be initiated by Asian Crowdfunding Network and financial services authorities of Asian countries. *Sixth,* after the cross-border regulation is set-up, the government and authorities of Asian countries should promote and facilitates the establishment of cross-border crowdfunding platform in Asia. The case of Europe proves that cross-border crowdfunding platform is able to raise capital from all over countries in Europe and channelled it to many countries in the continent. In addition, to extend the network, the Asian Crowdfunding Network may also cooperate with other continent networks such as the European Crowdfunding Network. Furthermore, the roadmap of crowdfunding development in Asia for Infrastructure project financing is summarized in Figure 8. In addition, regarding research contribution, this study expands and strengthen literature on crowdfunding impact and development especially for Asian context. It also provides targeted policy on how to develop crowdfunding for infrastructure project financing that is expected to benefit and be used as a reference for policy makers in Asia. Furthermore, considering that the limitation of the study lies on generic policy for all Asian countries, it would be better if further study differenciate Asian sub-regions or countries as the object of analysis depending on its distinctive characteritics including its socio-economic conditions.

Figure 8. Roadmap of crowdfunding development in Asia for infrastructure project financing



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ENDNOTES

[1] In the case of a joint force with Lumo in 2017, a French crowdfunding platform to finance Torreiles Project in France, the involvement Oneplanetcrowd as the Dutch crowdfunding required a special arrangement via SPV (CrowdFundRES, 2017).

[2] Due to a high-risk rating or specific tax legislation, investors with a nationality or country of residence from Afghanistan, Bahamas, Bosnia and Herzegovina, Bostwana, Cambodia, Ethiopia, Ghana, Guyana, Iran, Iraq, Lao People's Democratic Republic, Libya, Nigeria, North Korea, Pakistan, Panama, Samoa, Saudi Arabia, Serbia, Sri Lanka, Syrian Arab Republic, Trinidad and Tobago, Tunisia, Uganda, USA, Vanuatu, and Yemen are not allowed (Oneplanetcrowd, 2020c).

Chapter 16
Influence of Industry 4.0 on Motives and Cultures in the Post-COVID-19 Era

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ABSTRACT

As the challenge of big data impacts how we understand cultural differences, a motive-integrated model of culture is becoming an effective strategy to search for convergence by the fourth industrial revolution called Industry 4.0. This study examines the integration approach of Industry 4.0 in merging motives and cultures to efficiently produce COVID-19 vaccines. Structure equation modelling has been conducted on the data in 38 countries during the period of 2006-2021. Findings indicate that Industry 4.0 has merged achievement motive in reactive culture, power motive in multi-linear active culture, and affiliation motive in linear active culture. The three pairs of motive-cultures have enabled people to successfully produce COVID-19 vaccines 10 times faster than previous approaches for vaccines. To implement Industry 4.0, the reactive countries and multilinear active countries would enhance the achievement and power motives, but the linear active countries would decrease the affiliation motive.

INTRODUCTION

Failure to examine the effects of industrial revolutions on motives and cultures creates critical issues in maintaining and developing cultures in the world. Arguably, World War 1 and 2 could be attributed in part to the negative impacts of the first two industrial revolutions on human motives and cultures. Motives are concerns over starting, maintaining, and directing (1) evaluated performance of human activities (achievement motive), (2) the means of influencing a person (power motive), and (3) positive affective relationships with another person (affiliation motive) (McClelland, 1985). In this study, motives are specific implicit behavior, so they are different from needs and traits. Needs generate response tendency and traits are the surface of motives (McClelland, 1951). Cultures are the growth of national personality

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traits (Lynn, 1991). Traits are the motives' channels (Winter, John, Stewart, Klohnen, and Duncan, 1998), so cultures are the channels of motives. Culture or national character is "relatively enduring personality characteristics and patterns that are modal among adult members of the society" (Inkeles & Levinson, 1954,1969). In sum, how cultures and motives that are consistent variables over time to be merged in accordance with the integration approach of Industry 4.0 will be studied in the paper.

To thoroughly analyze the strengths of Industry 4.0, the study will examine how the preceding three industrial revolutions affected motives and cultures. The first industrial revolution in 1784 changed agriculture to industry based on the discovery of coal. The sedentary human society became diverged into urban and country society. The human motive of power in agriculture was enhanced in urban cities. Cultures are mostly the polychronic culture in which people pursue multiple goals simultaneously and let one project influence another. They solicit first-hand information from people and use body language. The second industrial revolution in 1867 transformed industry from mechanic to electricity based on the discovery of gas. Every high-power country is searching for rich natural resources to enhance power resulting in the two World Wars in 1914-1918 and 1939-1945. The third industrial revolution transformed industry from electricity to nuclear based on the discovery of uranium. The polychronic culture has been changed to a monochronic culture in which people just do one thing at one time. Thus, the affiliation motive focusing on the institution rules and avoiding human critics is very important. Then international trades among countries were based on the competitive advantage or excellent performance. The achievement motive is the key in each country. The two world superpowers US and Russia competed in technology in the Cold War 1947-1991 by the three implicit motives: achievement, power, and affiliation (McClelland & Winter, 1969, 1971). In sum, the first three industrial revolutions focused on discovering, controlling, and distributing natural resources for the country.

The fourth industrial revolution called Industry 4.0 has transformed industry from physical to virtual based on the Internet of things and automation with renewable resources. The most significant uniqueness of Industry 4.0 compared with preceding industrial revolutions is the integration approach to combine information technology (IT) into organizational technology (OT). This IT-OT approach of convergence has made people efficiently produce vaccines for corona virus within 12-18 months compared with 10 years for other vaccines. The integration approach has been used in this study to merge motive and culture into a model of motive-culture.

Implicit motives of people or countries including achievement, power and affiliation will operate human behaviors through the three channels called linear active, multi-linear active and reactive cultures under the impacts of COVID-19 vaccines. For example, Vietnam, China, and Japan representing the reactive culture should create environments for people to perform their excellent services during the post of COVID-19 era. Vietnam was ranked as the second top country in the world to control COVID-19 cases. China was ranked as the frontier in producing COVID-19 vaccines. Japan was ranked as the top achievement of economics under the control of COVID-19.

In sum, the fact that the IT-OT integration approach of Industry 4.0 has motivated people discover COVID-19 vaccines efficiently in a certain culture has significantly affect human society in the economy, but little research has focused on an IT-OT integration of motives and cultures across countries, especially Asia. This paper is thus to examine the effects of the fourth industrial revolution with COVID-19 vaccines on the changes of motives and cultures in 38 worldwide countries and then on Asian countries.

The remaining sections of the present paper are organized as follows. Section 2 provides the history of Industry 4.0 affecting cultures, motives, and Asia. Section 3 examines Structure Equation Modelling to find coefficients of three motives and three cultural dimensions with the mediation of Industry 4.0.

Section 4 focuses on the discussions of the study findings. Section 5 concludes the contributions of the paper and highlights potential future research.

LITERATURE REVIEW

History of Industry 4.0 and Cultures

In the first Industrial Revolution in 1765 (Industrial Revolution, 2021), people used mechanics to produce products from coal. The processes included the steam engine for railroad transportation, the metal forging for production, the spinning machine for fabric, the boat for canal transportation, and the mules for ground transportation. The processes have changed agricultural society into nonegalitarian social relationships. As a result, productivity has increased and divided a society into upper and lower social classes. The cultures in each class are different; one is more individual, and the other is more collective.

In the second Industrial Revolution in 1870 (Industrial Revolution, 2021), people used the combustion engine with oil. There was mass production from the appearance of steel and chemical products, telegraph and telephone for communication, and planes and cars for transportation. As a result, jobs are more specialized, and cultures were divided into more task or social oriented. The two World Wars were incurred by divergent cultures.

The third Industrial Revolution transformed the electrical industry using nuclear technology invented in 1969 (Industrial Revolution, 2021). The discovery of nuclear resources has divided cultures by time either monochronic in present and future or polychronic cultures in the past.

The fourth Industrial Revolution or Industry 4.0 has transformed the nuclear industry into digital technology. The industrial internet, cloud technology and artificial intelligence created a physical and virtual environment for people. In addition, the growth trend of Industry 4.0 has been changed by disruptive technology (Dont, 2021). As a result, the cultures are divided not only by time but also by performance. There appear thus three types of culture: linear active or monochronic culture, multi-linear culture or polychronic culture, and reactive culture or performance culture in the fourth industrial revolution.

In this study, we will use data from the most magnificent discovery in Industry 4.0 called COVID-19 vaccines to reflect the most contribution of Industry 4.0 to the world in 2021. The COVID-19 pandemic was caused by severe acute respiratory syndrome coronavirus 2 in January 2020 and spread to the world quickly. More than 30 million people are infected and people from different cultures have worked to develop the vaccines for the coronavirus. As a result, there have been 165 coronavirus vaccines (Corum, Wee, & Zimmer, 2020). As of today, around 748 million (9.6%) people have been fully vaccinated (OurWorldData, 2021) and most of them are from the US, China, and Russia. The study model thus examined the impact of Industry 4.0 on behavioral cultures in the world and Asia.

Cultures across Countries – Linear Active, Multi-Linear Active, and Reactive

Culture is the growth of country personality traits (Lynn, 1971/1991). Traits are different from motives. Motives are expressed in behavior implicitly, that is, not accessible to consciousness and therefore measurable only by indirect means (Greenwald & Banaji, 1995). Traits are the motives' channels (Winter, John, Stewart, Klohnen, and Duncan, 1998). Motives are future ends of the traits in a particular way in time and traits are the life outcomes (McAdams, 1995). McClelland (1951) defines traits as "surface or stylistic manifestations of personality only". Therefore, motives are complementary to traits and traits are subsuming of motives (Winter, John, Stewart, Klohnen, & Duncan, 1998).

Culture or national character is "relatively enduring personality characteristics and patterns that are modal among adult members of the society" (Inkeles & Levinson, 1954,1969). Based on Eysenck's (1966) theory of personality including psychoticism, extraversion, and neuroticism, Lynn (1971/1991) showed results of a factor analysis of national medical indicators in 18 developed countries and identified the dimension of "anxiety." Lynn and Hampson (1975) extended this to two dimensions, "neuroticism" and "extraversion." Lynn (1981) added "psychoticism." Lynn and Martin (1995) have studied the national differences for 37 nations and found that extraversion, neuroticism, and psychoticism were related to economics of these countries.

Hall (1966) has integrated culture into the three dimensions of architecture by adding time as the fourth dimension.

In his book "Beyond Culture", Hall (1976) has grouped countries into cultures based on specific types of communication. There are two dimensions: the first based on perception and organization of time, and the second based on contextualization of information. There are monochronic and polychronic types in terms of time. In the culture of monochronic, people work on schedules and promptness. In the culture of polychronic, people do several things at the same time (p.17). In terms of contextualization, the culture related to the meaning of the message is called low context and the culture related to the way in which information is transmitted is called high context. Hall (1983) identified that polychronic culture is used to repetition and past experiences whereas the monochronic culture is toward the present and the future.

Therefore, Hall (1983) identified three types of culture: monochronic culture, polychronic culture, and contextualization culture.

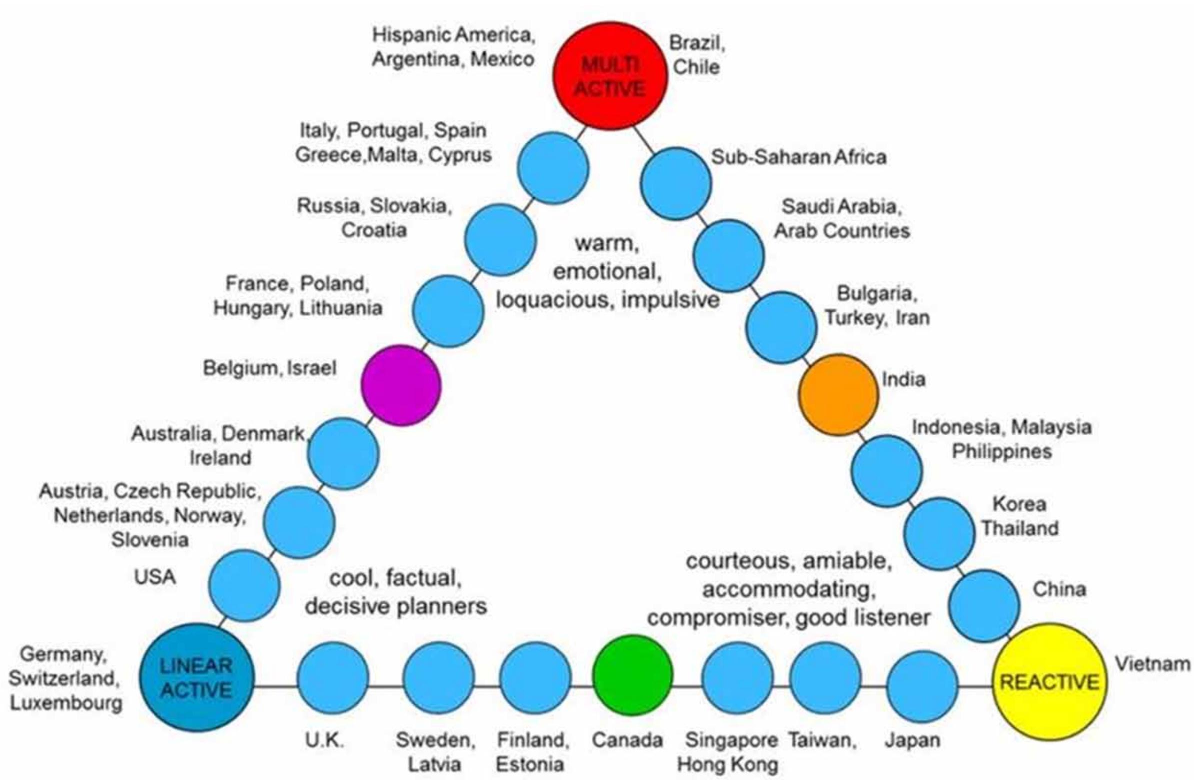
Lewis (2006) has revised the combinations of Hall's monochronic and polychronic types with high and low contextualization to create three types of cultures: linear active, multi active, and reactive. The countries in the linear active culture in Northern Europe and North America are the monochronic type with low contextualization in which punctuation is very important. People think logically to plan and compartmentalize projects. They get information from scratch and separate the social and professional. The linear-active culture might be thus fit for the affiliation motive.

The countries in the multi active culture in Southern Europe, Latin, African, and Middle East are the polychronic type with high contextualization in which punctuation is not important. People think of relationships rather than logistics. They pursue multiple goals simultaneously and let one project influence another. They solicit first-hand information from people and use body language. The multi-linear culture might be thus fit for the power motive.

Combining the linear and multilinear, the reactive people in East Asia are friendly to harmonize both data and people sources. They do not plan step by step or grand outline, they look at the general principles and strictly must not lose face. If the truth to linear and multilinear is priority and flexibility, respectively, it is the second after diplomacy in reactive. If the communication of linear and multilinear is written and spoken, respectively, the face-to-face is the key communication to the reactive. When the linear and multilinear set up the mission by compartmentalizing and one affecting another, the reactive sees the whole picture in reactive. If the linear and multilinear respect officialdom and pulling strings, the reactive respect networks. The reactive culture might be thus fit for the achievement motive.

Lewis's (2006) cultures in Figure 1 includes 56 countries and groups of countries in the world. "The several hundred national and regional cultures of the world can be roughly classified into three groups: task-oriented, highly organized planners (linear-active); people-oriented, loquacious inter-relators

Figure 1.



(multi-active); and introverted, respect-oriented listeners (reactive). Italians see Germans as stiff and time-dominated; Germans see Italians gesticulating in chaos; the Japanese observe and quietly learn from both." (Lewis, 2006).

Bacik and Turakova (2018) have applied the three cultural dimensions of linear-active, multi-active and reactive cultures to corporate culture in their empirical studies. Chandarana (2011) has elaborated the 3 dimensions of Lewis's (2006) model in terms of trust hierarchy as follows: (1) Family only, (2) School only, and (3) Institution only. He indicates the relationship between schoolmates' performance and the reactive culture, family control and the multi-linear culture, and institution law and the linear active culture. Lewis (2019) reports how the Western culture and economic power dominate the world. He also identifies the role of Asian countries in this era. Guiso, Sapienza, and Zingales (2006) report the relationships between culture and economics. Gardner (2021) examines the impacts of Industry 4.0 on cultures and economy. He posts, "The key to getting it right is to prioritize adoption rather than change for changes sake (i.e., linear active culture). A phased approach (i.e., Industry 4.0) will be beneficial for everyone in the long term (i.e., GDP per capita)." (p. 1).

Asia Culture – East and West

Asia culture or the culture in the East is different from the Western culture. The key differences between East and West cultures are one is hardworking and the other is adventurous; one is group interest first and the other is self-interest first; one is low profile and the other is high profile. Leung and Bozionelos (2004) used the five-factor model of personality to examine the Asian culture affected mostly by Confucius, a Chinese philosopher 2500 years ago. They forecasted extraversion related to high profile and openness associated with low conservatism would be low in the Asian culture because they are opposite with the Confucius principles "industriousness, sacrifice of personal interests over group interest, concealment of emotions, and low profile" (Leung and Bozionelos, 2004, p. 31). Judge, Bono, Ilies, and Gerhardt (2002) found that extraversion, conscientiousness, and openness had the strongest influence in the leadership for western culture. However, the interactions between East and West have been changed by industrial revolutions especially the Industry 4.0. Ishibashi and Kottke (2009) also found that Japanese culture highly appreciates extraversion in leadership for Japan culture. To thoroughly understand the roots of cultures, we have examined the human motivation theory (McClelland, 1985) through the implicit motives of people and countries.

Motives – Achievement, Power, and Affiliation

In this study, we will use the three implicit motives (Achievement, Affiliation, and Power) of the motivation theory of McClelland (1985). The three motives are implicit because they are measured by Thematic Apperception Test (TAT) (Vane, 1981) to measure the unconscious motives of human beings. In the TAT, participants will write their imagination based on the ambiguous TAT pictures and the professional raters will score the writings in three motives: achievement, power, and affiliation. The TAT approach is considered as an "X-ray" technology to reflect people's motivation (McClelland, 1985). The reason for this study is to use the three implicit motives for the 24 countries because the unconscious motives are more consistent than the explicit motives in the changing environment and the three motives are embedded in the fairy tales of each country (McClelland, 1985).

The achievement motive is the need for a standard of excellence in competition. Motivation theory (McClelland, 1985) states that high need for achievement (n Ach) persons or countries tend to be competitive and strive to do better than others and the direction of that striving is toward an excellence performance. High need for achievement (n Ach) appears to lead people or countries toward performance goals rather than toward influencing others or obtaining large profits (McClelland & Winter, 1969/1971). McClelland (1961/1976) used Thematic Apperception Tests to score the three motives in 24 countries in the 1950s to compare the economic development of these countries. Since then, researchers have applied this approach to examine the economic growth of countries (Hay Group, 2003; Spangler, 1992; Tuerlinckx, De Boeck, & Lens, 2002; Vane, 1981). Lynn (1991) administered a survey of university students in 43 countries between 1986 and 1989 and found that "The innovations on which economic growth depends are made by individuals who need to have the motivation to make these innovations". In addition, Lynn (1991) also sees the high scores on competitiveness in the five countries in Asia: Korea, Taiwan, Hong Kong, Japan, and Singapore that contribute to the development of their economies significantly.

The first assumption is thus the achievement motive of a country would be a future end of the channel or culture targeting on performance.

The power motive is the need to influence, teach, or encourage others to achieve, with little interest in doing things alone (Chusmir, 1985). Countries or people with a high need for power (n Pow) like to work with other countries or people who have disciplines and self-respects (McClelland, 1985). Managers who are n Pow appear to be more concerned with the maintenance of the system rather than expansion (Winter, 1973). While high n Ach managers look to become professionals with new and alternative means, n Pow managers generally stay with available means and fight for a greater share of existing limited resources (McClelland & Winter, 1969/1971).

The second assumption is thus that the power motive might be a future end of the culture of interaction among people or countries, i.e., the polychronic culture.

The affiliation motive is the need for positive friendship with other persons. Individuals with high need for affiliation (n Aff) tend to worry about disappointing others (Winter, 1982), leading them to avoid making decisive or unkind comments or criticism (McClelland, 1985; Winter, 1982). They tend to avoid conflict and competition with others (McClelland, 1985). They are thus overly sensitive under risk-taking situations (Winter & Stewart, 1977). The affiliation-motivated managers/leaders are reluctant to monitor subordinates' behavior, to convey negative feedback, or to discipline subordinates (McClelland, 1985). Therefore, high affiliation people prefer to avoid people's conflicts by doing one thing at one time.

The third assumption is thus the affiliation motive might be a future end of the monochronic culture.

Hypotheses

The above literature has reviewed the findings of the empirical studies on theory of motivation (McClelland, 1985) and indicated some assumptions for the present study. Before setting up hypotheses, we looked up the secondary historical data regarding cultures, motives, and economies across countries in the world affected by the impact of industrial revolutions as follows.

During Industry 2.0 and Industry 3.0, McClelland (1961/1976) has measured the three motives of achievement, affiliation, and power across 31 countries (Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Denmark, England, Finland, France, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy, Japan, Netherland, Norway, Pakistan, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, and Russia) in 1925 and in 1950 during the second and third industrial revolutions in Table 1. Data in 1925 is affected by the second industrial revolution due to the discovery of the oil fields in Texas and Persian Gulf; Data in 1950 is affected by nuclear power in 1945.

During Industry 4.0, Emmerik, Gardner, and Wendt (2010) have applied McClelland's (1976) approach to measure the three motives across 24 countries (Argentina, Australia, Brazil, Canada, France, Germany, Greece, Hong Kong, India, Indonesia, Italy, Japan, Malaysia, Mexico, Netherlands, Nordic countries, Philippines, South Africa, South Korea, Spain, Taiwan, Turkey, United Kingdom, and United States) which are illustrated in Table 1.

In Table 1, we also calculated the average data of motives, cultures, gross domestic product per capita in the world and Asia. We found that Industry 4.0 has changed (1) the average cultures of linear active, multi-linear active, and reactive, (2) the average motives of achievement, affiliation, and power of Asia countries, and (3) the average gross domestic product per capita of 41 countries. Therefore, we come up with the hypotheses and sub hypotheses as follows.

- **Hypothesis 1:** The relationships between the three motives (Achievement, Affiliation, and Power) and three cultures (Linear Active, Multi-linear Active, and Reactive) would be changed by Industry 4.0.
    - **Hypothesis 1a:** There would be a significant relationship between the reactive culture and the achievement motive.
    - **Hypothesis 1b:** There would be a significant relationship between the multi-linear active culture and the power motive.

    - **Hypothesis 1c:** There would be a significant relationship between the linear active culture and the affiliation motive.
- **Hypothesis 2:** Technology would increase the impact of motives (Achievement, Affiliation, and Power) on Asia.
    - **Hypothesis 2a:** The power motive will decrease in Asia through Industry 4.0.
    - **Hypothesis 2b:** The achievement motive will increase in Asia through Industry 4.0.
    - **Hypothesis 2c:** The affiliation motive will decrease in Asia through Industry 4.0.

METHODOLOGY

Sample

The study sample is the motives and cultures of 38 countries selected from 24 countries in the two periods 1925 and 1950 in McClelland's (1961/1976) book, 56 countries from Lewis's model (2006), and 25 countries in the research of Emmerik, Gardner, Wendt, and Fischer (2010). These countries include Algeria, Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, Denmark, England, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Iran, Iraq, Ireland, Israel, Italy, Japan, Malaysia, Mexico, Netherland, Norway, Pakistan, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, and US.

Method

This study first used Canonical Correlation analysis to find 3 significant relationships among 9 possible pairs of the relationships between 3 motives and 3 cultures. Then we used Structure Equation Modeling (SEM) to build six models for the three hypotheses of the study. Each hypothesis has two models: one with Industry 4.0 and the other without it. Lewis' (2006) three culture types including Linear-active, Multi-active, and Reactive are endogenous and the three motives Achievement, Affiliation, and Power are exogenous variables. Industry 4.0 is as an endogenous variable measured by a dummy variable with 1 representing the presence of vaccinations and 0 representing a lack of vaccinations from Jan 31, 2020 to June 30, 2021. Data of vaccinations was retrieved from Our World Data (2021). Similarly, the dummy variable ASIA is used for Asian countries as an endogenous variable. Motives for the 24 countries in 1925 and 1950 are the secondary data of McClelland (1976). If there are a missing one for the country, we will leave it blank. Motives for the 24 countries in 2010 are the secondary data of the study of Emmerik et al. (2010). Total of countries involved in the study sample is 38 countries because of the country overlap of the two previous samples. The cultures of 56 countries in Lewis's (2006) model are measured as follows. We have measured three vector scalars for each of 56 countries based on the assumption that (1) each country possesses three vector dimensions (Linear, Multi-linear, and Reactive) and (2) its relative distance to each cultural dimension in Lewis's (2006) model, on a scale of 25-100 (Table 2). All data were transferred into log to avoid any spurious regressions before conducting structure equation modelling.

In Table 2, the linear active culture is the culture people plan, schedule, organize, pursue action chains, and do one thing at a time. The multi active culture is the culture in which people "do many things at once, planning their priorities not according to a time schedule, but according to the relative thrill or

	Achievement				Affiliation				Power
Asia***	1.7	1.29	1.7	0.7	1.7	1.3	1.3	1.14	1.1
Linear(L)***	1.7	1.7	1.6	1.8	1.7	1.3	1	0.9	1.1
Multilinear (M)***	0.8	1.9	1.7	1.3	1.3	1.3	1.3	1	1
Reactive (R)***	1.8	1.8	1.8	0.8	1.7	1.5	1.2	1	1.1
GDPpc/Motives	1419	1991	19228	1384	2488	24883	1833	3736	30108
Argentina (M)	NA	NA	1.6	NA	NA	1.5	NA	NA	1.1
Australia (L)	2.8	2.4	1.8	1.8	1.2	1.3	1.2	0.5	1.1
Austria (L)	1.6	1.9	NA	1.2	1.1	NA	1.2	0.4	NA
Belgium (L)	1	0.4	NA	1.6	1.5	NA	0.8	0.9	NA
Brazil (M)	0.3	1.1	1.6	1	0.1	1.2	0.8	0.9	1.1
Bulgaria (M)	NA	2.2	NA	NA	1.2	NA	NA	1.1	NA
Canada (L)	2.7	2.3	1.6	2.4	2.2	1.1	1.1	1.2	0.9
Chile (M)	1.3	1.2	NA	0.9	2.2	NA	1.4	0.8	NA
Denmark (L)	2	1.1	1.5	2.2	1.8	1.3	1.7	0.9	1.2
England (L)	2.1	1.7	1.8	2.4	2.5	1.3	1.1	1.1	1
Finland (L)	1.2	1.5	1.5	1	1.7	1.3	1.3	1.1	1.2
France (M)	0.8	2.4	1.8	1.4	1.2	1.3	1.7	0.5	1.2
Germany (L)	1.4	2.1	1.7	1.6	1.3	1.2	1.3	1.3	1.2
Greece (M)	0.4	2.3	2.1	2.8	2.1	1.4	0.7	0.8	1.1
Hong Kong (R)**	NA	NA	1.5	NA	NA	1.2	NA	NA	1.1
Hungary (M)	1.3	1.8	NA	0.9	1.2	NA	1.5	0.5	NA
India (M)**	NA	2.7	1.7	NA	1.2	1.4	NA	1.2	1.1
Indonesia (R)**	NA	1.7	NA	NA	1.1	NA	NA	1.1	NA
Iran (M)	NA	1.2	NA	NA	0.2	NA	NA	0.9	NA
Iraq (M)	NA	2	NA	NA	0.6	NA	NA	2.7	NA
Ireland (L)	3.2	2.3	1.5	2	1.4	1.3	1.3	0.9	1.2
Israel (L)	NA	2.3	NA	NA	2.9	NA	NA	0.2	NA
Italy (M)	NA	1.3	1.9	NA	2	1.4	NA	1	1
Japan (R)**	1.8	1.3	1.9	0.8	2.2	1.4	1.3	1	1.2
Malaysia (R)**	NA	NA	1.8	NA	NA	1.3	NA	NA	1
Mexico (M)	NA	1.6	1.5	NA	1.6	1.2	NA	1.2	0.8
Netherland (L)	0.3	1.5	1.8	2.1	2.1	1.2	0.4	0.7	1.1
Norway (L)	1.3	1.7	1.5	0.6	2	1.3	0.8	0.6	1.2
Pakistan (M)**	NA	2.3	NA	NA	1.2	NA	NA	0.5	NA
Russia (M)	1	2.1	NA	1	1.3	NA	1.6	1.2	NA
South Africa (M)	NA	NA	1.9	NA	NA	1.2	NA	NA	1.3
South Korea (M)**	NA	NA	2.1	NA	NA	1.6	NA	NA	1.3
Spain (M)	0.8	2.3	1.5	1.1	0.6	1.3	1.6	1.9	0.8
Sweden (R)	2.2	1.6	1.5	1.1	1.5	1.3	0.6	0.8	1.2
Switzerland (L)	NA	1	NA	NA	1.1	NA	NA	1.6	NA
Taiwan (L)**	NA	NA	1.6	NA	NA	1.5	NA	NA	1
Turkey (L)	NA	3.6	1.6	NA	0.9	1.2	NA	0.6	0.7
United States (M)	1.9	2.2	1.7	2.3	2.1	1.3	0.9	1.4	1

Country	Multi-linear Active	Linear Active	Re-Active
Hispanic America	100	25	25
Argentina	100	25	25
Mexico	100	25	25
Italy	85	30	30
Portugal	85	30	30
Spain	85	30	30
Greece	85	30	30
Malta	85	30	30
Cyprus	85	30	30
Russia	75	40	35
Slovakia	75	40	35
Croatia	75	40	35
France	65	65	40
Poland	65	65	40
Hungary	65	65	40
Lithuania	65	65	40
Belgium	50	75	50
Israel	50	75	50
Australia	40	80	40
Denmark	40	80	40
Ireland	40	80	40
Austria	35	85	35
Czech Republic	35	85	35
Netherlands	35	85	35
Norway	35	85	35
Slovenia	35	85	35
USA	30	90	30
Germany	25	100	25
Switzerland	25	100	25
Luxembourg	25	100	25
UK	30	90	30
Sweden	35	85	40
Latvia	35	85	40
Finland	40	80	45
Estonia	40	80	45
Canada	50	70	50
Singapore	40	50	65
Taiwan	35	40	85
Hong Kong	35	40	85
Japan	30	30	90
Vietnam	25	25	100
China	30	30	90
Korea	40	40	80
Thailand	40	40	80
Indonesia	45	45	65
Malaysia	45	45	65
Philippines	45	45	65
India	50	50	60
Bulgaria	70	45	55
Turkey	70	45	55
Iran	70	45	55
Saudi Arabia	85	30	40
Arab Countries	85	30	40
South Saharan Africa	90	25	30
Brazil	100	25	25
Chile	100	25	25

importance that each appointment brings with it." (Lewis, 2006). The reactive culture is the culture which "prioritize courtesy and respect, listening quietly and calmly to their interlocutors and reacting carefully to the other side's proposals." (p.34).

Findings

1. The study has conducted canonical correlation analysis to find the pair of variates in the relationships between the three motives (Achievement, Affiliation, and Power) and three cultures (Linear Active, Multi-linear Active, and Reactive) under Industry 4.0. Results indicate that (1) affiliation motive and linear active culture are the first pair with highest canonical correlations (.74/.90). (2) achievement motive and reactive are the second pair with second highest canonical correlation (.25/.61). (3) Finally, power motive and multi-linear active are the third pair with significant canonical correlation (.23/.34) in the first variate. Hypothesis 1 was confirmed. There are 3 significant relationships between motives and cultures in Industry 4.0. In other words, Industry 4.0 affects the three relationships as follows: Achievement motive fits for reactive culture, Affiliation motive fits for linear active culture, and Power motive fits for multi-linear active culture. Hypotheses 1a, 1b, and 1c were supported.
2. Regarding the impacts of Industry 4.0 on the motives and cultures, the study has conducted AMOS SPSS 27 to set up two following models: one with Industry 4.0 and the other without it, the study has found the following equations retrieved from Figure 2. The two models "with Industry 4.0" and "without Industry 4.0" in figure 2 are well-fit models with composite reliability of .94 and .95, respectively and variance extracted of 70% and 72% (CMINs/df=1.03/1.05; ps=.406/.50; GFIs=.93/.96; CFIs=.99/.99; RMSEAs=.04/.05, AICs=43.82/45.1)

The following equations for Model 1 with Industry 4.0 (eq.1.1, eq.1.2, eq.1.3, and eq.1.4) and for Model 2 without Industry 4.0 (eq.2.1, eq.2.2, and eq.2.3) and figure 2 are the outcome of Structure Equation Modelling of SPSS AMOS 27.

$$LLinear = (-.85)\ LAffiliation + (.06)\ LIndustry\ 4.0 + e1.1 \tag{1.1}$$

$$LMultilinear = (-1.02)\ LPower + (-.02)\ LIndustry\ 4.0 + e1.2 \tag{1.2}$$

$$LReactive = (.76)\ LAchievement + (-.09)\ LIndustry\ 4.0 + e1.3 \tag{1.3}$$

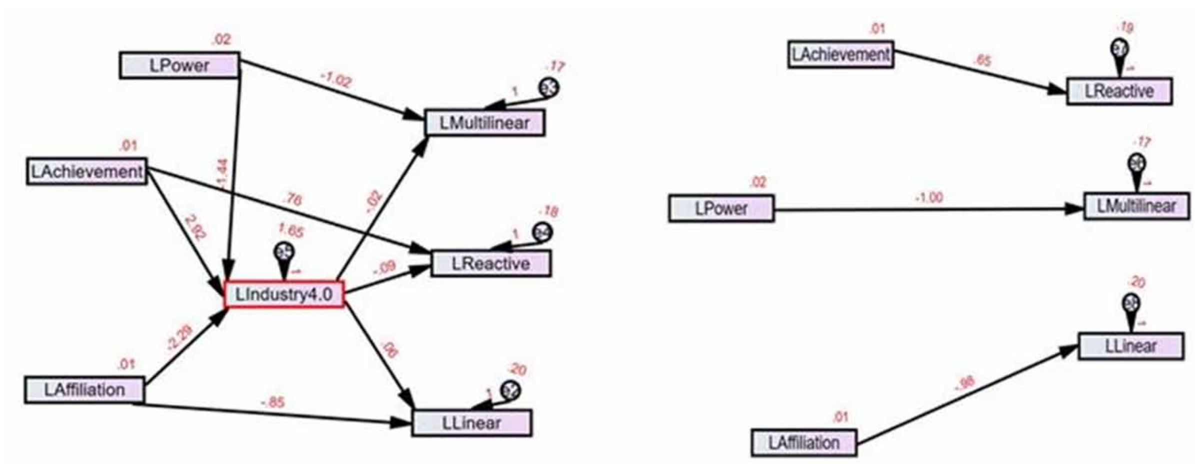
$$LIndustry\ 4.0 = (2.92)\ LAchievement + (-2.29)\ LAffiliation + (-1.44)\ LPower + e1.4 \tag{1.4}$$

$$LMultilinear = (-1.00)\ LPower + e2.1 \tag{2.1}$$

$$LReactive = (.65)\ LAchievement + e2.2 \tag{2.2}$$

LLinear = (-.98) LAffiliation + e2.3 (2.3)

Figure 2.



The mediator of Industry 4.0 has enhanced the relationship between achievement motive and reactive culture as follows. Figure 2 indicates that the coefficient of achievement motive on reactive culture is bigger with the mediator Industry 4.0 than without it (.76>.65). Industry 4.0 enhances the effects of achievement motive on reactive culture.

The mediator of Industry 4.0 has enhanced the relationship between power motive and multi-linear active culture as follows. Figure 2 indicates that the coefficient of power motive on multi-linear active culture is bigger with the mediator Industry 4.0 than without it (1.02>1). Industry 4.0 enhances the effects of power motive on multi-linear active culture.

The mediator of Industry 4.0 has enhanced the relationship between affiliation motive and linear active culture as follows. Figure 2 indicates that the coefficient of affiliation motive on linear active culture is smaller with the mediator Industry 4.0 than without it (.85<.98). Industry 4.0 reduces the effects of affiliation motive on linear active culture.

3. Regarding the impacts of Industry 4.0 on the motives and Asian countries, The study has conducted AMOS SPSS 27 to set up two following models: one with Industry 4.0 and the other without it, the study has found the following equations retrieved from Figure 4. The two models “with Industry 4.0” and “without Industry 4.0” in figure 3 are well-fit models with composite reliability of .94 and .95, respectively and variance extracted of 75% and 76% (CMINs/df=0.99/1.03; ps=.49/.50; GFIs=.93/.96; CFIs=.99/.96; RMSEAs=.04/.05, AICs=48.82/49.1).

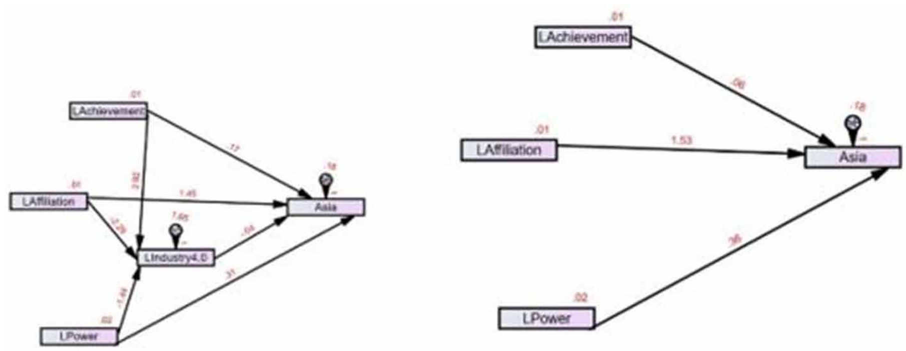
The following equations for Model 5 with Industry 4.0 (eq.5.1, eq.5.2) and for Model 6 without Industry 4.0 (eq.6) and figure 4 are the outcome of Structure Equation Modelling of SPSS AMOS 27.

Asia = (.17) LAchievement + (1.45) LAffiliation + (.31) LPower + (-.04) LIndustry 4.0 + e3.1 (3.1)

LIndustry 4.0 = (2.92) LAchievement + (-2.29) LAffiliation + (-1.44) LPower + (1) e3.2 (3.2)

Asia = (.06) LAchievement + (1.53) LAffiliation + (.36) LPower +e3.3 (3.3)

Figure 3.



The mediator of Industry 4.0 has enhanced the relationship between achievement motive and Asian countries as follows. Figure 4 indicates that the coefficient of achievement motive in Asian countries is bigger with the mediator Industry 4.0 than without it (.17>.06). Industry 4.0 enhances the effects of achievement motive in Asia.

The mediator of Industry 4.0 has reduced the relationship between power motive and Asia as follows. Figure 4 indicates that the coefficient of power motive on Asia is smaller with the mediator Industry 4.0 than without it (.31<.36). Industry 4.0 reduces the effects of power motive in the Asian countries.

The mediator of Industry 4.0 has reduced the relationship between affiliation motive and Asian countries as follows. Figure 4 indicates that the coefficient of affiliation motive in Asia is bigger with the mediator Industry 4.0 than without it (1.53<1.45). Industry 4.0 enhances the effects of affiliation motive in Asian countries.

DISCUSSION

There are specifically 3 research gaps in this study: motives gap, cultures gap, and COVID-19 vaccines gap. Implicit motives of achievement, power, and affiliation that are in both vertical in Maslow hierarchy and horizontal in process of need-motive-trait are integrated and scored right after participants speak or write their feedback using LIWC 2015. Cultures that are in horizontal plane in linear active, multi-linear active, and reactive and horizontal process of need-motive-traits are integrated to identify customer demands in their social media using the three models of this study (achievement-reactive, power-multi-active, and affiliation linear active). COVID-19 vaccines are generated within 18 months using convergence of gene and vaccines in vector space including vertical, horizontal, and plane. Canonical analyses using SPSS 25 are conducted to derive two functions of motives and cultures and integrate two pairs based on variances. The pair variate with highest correlations are identified to conclude their significant association. As a result, three pair variates including reactive-achievement, multi-active-power, and linear-active-achievement are study findings to be used as the key marketing strategies to forecast people's demand.

Then structure equation modelling was used to find median impacts of COVID-19 vaccines to examine the change of correlations between motives and cultures by the vaccines. When testing the 3 pair variates with COVID-19 vaccines in 38 countries, the study found achievement increases in reactive culture, power increases in multi-linear active culture, but affiliation decreases in linear active culture. The implications are (1) reactive culture can control the COVID-19 using their achievements for example the first successful vaccine for COVID-19 in China and Vietnam is the second top country to limit the epidemic of COVID-19. (2) multi linear active culture can increase their purchasing power for the COVID-19 vaccines. Brazil and Argentina are two powerful buyers for the vaccines (3) the linear active culture limits friendliness in communication. The US and Russia are competing in producing COVID-19 vaccines.

The study findings are applicable to practice. Firstly, the impact of Industry 4.0 with COVID-19 vaccines on motives and cultures of the world and Asia in the post COVID-19 era has enhanced the achievement motive in the reactive culture and Asia and the power motive in the multi-linear culture, but it has decreased the affiliation motive in the linear active culture. In the 6-step process of Industry 4.0 presented by Gardner (2021), the study findings are consistent with the process summary as follows. Step 1 regarding "Be Realistic" indicates the digital transformation may many people at first, Gardner suggests not to "take everything on at once". It implies the linear active culture should decrease affiliation motive. Step 2 regarding "get stakeholders on board" indicates it is impeccable for increasing power motive in multi-linear culture in Industry 4.0. Step 3 regarding "Keep talking" indicates Industry 4.0 communications to increase information for achievement to increase in Asia is very critical.

Secondly, Industry 4.0 has enhanced the gross domestic product per capita (GDP) in the linear active and reactive cultures but it has decreased the GDP in the multi-linear cultures. In step 4 of Gardner's (2021) Industry 4.0 process, it is necessary for people to keep "comprehensive training and ongoing support" in Industry 4.0. It implies that the linear active culture and reactive culture countries who invest most in COVID-19 vaccines will get increasing payoffs (The Guardian, 2021). On the contrary, the multi-linear culture countries who cannot invent COVID-19 vaccines suffer a decrease in the GDP per capita in 2020.

Thirdly, Industry 4.0 has enhanced the achievement motive in Asia but reduced the power motive and affiliation motive. In step 5 regarding "Take your time", it implies the investment in Industry 4.0 using much power motive "too quickly could be detrimental" even though Asian countries are successful in increasing the achievement motive to discover COVID-19 vaccines and apply them first in China. In step 6 regarding "Undertaking regular reviews," Gardner (2021) warns the regular reviews are critical because the achievement motive is often opposite to the affiliation motive (McClelland, 1985) resulting in the reduction of affiliation motive in Asia while achievement motive increasing in Industry 4.0. In addition, Peng (2018) and Qin (2015) reports the unique culture of Asia will be the fit integration of East and West. This reflects the Japanese, Korean, and Chinese trendy dramas to create the re-imagined Asian-ness.

The achievement-reactive model forecasts the reactive countries (Japan, Vietnam, China, Korea, Taiwan, Singapore, Thailand, Indonesia, Philippines, and Hong Kong) would excel the best performance in products and services in the post epidemic era. The affiliation-linear active model forecasts the linear active countries (the US, Germany, UK, Sweden, Finland, Luxembourg) are less friendly in communications in the post epidemic era. The power-multi-active model forecasts the multi-active countries (Brazil, Argentina, Russia, Italy, Spain, Mexico, Arab countries) are more powerful with financial and natural resources in the post epidemic era.

In sum, the empirical study has forecasted the consumer behavior in the post epidemic era.

CONCLUSION

The study has compiled the two famous books: "The Achieving Society" by McClelland (1961/1976) and "When Cultures Collide: Leading across cultures" by Lewis (2006) and reviewed recent research findings of motives, cultures, and Asia. Although the limit of study is a small sample of 38 countries, the study has contributed to the academia and practice in providing the significant relationships between motives and cultures under the impact of Industry 4.0 and the changes in Asia. The key contributions of the study are as follows.

1. Motives and Cultures integration has contributed to the integration of Information Technology (IT) and Organizational Technology (OT) which are the key in Industry 4.0.
2. Cultures has been convergent by COVID-19 vaccines distributions: Cultures merged into motives: Linear active – Affiliation, Reactive – Achievement, and Multi-linear active- Power.
3. Berry's (2019) acculturation: Margination (Affiliation), Separation (Escape), Integration (Achievement), and Assimilation (Power) have been changed into 3 facets of one cultural convergence of motive-culture model due to COVID-19 vaccines (Affiliation-Linear, Achievement-reactive, and Power-multilinear).

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Chapter 17
Developing an E-Commerce Strategy for Success in Brunei

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ABSTRACT

The people in Brunei are digitally connected every day. Brunei recorded itself with the highest internet penetration (95%) in Southeast Asia. However, the local e-commerce industry seems to be still at infancy stage although the idea of e-commerce is not new here. Bruneians shop at global e-commerce sites, purchase from local social sellers, and commission online personal shoppers. But why are local e-commerce brands struggling although they are also providing similar business? Thus, this chapter aims to find out the ways to improve and strive in the Brunei market – What is the problem? What is missing? What can be done? The researcher aims to dissect the root issues and provide recommendations as the e-commerce strategy. The motivation for this research is in the effort to support the government continuous initiatives to curb unemployment in this country; e-commerce industry as the enabler for self-employment, entrepreneurship, and job creation contributes to the economic growth.

INTRODUCTION

Recent years have witnessed a tremendous development of the internet in the world. This has led to a growing number of online users and has increased the importance of e-Commerce and online shopping. Like any growing nation, Brunei is also adopting e-Commerce. The AiTi, or the Authority for Info-communications Technology Industry of Brunei Darussalam conducted a research in 2018 on e-Commerce usage and concluded that approximately 76% Bruneians are using e-Commerce to shop (AiTi, 2018). The next following year, AiTi organized a Brunei Cybershop Fair in February 2019. The fair is organized as part of AiTi's efforts to encourage the public to shop and trade online, particularly through local e-Commerce vendors. As mentioned by RTB (2019), the Deputy Chief Executive of AiTi

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Julianah binti Ali Ahmad noted that while the 76% figure seems very encouraging, there is still a need to shift e-Commerce activities from the local e-Commerce vendors towards online purchasing to generate revenue that can significantly contribute to the growth of Brunei's economy. This indicates that local e-Commerce entrepreneurs need to carry out more continuous efforts to grow and sustain in the market. Growing means to further develop their companies, earning more sales and may be able to hire more staff. To sustain the market is referring to the ability to continue staying in the market and existing to continue operating their business.

e-Commerce companies, in order to survive will need to assess their strategies for sustainability and growth. This includes practicing a strategy for e-Commerce that can cater specifically for Brunei's unique market. The main research aim is to develop an e-Commerce strategy that fits the Bruneian market that can assist companies towards a successful e-Commerce business in Brunei. While there are general guidelines available in textbooks and online, although these available guidelines can be useful however there are less specific to cater the local market here. Brunei has a unique market due to the country's small population in comparison to other countries. Having a small population, Brunei is also facing a serious unemployment problem. At the rate of 9.04%, it is the highest unemployment rate in Southeast Asia (Othman, 2020). As reported in April 2020 by Othman, the unemployment rate among youth aged 15-24 increased from 28.8% in 2017 to 29.9% in 2018. By educational attainment, 40% of the unemployed have tertiary education, or technical and vocational education and technical training. e-Commerce has the potential to create job opening, partnerships and entrepreneurship. To elevate the dream to a successful reality, e-Commerce store owners should not only focus on developing a website with e-Commerce functions without comprehending the current issues and failures to be learned from previous failed e-Commerce businesses. If so, the company will risk facing bills and expenses that exceeds their sales figure. The specific knowledge of e-Commerce business issues and concerns including identifying the current trends, therefore, becomes critical for companies to identify potential success elements in the e-Commerce business. It is this very gap that this research hoped to fill, by developing a specific e-Commerce strategy to penetrate and sustain in Brunei market. Therefore, the objective of this research is to propose a framework for e-Commerce business in order to achieve sustainability in Brunei. The framework will be in the form of Critical Success Factor (CSF). The framework, by the end of the research is created to keep e-Commerce businesses in Brunei to sustain and even flourish. The framework should articulate what a company must do and do well. Meanwhile, the research question that guided the overall research is "What is the Critical Success Factors (CSF) relevant to all companies engaged in e-Commerce in Brunei to sustain their business?"

BACKGROUND

Employment allows people to earn money, spend their income and obtain credit worth. By gaining credit worth, an individual with income are able to pay their debts. This productivity is the driver of development as the country grows. According to Kudjey (2013), employment provides psychological, health and social benefits to people. Jobs are therefore more than a byproduct of economic growth. Brunei is currently facing high unemployment rate. As this issue is alarming, the government has set initiatives to face the challenge and multiple interventions have been carried out to address the problem. This includes setting up the iReady programme. Such programme is matching all unemployed graduates with participating private companies. To encourage private companies to participate, the government offers to pay a minimum salary or allowance to successful graduates with the condition that participating companies will hire these graduates after or before the terms of three years. Another initiative by the government is the set-up of DARe (Darussalam Enterprise), a statutory body existed to support local enterprises in Brunei. This body's vision is to build enterprises into dynamic and resilient drivers of economic growth. They encourage entrepreneurship among Bruneians. DARe provides a pro-business ecosystem with the necessary infrastructure, reliable support and effective development programmes. With the establishment of the Digital Economy Masterplan 2025, the Brunei government announced their support to private sectors and the government is also encouraging e-Commerce adoption. The Brunei government is moving forward for digitalization as mentioned in the Digital Economy Masterplan that it will create opportunities for innovation.

e-Commerce is not a new concept in Brunei. Although there are initiatives in the country to bring awareness to the public on e-Commerce brands, the number of visitors and conversion rate seems to be slow. Brunei's unique market is where the people are actually using internet daily but not yet adopting e-Commerce fully. Othman (2020) said Brunei Darussalam's Instagram users are the third highest in the world, reaching audiences totaling 210,000 or 60% (by eligible audiences above 13 years) in terms of population ratio. Othman's (2020) report also stated that Brunei Darussalam is second highest in terms of social media use at 410,000 users. In a separate report, Kemp (2020) mentioned that there are 413,000 internet users in Brunei Darussalam in January 2020. With all of these remarkable figures mentioned, one can assume the e-Commerce venture in Brunei is highly profitable. However, in reality, e-Commerce brands are facing challenges. A 2017 publication by Asia-Pacific Economic Cooperation in their publication "Promoting E-commerce to Globalize MSMEs", it was recorded in the publication that the two well-known local marketplace platforms in Brunei are Bruvera and Cube junction. By 2019 however, only two years from the publication release, both of these brands' websites has vanished from the internet. While Cube junction has disappeared completely from the business industry, Bruvera is yet thriving but has closed down its website. Bruvera to date is still ongoing through Facebook platform only.

To comprehend e-Commerce strategy and practice, it is essential to not just set up a website but also take into importance the identification of the correct business strategy. Lynch (2000) describes strategy as an organizations sense of purpose. However, he notes that purpose alone is not strategy, plans or actions are also needed. According to Miller & Dess (1997), and Certo & Peter (1988), strategy is defined as the continuous, iterative planning process, which focuses on keeping an organization competitive in its environment. The need of having a strategy was emphasized by Evans (2001), who also mentioned that strategy does affect all types of organizations. Evan stated that "Both new e-Business startups and current businesses that are investigating the possibility of migrating to an e-Business system need to have an e-Strategy". Kalakota and Robinson (1999) stated companies that simply build a web presence rather than configuring their business practices are not going to succeed in the electronic marketplace. If a long-term and wide ranged e-Commerce strategy is not present, the investment in e-Commerce will eventually lead to business failure. Lee and Whang, (2001) also mentioned benefit and importance of businesses in having a wide ranging e-Commerce strategy, stating that "Numerous factors affecting the adoption of an e-Business strategy need to be addressed. A commitment from the executive level is necessary for rethinking business processes. Without the involvement of an executive decision maker, many projects will not reach fruition. The strategic planning process should not begin without this commitment". Venkatraman (2000) mentioned that every company must develop a strategy for the "dot com" world and ultimately with that, business strategy will be "dot com" strategy. This goes in line with the researcher's aim to develop an e-Commerce strategy for success in Brunei. Vision, governance, resources and alignment are the stepping-stones to a successful Web strategy (Venkatraman, 2000).

Euromonitor (2018) mentioned that the business environment in today's world, sustaining the growth and profitability of the business is never a guarantee. The author further said, to identify market opportunities in these conditions, first, it is needed to define a framework to help search for opportunities. This shows that it is essential to understand the market of a country where a business will want to obtain a place for their company. The researcher is constructing the e-Commerce strategy in Critical Success Factors (CSF) form. Ward and Griffith (1997) said critical success factor analysis is a powerful and a "deservedly popular technique" in information system strategy planning and business planning. The critical success factor technique has been widely accepted and used as a mean of identifying the information requirements of executives within organizations. This approach has been expanded by Bullen and Rockart (1981) into a Strategic Information Systems Planning (SISP) methodology. Bullen and Rockart (1981) define critical success factors as, "Critical success factors are the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization. Critical success factors are the few key areas where "things must go right" for the business to flourish and for the manager's goals to be attained. If these goals can be attained, the success of the firm or organization is ensured Rockart (1979).

A local study was done by Ibrahim, Ramzi & Razak in 2018 where they had selected Brunei's QQeStore as their core research sample. QQeStore is the earliest e-Commerce brand ever existed in Brunei selling electronic devices. The study by Ibrahim, Ramzi & Razak proved that Bruneians responded rather slowly to e-Commerce. QQeStore has started since 2016 however through their case studies, 49.3% said they rarely browse in the platform and 44% stated they only knew this brand less than 10 years' time. Ibrahim et al. (2018) concluded that proper IS planning and capabilities determine how efficient and effective an e-business can perform. In the context of QQeStore, the majority of responses from the research findings had stated that respondents are already familiar with the business and its website platform, citing positive criticism towards the unique features or modules of the website (platform) such as the multi-tier pricing and product filtering. This indicates that the platform is proven to be successful in communicating customer interactivity towards the frontend system and to the overall system processes itself. However there is also evidence from their survey results that shows negative feedback towards certain factors of the business. Although it seems contradictory, some respondents stated that the pricing for the products offered by the business are expensive compared to other businesses, implying that the price efficiency that was emphasized by QQeStore, can be argued. They concluded in their paper that there is a need of effective marketing strategies and adding PayPal as a payment solution.

TOWARDS THE DIGITAL ECONOMY

COVID-19 pandemic surfaces a year ago and it started to affect Brunei in February 2020. For the safety of this nation, the government had issued several rules including distance learning, no dining in restaurants, no public gathering and many more. The new normal had actually accelerated the demand for online shopping and delivery services. By June 2020, the government published the Digital Economy Masterplan 2025 that outlines the strategic plans towards becoming a Smart Nation. The plan will be driven by the "Whole of Nation" approach with participation from all stakeholders. The master plan also stated that industry digitalization focuses on the need to evaluate the readiness for the Fourth Industrial Revolution technologies adoption and urge awareness among MSMEs (The Scoop, 2020).

ENTREPRENEURSHIP THROUGH DIGITAL SPACE

Although e-Commerce setup in Brunei may seem challenging, there is income-making potential by investing in such business as the Brunei government is gearing towards the Smart Nation plan. The opportunity should be seized while there is support from the government to push forward digitalization in the country and continuously improving the internet infrastructure – with that, online business is the future. The AiTi has successfully established the eKadaiBrunei, the country's first full online directory that enlists local e-Commerce brands including logistic brands. The endorsement made by the AiTi helps to gain customer's trust.

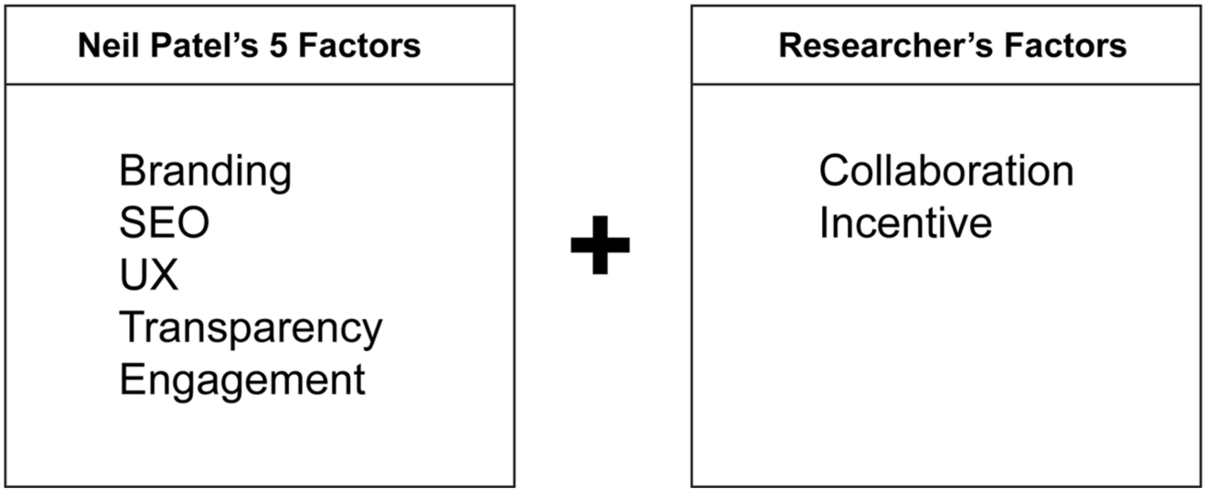
Knowledge Sharing

For e-Commerce ventures, entrepreneurs may learn from reading tips online and through observing global and successful e-Commerce sites like Amazon, Alibaba and etc. After reading and observation period, entrepreneurs may start getting capital and build their website as they desire. The researcher had the experience of running such idea and learnt that it does not perform well without planning for sustainability, further development and maintenance of the system from the start. The pain is also shared by other local e-Commerce store owners. Capital was invested, sales are not encouraging and the revenue is not sufficient to cover monthly or yearly expenses. The researcher believe that in order to sustain in any business in Brunei, especially if the business needs people to start adopting them, every entrepreneur have to first understand the local market. It can be done by getting knowledge from others. Entrepreneurs should learn the precise situation in Brunei by knowledge sharing with the right stakeholders; 1) Learning from experienced business managers; 2) Observing the issues from a failed e-Commerce company and; 3) Networking with e-Commerce and online business entrepreneurs. The idea is similar to getting a business mentorship – learning the experiences from a business individual who is willing to share the knowledge, offering support, guidance and advice to help entrepreneurs in improving their business. A research by Mavuso (2007) concluded that mentoring can be a very effective way to advance one's career and improve on one's skills and knowledge. Mentoring also plays a key role in succession planning. Mavuso also said mentoring as a concept is not new because it has been a practice in general for transferring tradition throughout the human generation. As mentioned by Mavuso too, organizations started to see sharing and transfer of knowledge are crucial during the industrial and information age.

SOLUTIONS AND RECOMMENDATION

Parameters must exist to define "successful". The researcher adopted a strategy by a digital marketing expert, Neil Patel. The strategy is called Neil Patel's guide to "5 factors for Success in e-Commerce". Neil Patel is one of the most well-known digital marketers in the world whose clients include mega digital brands which most Bruneian recognizes – Google, Amazon and eBay. The digital marketer's "5 Factors for Success in e-Commerce" are Branding, SEO (Search Engine Optimization), UX (user experience),

Figure 1. Neil Patel's 5 factors and researcher's factors combined



Transparency and Engagement. According to Patel, around 80% all e-commerce businesses fail. There are three common reasons why customers are likely to leave businesses are due to three main reasons. The reasons are firstly, customers do not know how to use the site. Secondly, product value is not clear and third, navigation is difficult. The rationale behind selecting Neil Patel's guideline is because of his achievements and the giant brands that hired him (in which two of them, Amazon and eBay are directly related to the heart of this research). Patel's net worth is $30 million USD.

In further developing the parameters, aside from adopting the 5 factors from Neil Patel's guideline, the researcher decided to combine the expert's theory and her own CSF. The expert theory applies for e-Commerce success in general, mainly in the U.S.A and its surrounding countries. It may also apply to countries with high population. The CSF is build out of self-narration (the description of the researcher's own experiences and belief that those factors applies uniquely for Brunei) which means the CSF has limited evidence but has been used as a starting point for the research. The researcher's additional factors are Collaboration and Incentive. Collabaration is added by the researcher as new brands may experience slow public responses in Brunei. Collaboration can be made with the government, popular brands and/ or famous influencers. The researcher also adds another factor, Incentive. This factor is important because Brunei is a small country with no transportation issue. The public transportation in Brunei is not heavily used by the local themselves. As reported by Wasil (2018), Brunei residents relied largely on their personal cars for transport, where 80% stated they use their cars "all the time". With that, it can be observed that it is "easy" to get around the country. Offering incentives can encourage people to shop online.

According to an economic expert, Rashesh Shrestha of the Economic Research Institute for ASEAN and East Asia (ERIA) based in Jakarta, Indonesia, "In a traditional model, SMEs make use of locational advantage, build long-term personal relationships with their suppliers and customers, and have some control over pricing strategies". He also said "These advantages are less relevant in e-commerce – a world of algorithms and optimization." Shrestha mentioned the cost of an online platform for success (while keeping the operational cost low) includes online advertising and customer acquisition, maintaining high ratings, managing higher volume of trade and inventory, handling returns and exchanges and dealing with logistics companies. Andrew Zeng of AEZ Media, Australia, has his own guide to a "Profitable e-Commerce store". The factors, according to this digital entrepreneur are these four - Product, Store front, Traffic and Fulfillment. Zeng have worked directly with Google, Snapchat and Facebook. In terms of local digital marketing, a well-known company in Brunei called Active8bn Digital Solutions has their insight about this topic. This company is providing innovative digital solutions not just in Brunei but also across international clients including Australia, Hong Kong, Singapore, Malaysia, Philippines, USA and more. They claimed that one of the main reasons why a lot of marketing does not work out in Brunei are because the advertiser is not applying the right type of marketing strategy for the kind of service or product they provide. To market correctly in this country as of now according to them is through SEO and Social Media Marketing.

In terms of applicability of this 7-CSF in Brunei, the 7-CSF can be learnt from established physical brick-and-mortar stores in Brunei for adoption in the digital space. Learning from experienced and successful brands may help to build a strategy for running a successful e-Commerce platform in Brunei. These factors must be learnt from brands that have done it right in this country although they are not directly running e-Commerce. The discussion below is setting exemplary scenarios in Brunei business scenes that are applicable in 7-CSF form;

Branding: New malls keep on opening in Brunei for the past few years. Brunei's favourite Rimba Point shopping centre has a face lift. New malls include Annajat, Aman Hills, The Walk, Onecity, SKH building and very soon, Midvalley. The common sights in these shopping malls are the same business tenants. These brands are able to sustain and continue their business with several branches opening up in Brunei-Muara District alone. This proves on their branding is strong for which they are courageous and confident to invest on expanding their new branches.

SEO: A must have in Brunei as Google search is the peoples' go-to platform to seek answer. Statcounter (2020) updated Brunei's search engine market share where there is a data showing 97.28% share is towards Google search tool. Hence when an individual in Brunei is looking for an item, he or she will very likely Google it up. This shows how important SEO is. There is evidently the impact of mobile search on SEO. The more people in the nation uses smartphones, the more access they have to SEO. Kemp (2020, February 17) reported that there were 567,000 mobile connections in Brunei Darussalam in January 2020. Mobile connections in Brunei Darussalam have increase by 8,923 (+1.6%) between the periods of January 2019 to January 2020. The number of mobile connections in Brunei Darussalam in January 2020 was equivalent to 130% of the total population.

UX: For UX (user experience) example, the researcher will be using Huaho as a good example. Hua Ho Department Store is today one of the largest (11 outlets across the country) and most prominent department store and supermarket chains in Brunei. From the researcher's personal account and observation, over the years, they have taken user experience creatively. Their shopping trolley size changes from a standard size to a large one. They have also introduced small shopping trolleys for kids. Some HuaHo malls have basement parking and all are free of charge. Huaho built free public restrooms at their outlets. Some of their branch has its own kid's playground. Personalization is one aspect under UX that the researcher wants to bring in this strategy formulation. The researcher is bringing Ayamku and Jolibee fast food chain as good examples in Brunei. It can be greatly acknowledged that these two flourish greatly in Brunei when they realize Bruneians prefers rice in the food sets. They are almost pioneering the rice-in-fastfood trend in this country. By connecting data-driven insights and personalization through understanding user personas, businesses can customize preferences to cater Bruneians' behaviors and expectations in achieving high conversion.

Transparency: A local recent example is an electronic store, Yappe. This company recently received a big backlash during the end of November 2020 about their PS5 game console's price. The price was charged at what the public perceived as overly priced in comparison with the price released in Malaysia, Singapore and Indonesia. Their social media post was filled with angry comments and the message went viral in WhatsApp. Yappe Company was fast to be upfront about their pricing. They proceeded to post an apology statement and disclose the reason for such pricing. The Brunei public responded and the result was a mixed reaction. Some were still upset and some shows understanding. Despite such happenings, their Instagram analytics shows they are still growing strong and shows no sign of slowing down. Currently they are standing at 35,000 followers at Instagram.

Engagement: It can be observed through the Internet that social sellers in Brunei are making money judging solely from their active status at their social media platforms. A number of social sellers state their establishment year in their biography and can go back as way back starting in 2006 like Belleparis (23.3k instagram followers) and some still standing strong using only social media as their digital storefront like Widasushi (16.0k instagram followers). They manage to generate income and able to open a small physical store infront of their house for walk-in and pickup reasons in 2015. Social sellers, when done right, make use of the free social media applications that comes with a very powerful tool for marketing, that is "engagement". Physical mega stores and established brands like Hua Ho, Guardian, McDonald's Brunei and many more has adopted social media despite having physical stores with branches scattered everywhere in Brunei.

Collaboration: The rise of Brunei influencers have been remarkably spiked by McDonald's Brunei. McDonald's Brunei was the first big company in Brunei to endorse influencers at a big scale in late 2018 when they privately invited a lot of influencers to exclusively spend time at the new McDonald's Brunei Lambak branch. Sport Dynamics, a popular sports shop, endorsed RanoAdidas (a local social influencer) for their sport shoes in a less conventional way. Instead of full gear professional video advertisement, they gave the creative control to the influencer itself, Rano Iskandar to take charge. Brunei Shell Marketing too is not overlooking the trend. Their latest "Bagitau saja BSM" was a hit across the nation. Sudden publicity hits a small cafe owner at Jerudong when a Twitter user with high following shares photos of the lonely cafe called "De'ofiz Cafe" on 18 November 2020. On 30th November 2020, the post has been receiving 813 retweets and comments, and 1204 likes in the span of thirteen days. The social media effect has greatly impacted their number of visitors.

Incentive: HuaHo, a prominent grocery store brand with multiple chains in the country, gives out loyalty cards called the bonus card. McDonald's Brunei, Starbucks Brunei and KFC Brunei gave out car sticker for customer. If these customers stick it onto their car and come to buy at the drive-thru, they will get instant discount for showcasing the stickers. Paloma Brunei has gift points through a point-redemption app. A new coffee chain called brew9 offers portable power banks for use personally to customers who need to charge their devices while in the store. All of these brands mentioned are showing good performances in the country.

METHODS AND FINDINGS

The research was carried out by mixing different methods to approach the different stakeholders. Observational based case studies were done, studying the comparison of different e-Commerce sites. The first case study was observing global e-Commerce brands and the second case study focuses on Bruneian

Table 1. Website traffic and company revenues

Brand	Score	Website Traffic (Nov 2020)	Company Revenue (4th Quarter, 2020)
Amazon	7/7	2.908 B	USD$280.5 billion
Yahoo! JAPAN	7/7	2.398 B	USD$7.5 billion
eBay	7/7	957.0 M	USD$10.8 billion
Aliexpress	7/7	610.7 M	USD$72 billion
Rakuten	7/7	593.4 M	USD$12 billion
Taobao	7/7	460.4 M	USD$571.7 million
Tokopedia	7/7	109.2 M	USD$992.2 million
Shopee	7/7	49.12 M	USD$70.1 million
Bukalapak	7/7	37.21 M	USD$192.2 million
Lazada	7/7	9.515 M	USD$1.9 billion
Qoo10	6/7	5.866 M	USD$10.4 million
PG Mall	5/7	5.153 M	USD$8.9 million
Ensogo	2/7	N/A (Company has decline their business)	

Source: (Similarweb.com, Zoominfo.com)

e-Commerce brands. The public opinions are also essential in completing this research. The researcher made use of Reddit platform, a network community based on people's interest, to reach Brunei internet users in the attempt of finding out what are their opinions about e-Commerce sites in Brunei. Questionnaires had also been distributed online to validate the 7-CSF are indeed what the public cares about in an e-Commerce site. A mini experiment was made for the questionnaire method. This is discussed further in a dedicated section below. The researcher had also carried out interviews locally and globally (online).

Case Study

The first case study was a comparative study on global e-Commerce brands. The comparative study was done by observing the 13 selected e-Commerce brands from 7 different countries. CSF in management works as the indicator for "success", whereby it indicated conditions, opportunities and/or activities that are required to be achieved within a mission. The concept of Critical Success Factors (CSF) was developed and introduced by D. Ronald Daniel, on behalf of McKinsey & Co, in 1961. A decade later, John F. Rockart refined and popularized the concept. Ever since then, the concept has been widely applied to guide organizations in developing and implementing strategies and projects. The researcher studies each e-Commerce sites and observes if they fulfill any 7-CSF. From all the global brands selected, Ensogo scores only 2 out of 7 or abbreviated as 2/7 CSF and this brand has already closed their operations. Ten companies scores full 7/7 CSF meanwhile two companies, namely Qoo10 and PG Mall scores 6 and 5 respectively. The table below shows their website traffic and company sales.

It can be observed that Qoo10 (scoring 6/7) and PG Mall (scoring 5/7) has big sales difference from the others in the listing.

The second case studies was a comparative study similar to the one above but done on local e-Commerce brands. There were 45 e-Commerce sites identified. The researcher grouped them according to the average number of visitors.

Table 2. Average web traffic in local e-commerce platforms for 3 months

GROUP 1	GROUP 2		GROUP 3		
100k + Visitors	**10k +**	**1000 - 5000 +**	**500 +**	**100 +**	**99 & below**
Pizzahut Brunei	RBA Times Cineplex Buycour QQeStore DSTINCOMM Beaute Pratique	J3Smart AV Electronics Go Mamam Dynamic Sports Shopifull Babakimpo Empire Brunei Community for Brunei Ximivogue Weelago Auto Gadget Wecare Online HealthyBeauty365 Nimanja Beastmode	Ta-Pow! Lets Buy Repathelete Agrome market Kadairuncit Hey Domo Click.com.bn	Naindah Kitsu Models Bellary Nature Encoreshop Mumtaz collections Bruecom Brubuy Suhulah Urbanlife FS Apothecary Holdas Randominities Nollybook	Qafa Haus Supplyya Social Deal

Source: (Similarweb.com)

Brunei has a population of 437,479 people. Only Pizzahut Brunei is at Group 1 (100+k visitors). Meanwhile 21 brands are in Group 2. This category is for the ones that garners 1,000 to 10,000 visitors but less than 100,000. The ones in Group 3 have less than 1,000 visitors in 3 months. There are 23 brands in Group 3 alone. Since there are 45 brands altogether analyzed, this means half of them fall inside Group 3. This preliminary information is already showing how e-Commerce brands in Brunei are still developing slow. Only about 15% are of Group 1 and 2. Specifically, Pizzahut Brunei brings in an average of 119,278 traffics to their site. There must be factors that one can learn from Pizzahut Brunei. The researcher took the top 12 from the brand list. After analyzing them, it is found that there are similar activities among them. From the researcher's analysis, only PizzaHut Brunei has the most marketing channels howeverA trend that the researcher found out is that, 11 out of the top 12 in the list uses Youtube for advertising. There is also a trend of using Reddit as an advertising platform. Other than these top 12 and Nimanja, the rest of the brands do not employ Youtube at all. Group 3 especially, does not use Youtube and mostly adapt one social media type only.

Getting the Public's Opinion

The researcher uses internet to reach the public as the users of e-Commerce are in the internet. There are two groups with two different objectives. The first group is approached to gain insights on their personal views and opinions about e-Commerce sites in Brunei. The second group is approached to validate 7-CSF applicability towards the public in this country.

Asking Internet Users at Reddit

Reddit is a networking platform, where for Brunei, there are 27,100 active daily users. The researcher posted a thread in December 2020 asking the community with the following casual statement;

"Hi! Just curious. Does anybody shop at any eCommerce websites in Brunei? There's a number of local brands listed under the eKadai Brunei. Some I am familiar with and some I just heard of. What is your opinion about eCommerce business in Brunei? (local based serving for Bruneians)"

The responds were engaging and is available in Brunei's Reddit channel. The highlights include users only browse the company's website and social media. They will only buy in person after getting information online. The primary reason for this is due to the small country size and ease of going around using cars. A common mention was about local sites are not optimized for browsing. A user mentioned that some sites are "terrible" and some are only "decent". No internet users have shown high satisfaction on the topic. A user mentioned that buying can be frustrating because so often that the products are out of stock and website shown expired links. However, there are users who have hopes that e-Commerce in Brunei could improve in the near future.

Questionnaires and a Mini Experiment

Online questionnaires were released to the public in December 2020. The researcher decided to conduct a mini experiment. As the nature of the questionnaire will be online, the researcher applied 7-CSF to the campaign. It involves setting up a temporary website, designing and providing attractive reasons to participate.

The researcher approached students from other universities in the senate, all of them said that based from the experiences, it will take them 2-3 months to gather 100 questionnaire submissions. For the researcher's questionnaire and by experimenting 7-CSF integration, a total of 442 submissions were received in 37 days only. From this 442 submission, 251 were Malay form and 191 were English. The questions in the survey are directed in getting the public to tell whether the 7-CSF is applicable to them or not. As a result, yes, the 7-CSF is applicable for the public. The questions were in likert-scale form. Users can choose Yes, Sometimes or No. It can also be deduced that the usage of 7-CSF in this campaign has helped the acceleration of participation. It has boosted participation and gained trust from the public to join.

To conclude the questionnaire result, the entire Yes" answers scores more than 50%. With that, the 7-CSF is valid as it is catering to what the public wants in an e-Commerce site.

Interviews

In-depth interviews were carried out. The researcher approached 3 business managers in Brunei.

Mr Lim Ming Soon is the CEO and Board of Director at NiAT (Network Integrity Assurance Technologies Sdn Bhd). He is a dynamic and proactive individual who is highly capable and hired by big companies to have the ability to hold different job positions simultaneously in different companies at the same time. Mr Lim Ming Soon particularly discussed about People, Product, Customer, Marketing and R&D. He had also touched on effective management as well. From his account, the general CSF according to him for any business that he believes is the People, Market and Sustainability. He mentioned that the people working for the company has to have the vision, understood the company's strategy and from

Table 3. 7-CSF applied in the online questionnaire for the public

7-CSF	Questionnaire by Researcher
Branding	• Creating a brand called "Biztech Research" • Designed a professional logo for the brand • Created social media presence at Instagram and Facebook • Set up a website • Created attractive tagline
SEO	• Set up SEO integration with Google
UX	• Use website that shows all required information with attractive images and colours combination • Set up short, catchy and easy-to-remember domain (bahjoin.com) instead of long links • Created button in the website where users can click on it to access questionnaire • Provided English and Malay form options • Uses Likert Scale questionnaire for easy answering • Uses short, casual and easy to understand writing
Transparency	• Provides the "About" page in the website describing all important information • Offers phone number, email, contact form in website and social media accounts for the public to contact the researcher
Engagement	• Responding to commenters in social media • Replying to the public messages in Instagram direct message inbox
Collaboration	• Includes UTB logo in the website "About" section • Hired an internet influencer to advertise the website
Incentive	• Offer a chance to win a phone and other attractive prizes for anyone participating

Source: (Researcher's account)

his words, "shares the same DNA" as the business owner. Business sustainability for him is continuity of the business, intensive planning, company evolution and product life cycle. Careful and proper R&D comes in place for this.

Mr Javed Ahmad is the current CEO of Darussalam Enteprise (DARe) since 2017. He is an experienced managing director serving at different financial institutions including BIBD Brunei, Fajr Capital, HSBC and RHB Bank. Mr Javed led transformation of BIBD into a market leader, including the implementation of core banking platform. He has extensive banking experience in the Middle East, Europe and Asia. One of his notable achievements at BIBD Brunei was being successfully developing BIBD into the largest issuer of cards (debit and credit) in Brunei and increased the market share impressively from 6% to about 40%. He had done so by focusing to the customers. Mr Javed, in response of the researcher's topic, discussed about Customer, R&D, Planning and Product. From his personal opinion, an e-Commerce in Brunei may thrive if it has a wide range of products and if the company focuses on making the processes convenient. This includes convenient payment system, mode of delivery and buying processes. Branding according to Mr Javed is extremely important. When mentioned to him about incentives, he stressed the importance of getting the value right. In other words, he meant the intention to the incentives has to be on point and with clear objectives. The right product is essential in every business. Also according to Mr Javed, getting the right people is also as important.

Dr Sophiana Chua Abdullah is the current councillor of ACIOA (Asean Chief Information Association), representing Brunei. Currently she is the CEO at AvisionAday where she specializes in training professionals in Strategic Foresight and Strategic Planning. Dr Sophiana also teaches Strategic Foresight & Planning of the Master of Government programme at Universiti Brunei Darussalam (UBD). During the interview with Dr Sophiana, she discussed about Leadership, Managing People and Strategic

Table 4. Result deduced from the questionnaire

7-CSF	Particulars	YES	Reasons for "Sometimes" or "No"
BRANDING / COLLAB	Find out company is real	91%	• Great price • Convincing brand • Never think about it
	Buy from trusted/popular	94%	• Great price • Convincing brand • Want to try out/ give chance
	Reputation & Purpose	100%	-
SEO	Use Google	100%	-
	Hashtags	100%	-
UX	No random ads	79%	• Truly don't mind but not too much • Not explicit or sensitive ads
	Easy to use	100%	-
	Shopping cart	100%	-
	Fast payment/checkout	100%	-
	Interactive content	100%	-
	Use phone	100%	-
	Text size	96%	• Type of font • Color of text
	Site not lagging	100%	-
	Prefer cash payment	55%	• Bank Transfer • Credit Card
	Order delivery	91%	• MeetPoint • Pickup
TRANSPERANCY	Clear charges	100%	-
	Clear, quality pic	100%	-
	Product info	100%	-
ENGAGEMENT	Read Review/Testimonial	100%	-
	Support line	100%	-
	Forum	98%	• Easy to search • Provide link for fast search
	Real event	78%	• Depend on location • Transportation availability • Goods offered
	Leaving review	72%	• Shy • No time • Avoiding conflict
	Leaving feedback	96%	• Shy • No time
INCENTIVE	Giveaways	100%	-

Source: (Researcher's account)

Business Planning. She stressed out the importance of vision, mission, values, strategic and long-term objectives, company's goal, departmental goal and individual goals and action. In terms of management, she discussed on the importance of vision alignment within the organization from the top management to the staff. Vision and goal must be curated uniquely and aligned correctly along the organization. Dr Sophiana also mentioned about the importance of strategic thinking, strategic decision making and strategic planning.

The researcher had also carried out global interview with other experts. The reason is to add value to the researcher's finding. The researcher has spoken with a web developer, Mr Ahmed Al-Taweel from Egypt via Telegram video call. Currently Mr Taweel is a software engineer at Delivery Hero. In Egpyt according to Mr Ahmed, Zouk is the dominant e-Marketplace in the Middle East. Very important to note, it took Zouk 15 years to gain the massive market share they have to date. The reason for the long time needed was because of the need to persuade the people to adopt online shopping, specifically e-Commerce. From the researcher's opinion, this may describe Brunei in a certain extent. Mr Ahmed mentioned in the past people there prefers cash payment although they have cards. They also prefer to shop physically as transportation is readily available. Buying from social media sellers is easier too. The second person the researcher spoken to was Mr Hairi Soewarso from Thinking Tub Media (TTM) Pte. Ltd of Singapore who runs OTT media service. Mr Hairi Soewarso has business connections in Brunei and in 2018 and 2019 had spent some time staying in Brunei. Mr Hairi was quick to describe Brunei has a "sophisticated market". From his perspective, the people in Brunei has a bargain culture and need to have the sense of touch and see to purchase. This is the main challenge for e-Commerce businesses in Brunei in his opinion. Asking his opinion on does an e-Commerce in Brunei then need to have a physical store to showcase products (fulfilling the needs to see and touch items in person) in order to sustain? He said this can be argued, as although he believes that online and offline sites doubling at the same time might work in Brunei, but it does not necessarily mean setting up physical store is a must. However, he said offering some forms of visibility is vital in Brunei. This can be done through personalized marketing and good engagement. He mentioned that the he believes the internet is driven by millennials. These millennial according to him use internet media and connect with their beloved icons (online influencers).

The researcher also approached 4 Brunei e-Commerce brands and 2 failed Brunei e-Commerce brands. For privacy reasons, some of the brand names will not be mentioned in this paper as requested by the respective brands who wishes not to disclose their name but are willing to share their experiences. The topic discussed with all of these entrepreneurs was on the challenges of their ventures in e-Commerce.

THE E-COMMERCE STRATEGY

The strategy constructed is in the form of a list of Critical Success Factors (CSF) that by theory will improve an e-Commerce business performance. The researcher is proposing an e-Commerce strategy called the 7-CSF. research nature is quantitative and qualitative. Quantitative data collections were made to 442 general public who are the end consumer who shops online. Their role is primarily to verify that the 7-CSF is valid to each of them. Qualitatively, the researcher conducted series of interviews. The researcher also carry out observational case studies onto 45 Brunei e-Commerce sites and 13 global (and giant) e-Commerce brands from China, Malaysia, Indonesia, US, Singapore and Japan.

Learning from the global e-Commerce brands and also Pizzahut Brunei, consistent branding is indeed important. As Marcu (2020) mentioned, as Seth Godin famously said, "A brand is the set of expectations, memories, stories, and relationships that, taken together, account for a consumer's decision to choose one product or service over another". People frequently mistakenly equate a brand to a logo. While a logo is

Table 5. Brunei e-commerce brands sharing their challenges

Company	Challenges
Kitsu Models	• Training the users to use the website directly instead of ordering through Whatsapp and Facebook • Getting the users to report website shortcomings to the owner/ developer
Beastmode BN	• Training the users to use the website directly instead of ordering through Whatsapp or visiting their physical showroom
Company A	• Hiring motivated individuals. Faced the problem where local employees worked for few days and quits. • Not understanding who their customers are at the beginning stage • Built a website without strategic planning and long-term objectives which resulted in money loss and slow development • Invested in wrong marketing channels, incurring money loss and no sales made
Company B	• Built a website without thorough strategic planning and long-term objectives which resulted in money loss and slow development • Not enough people in the team • Overworked staff, lack of focus hence affects work performances

Sources: (Researcher's account)

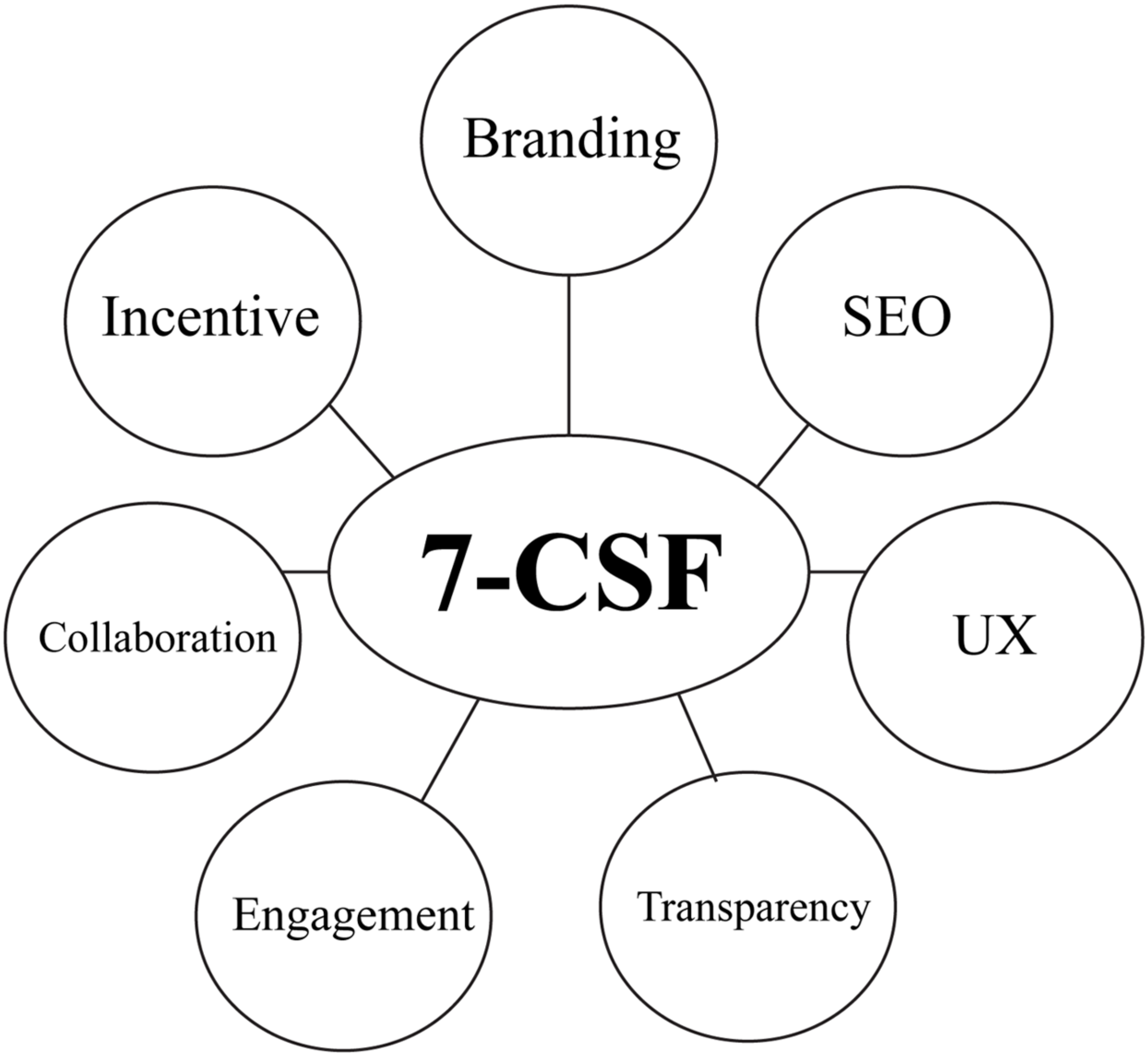
a part of a brand, it, alone, is nowhere near the brand as a whole. Common elements of a brand are its logo, colors, taglines, and of course, the product. However, an eCommerce branding strategy surpasses the creation of visual elements. Marcu further said an individual have the power to establish a unique personality for their e-Commerce brand that sets them apart from their competitors despite potentially having similar products. Their unique personality creates a point of familiarity for their customers. How one builds their brand online is an ongoing process that helps customer understands what is offered, what the company stands for, and how the company makes their customers' lives better. In context of Pizzahut Brunei, they have competitors in the pizzaria field in Brunei – big brands like Margharita, Yellow Cab and Courtyard Pizza. They all have very similar products. Pizzahut has a strong branding where red and black colours will be associated with them. This company offers 20 minutes delivery time from their store to customer's house. Currently, they are encouraging website orders. Customers are able to see order status from the website. By ordering from their website, customers are not restricted to pay online only. Customers have the option to pay cash during picking up. Wallace (2020) said branding can

Table 6. Failed Brunei e-commerce start-ups sharing their challenges

Company	Challenges
Company C	• Does not have good relationship with customers • Suppliers are not able to provide the quantity ordered • Local market share is small due to the nature of product is very niche • High competition with cheaper alternatives from brick-and-mortar shops
Company D	• Internal disagreements between top management / shareholders, resulting in inefficient information flow and money management • Lack of effective communication • Difference in business culture/ belief between top management • Inability to retain staff to stay in the company • Delivery delays • Customer complains due to delay in deliveries • Overworked staffs

Sources: (Researcher's account)

Figure 2. The proposed 7-CSF as the e-commerce strategy for success in Brunei



only be felt. This is business mixed with emotion and engagement and expectation. This is mission and customer participation mixed into one. It encompasses a company's web presence, communications, and products. Branding as the first strategy should fulfill - 1) Identifying purpose, 2) Motivating brand advocacy and purchase, 3) Find a good USP (unique selling proposition) and; 4) Run good marketing that matches brand values.

Next, SEO is a must. Bruneians use Google to seek answers, to ask questions. All of the global e-Commerce in this research sampling uses Paid Search although they can always rely on Organic Search. Taking Pizzahut Brunei as an example, they are the only one who does Paid Search in Brunei. Pizzahut Brunei garnered 119,278 average traffic in a month. The channels from which this traffic comes from are 16.5% from Paid Search. A 16.5% rate sound small but it actually accounts 19,680 Pizzahut Brunei visitors. The use of relevant keywords is important to get a website content up in Google results. When it comes to ranking in Search Engine, other than ensuring relevant keywords, the company must also pay attention on balancing a good bounce rate. Moser (2020) said bounce rate is the percentage of people who leave a website after visiting only a single page. Some scenarios that can count as a bounce in a website is when someone clicks the back button after viewing a single page, or exits their browser after viewing a single page. Another scenario is when a user clicks to another website that takes them elsewhere after viewing only a single page on the site just now. Moser also mention that the average bounce rate of e-Commerce stores are at 45.68%. The reasonable e-Commerce bounce rates are between 30% - 55%. High bounce rate impacts e-Commerce stores in two ways. Firstly, high bounce rate indicates no purchase is done. Secondly, high bounce rate will affect the site ranking in search engines. Search engine like Google will record the data and demote the site's domain authority. To have a good bounce rate, then the company will need to focus on the next strategy; delivering great UX.

Delivering great UX according to Neil Patel are to possess - simplified navigation, clear business nature, landing page has clear call to action, easy checkout and payment, has eye-catching element (product imagery), site is mobile optimized, site provide easy to read prints and the website has acceptable loading time. As for Transparency, it means to have visible contact information, offers customer service, show clear charges (no hidden fees), provide quality product information and image, to offer competitive prices and show testimonial & customer positive reviews. Meanwhile for Engagement, this means to use social media, do content marketing, have paid online advertisement, build forum/community section in the website, host events, encourage user generated content and ensure users tag the company's name and; carry out personal touch (get customer feedback).

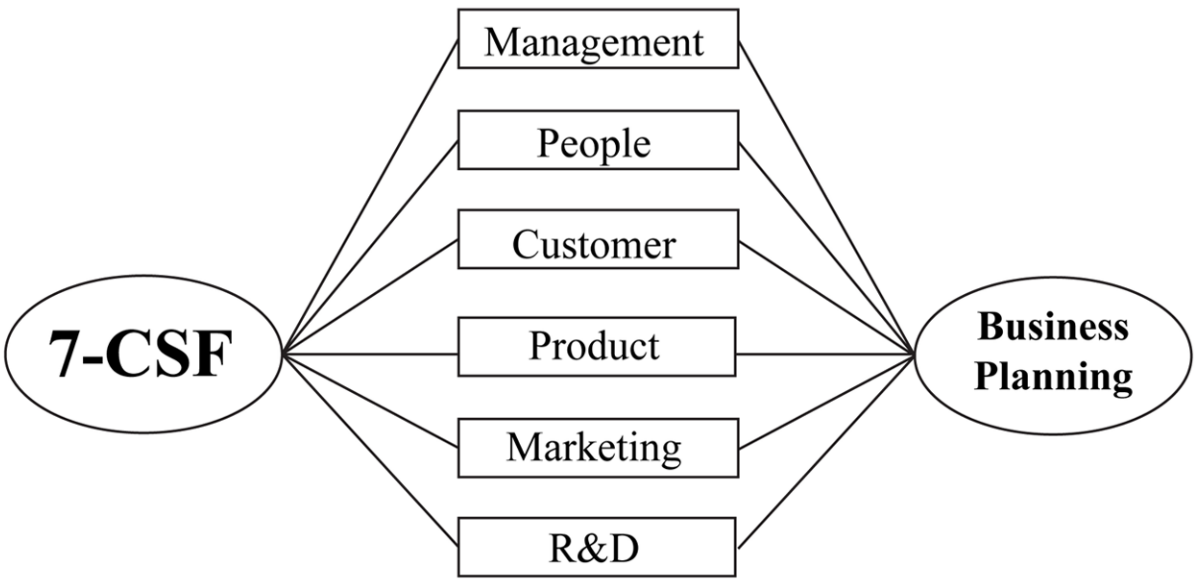
The researcher listed Collaboration in the 7-CSF. This is because Brunei's top marketing method has always been Words-of-Mouth, which now has upgraded into "Words-of-Whatsapp" version. It has similar elements. People talks about it and share it with the people around them. Virality in Whatsapp through sharing and conversations are effective. The researcher is recommending e-Commerce companies to explore partnership with well-known or popular brands to increase exposure, reach new customers and gain continuous revenue generation. Collaborate with influencers in the country. Referrals in Brunei can also be effectively done by requesting to be enlisted in AiTi's eKadaiBrunei listing. Bruneians look through this listing to discover e-Commerce platforms in the country. As any of the brand listed in eKadai, it means the government is endorsing the brands. The people will have more trust because the government endorsed the brand names in the listing. Another collaboration method is through display ads and backlinks. Display ads and backlinks can also be proposed to websites that Bruneians frequently visits.

Finally, the researcher recommends offering Incentives. The global e-Commerce sites make use of flash deals/sales to stimulate urgency to encourage action of buying as soon as possible. This is because the flash deals/sales have a time counter that shows visitors the time left until the deal is gone. Instant rewards can also be offered to new customers to increase conversion from new member to customer. Added value to customer for long-term can be introduced. This can include loyalty programs, offering news subscription, exclusive pricing /discount to members.

CONCLUSION

The 7-CSF is indeed vital for success in e-Commerce planning. However, after interviewing experienced business managers, failed e-Commerce companies, current e-Commerce entrepreneurs and social media store owners including personal online sellers, the researcher found that the strategy must be expanded. The researcher is further proposing the 7-CSF to be combined with proper business planning (focusing on 6 key areas including management, people, customer, product, marketing and R&D). These two elements (Business Planning and 7-CSF) needs to co-exist side by side to foster success.

Figure 3. The extended e-commerce strategy by the researcher



After interviewing failed e-Commerce brands and other striving brands, the researcher found out that not only adopting 7-CSF will bring success but also proper business planning that encompasses six identified key areas are important. These additional six key areas are discussed and backed by three successful business managers that the researcher approached.

Management: One of the failed e-Commerce brands interviewed has a complete website platform that has complete e-Commerce capabilities. The branding is strong as they used to actively engage themselves in the local news, joined business networking sessions and maintain their active social media presence. They also used to have everyone in their company to wear a t-shirt uniform that bears their brand name and website address. All of the staff including the management wore those. They also initially have good relationships with their customers. Despite all of their excellent operations, however they have issues with their own management internally. As a company with multiple partners, they have different business culture beliefs. This then lead to disagreements between these top management people. As time went by, information did not transfer smoothly. There were lack of communication and finally led to a downfall and closure of their brand from the business industry.

People: In every business, having people to work and support the business operations are important. The researcher find out that striving brands are struggling to find the “right” people to join them. This is due to salary reason, not motivated and very inexperienced applicants. One of the failed e-Commerce brands had problems in retaining their staff. In a very serious case, twenty of their staff quits at one time together. This proves how very discouraged the staffs were working with the brand. Because of that, the brand had troubles in operating as they were short of staff and had to work until night time to cover deliveries. These resulted in delivery delays. These frequent delays massively affected their customers' satisfaction. Hiring the "right" people is also as important as having the ability to retain them to stay, work with great performance and getting them motivated at work.

Customer: Understanding customer is the catalyst to business success and sustainability. When one company does not know who their customers are, the company is risking in wasting money, time and energy. The striving brands shared their pains with the researcher where they did not study their customers well and it slows down their business development. One of a failed e-Commerce brand was willing to share her experience where her failure to understand her customers had primarily caused the downfall of her brand. The business was supposed to export out local products to overseas clients. As this platform tapped international market, big orders should be expected. While she was able to get orders from overseas, she was not able to obtain the products. The product providers (her customers in Brunei) were not able to deliver on time and at the right quantities. Her relationships with her customers were also not in very good terms as the customers were not able to tolerate criticism and feedbacks from foreign peoples' remarks.

Product: One of a new brand that the researcher approached, Kitsu Model, is offering miniatures. As a new brand, they are actually flourishing as their product caters a specific community. The community type is unique. They are the type who will pay high costs as they are collectors and possess the same personality – being loyal and obsessed with collections. As proud collectors, the customers will stay when the company sells them the right product. Kitsu Model is an example in Brunei that other brands can observe in understanding the importance of product.

Marketing: Getting exposure is important to make sales. There are several marketing tactics out there. A company should select the right marketing channels that reach their customers. After understanding their customers, a company will know where to market their product cost-effectively. A striving brand shared with the researcher on how investing in the wrong marketing channel had incur them a loss. This brand solely had relied on Facebook marketing and had spent money on the campaign. The campaign did not bring them customers and their web visitors' counts were very low. It took them some time to realize that their customers were rather the people who went to grocery stores instead of people who are in Facebook; hence the correct marketing was to strategically put their brand posters or banners on physical stores.

R and D: In business sustainability, research and development (R&D) is a must. Change is inevitable and businesses must be proactive in moving with the changes. R&D is also important in capturing opportunities to develop and earn more income. For example, a car workshop may sustain and generate decent money every month. Say they run good R&D and learned that they can add extra services like selling second hand cars, not only that they can sustain but they are also able to earn higher income. One e-Commerce brand in Brunei did their R&D and learnt that their customers are the middle-class people that stay in the national housing location. With that, the company is able to effectively distribute their promotional flyers at these areas and obtained orders.

In conclusion, the proposed 7-CSF may help as a strategy that e-Commerce companies can adopt for success in Brunei. Every strategy should be followed and if done right, will execute good results. Pizzahut Brunei is the one and only existing local example that proves the 7-CSF can work locally in Brunei as they closely imitate the 7-CSF strategy. Although their traffic and revenue may not as huge as the global e-Commerce brand, this is because Pizzahut Brunei caters their service for this country only. They do not serve orders for outside of the country like the global brands. Also, they cater for the

Brunei small population. If more e-Commerce brands follow Pizzahut Brunei steps, it should bear great performances like they did. There are limitations in this study however. The limitation includes - the 7-CSF is proposed provided the company has good business planning. Another limitation is that the researcher is not able to get all 45 local e-Commerce brands to speak their experiences. This may be due to their time constraints, concerns on the current COVID-19 pandemic and not willing to share their company's sensitive reports/information. Finally, the researcher hopes that the result of this research will help to support the current and new e-Commerce entrepreneurs to excel and gain market share in Brunei. A progressive e-Commerce company will create job employment ranging from diverse areas ranging from IT, programming, web administration, business administration, marketing, accounting, operations, delivery, design, customer service and more. It will also promote self-employment and partnerships. In regards of the Brunei Vision 2035, in enhancing opportunities for local small and medium sized enterprises (SMEs) and MSME too, as well as enable Bruneians to achieve leadership in business and industry by developing greater competitive strength, this research is supporting this vision in the form of e-Commerce venture. The researcher hope the 7-CSF may help to realize the vision.

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Chapter 18
Digital Startup Business Model Compliance:
Millennial Acceptance of BookTia Platform

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ABSTRACT

This study is to reveal the challenges of millennials' preferences and criteria in booking a venue via an online platform. The main target users for this study are the millennials ranging in age from 18 – 40. The dependent variable for this study is user acceptance testing on Booktia. The independent variables for this study are content, navigation, multimedia, and usefulness. The result is very interesting. The finding concluded that user acceptance testing shows a positive relation towards the four independent variables with coefficient value for multimedia of 0.066, content of 0.055, navigation of 0.055, and usefulness of 0.060. All independent variables show a significant result between 0.000 to 0.005. Thus, the result shows the millennials are accepting features and usage of Booktia upon testing it. Implications were drawn in the study, such as the benefits this study will bring to the Booktia platform.

INTRODUCTION

Online Booking has emerged in millennials as a new trend of booking nowadays and it is quickly absorbed in their routine life (Sethi, 2020). A huge target population like this can be served easily with the help of providing online services, such as free cash on delivery, online hotel reservations, online airline ticket booking services, online wedding hall bookings and many more services (Makki and Chang, 2014). One of the success factor of software development is to involve end user in the process. (Alvertis et al.,

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2016). User is one the main stakeholders that is vital role in any project because they will be the one that is going to use the platform as a way to build trust to the software or platform provider. According to a study by Papaspyros (2016) mentioned that Software design experience teaches us that it gets more and more expensive to remove conceptual flaws the later the process of software development gets. For that statement will help to ensure BookTia, an online venue booking platform in Brunei to minimize any risk in terms of cost that may have arisen in the future once the platform is fully executed for public use. However, Asia has the largest percentage of internet usage with 50.3% (Statisa, 2020). It has long been stated that the Internet, yet, is not used to its full extent as a platform for bookings and recommendations (Klein, Köhne & Öörni, 2004). The once tedious process of actually con-tacting each accommodation provider to make a reservation for a specific date, making deposits, checking the availability of the venue, and providing proof thereof is now easily performed and managed by a booking platform (Satguru Travel, 2019).

The aim of this research paper is to understand the views on challenges of user when using online platform, to book their venue for their respective venue. The result from this research study will be used in altering any discrepancies that may have been identified by the beta users. Not only that, the finding aims to ensure the platform can be deemed ready to be executed to the public. Moreover, this study therefore has the following objectives: (1) to confirm the system performs business functions as intended in business requirement; (2) to confirm that the system is usable from millennials perspective (operational ease of use); (3) Identify and resolve discrepancies during the UAT process; (4) to certify that the system is deemed ready to be executed for public use.

LITERATURE REVIEW

Sualim *et al* (2016) stated that usability criteria such as efficiency, effectiveness, errors and satisfaction are important criteria in evaluating the user acceptance of a tool. The difference in execution time will differentiate and classify either the best testing tool or not. Based on the evaluation performed in this research, Watir Webdriver is the chosen automated testing tool for web application among the three evaluated tools. The tool is not only has the shortest execution time and excellent test script but also fulfill usability criteria as well. Watir Webdriver shows the efficiency criteria when it has minimum rate of speed to complete task given. Besides, Watir Webdriver also has error criteria with high maximum error rate detected during testing web application. This testing tool also has high satisfaction as it is pleasant to use the tool during testing web application. As a conclusion, with that usability criteria checked and other special features Watir Webdriver is the best choice for tester to perform testing for web application. According to a study conducted by Brooks, Krebs and Paulsen (2014) in their research on User Acceptance Testing (Beta Testing) a requirements analysis tool stated that the new tool was perhaps not quite ready for when conducting user acceptance testing for beta users. Two categories of comments or warnings were still under development. Also, there is a strong suggestion that numbers within the text of requirements sometimes confused the parsing performed by the new tool. The lack and the absence of user documentation making investigators unable to make use of the new tool configuration options. Inretrospect, the company should have been informed to this configuration difficulty earlier to provide ample opportunity for detailed documentation or other guidance to be provided. The lesson learned is that it is a vital move for beta-testers to main-tain frequent communication with the company or group developing the software to detect any future discrepancies.

Moreover, Pathak (2016) stated that acceptance testing is one of the most important aspects of software development life cycle. Acceptance testing is conducted to determine if the requirements of a specificationor contractare met. As the world is advancing in all fields of automation and software, in the field of software testing also, there are frameworks available for performing acceptance testing. This paper tries to provide the information about some of the framework used for acceptance testing, some of which support to perform it in the automated manner. The study of conducting UAT helps reduce the rate of software failure for the both the defects and requirements provided by its owner and increase the quality of software product. Inline with it, Amalia and Dellyana (2019) mentioned that potential users would prefer to use the Muslim- based mobile application when the facilitating conditions is fulfilled. Facilitating conditions means they would prefer to adopt the application when they have a sufficient resources and knowledge to adopt it. Facilitating conditions would give a positive influence for 1.623 times over the other variables. All the independent variables explain the dependent variable for 15.10% and the rest is explained by other factors out of the independent variables.

In other hand, Dedkova et al. (2018) stated that beta testers represented regular users reasonably well, and they did not observe a regular-user segment that would be underrepresented among beta testers. ESET's approach stated that not filtering beta testers and "the more testers the better" followed by analyses of selected observed differences seems sufficient for developing its software products. It is the most efficient for large international companies able to attract large numbers of beta testers. However, this approach would probably not yield representative outcomes and could even shift development focus in a wrong direction for smaller, local, or less-well-established companies. According to a study conducted by Antonelli et al. (2018) in their research on modelling approach to generating user acceptance tests stated that they have shown a new way of generating acceptance tests from well-known requirements artifacts, by presenting a set of rules to guide the implementation of semi-automated solutions and shown the first steps towards a supporting tool. Theye are now working in completing the rule set, by adding the rules required to translate iterative episodes into tasks. For example,each verb used in the episode of a Scenario that describes iteration should be written as a while expression in in Task/Method model: while <condition> <block>. This would help to support other scenarios that require iterative tasks, e.g. "For each order, determine the time needed to take the products to the destination". We also plan to publishthe web application in order to experiment with the presented ideas in real development settings, so we can assess the benefits of semi-automatically generated UATs.

The accessibility of the Internet and the expanding mobile application environment, public beta testing has gained tremendous popularity in the software industry. This study provides an in-depth analysis of both the reliability-related and the market-related benefits of public beta testing. We show that in addition to improved software quality, market-related benefits accrue because public beta testing can speed up product diffusion and increase potential users' valuation of a software product. Both the methodologies and findings of this study are of practical significance. The new software landscape with online access to software products requires a new way of thinking specifically, closing the gap between marketing and development. The traditional model of develop–test–market will handicap firms in this new software era. Firms can also take advantage of public beta testing to improve their product quality and secure a better market position in an increasingly volatile and competitive marketplace. In addition to demonstrating the importance of public beta testing, the models developed in this study can help firms make informed public beta testing decisions under different scenarios (Jiang, 2016). According to a study conducted by Petterson et al. (2018) on their finding on User acceptance and adoption of circular offerings in the fashion sector stated that exploring user acceptance and adoption of solutions that contribute to environmental sustainability is a topic that has occupied researchers for at least two decades. Some contributions have been made regarding the factors that influence such intention and behavior. However, and according to Quet al. (2016), most research addressing acceptance of circular offerings such as Product Service Systems has been done using scenarios describing potential.

Usability criteria such as efficiency, effectiveness, errors and satisfaction are important criteria in evaluating the user acceptance of a tool. The difference in execution time will differentiate and classify either the best testing tool or not. User Acceptance Testing is important because it helps demonstrate that required business functions are operating in a manner suited to real-world circumstances and usage. If the expected outcome is not achieved during testing, the item will be documented and sent back to the developers for repair. This process serves as a final check to ensure the finished product is well built. But make no mistake, just because User Acceptance Testing is the final test conducted before production does not mean that few bugs are uncovered.

RESEARCH METHODOLOGY

The research framework in previous chapter, consists of four independent variables which includes content, module, multimedia element, navigations and usefulness. The 2 main control factors are age and gender. Whereas the variable factor for this research is user acceptance testing. With this formation, it will help us to identify which determinants needs changes and focus on when conducting user acceptance testing for BookTia, a centralized venue booking platform in Brunei. The beta test was carried out to serve as a trial before conducting a real test. It also provides the researcher with information with regard to any unexpected problems which may arise from the usage of the computer or the contents of the courseware. Indirectly, the researchers were able to identify any weaknesses or problems from the perspective of the students in relation to the use of the developed software (Fazzlijan & Mona, 2013).

H1: Content has a positive significant effect towards user acceptance testing

Multimedia Element refers to the channels relative ability to convey messages that communicate to convey static visual cues through the wordings in text messages, dynamic verbal cues through the tone ofvoice and inflections in audio messages, and dynamic visualand verbal cues through gestures and facial expressions in video messages. Multimedia element that applied in the prototype includes the appropriateness of font type, font size, graphics, button, colour and audio. (Nuraini & Faizah, 2018)

H2: Multimedia Content has a positive significant effect towards user acceptance testing

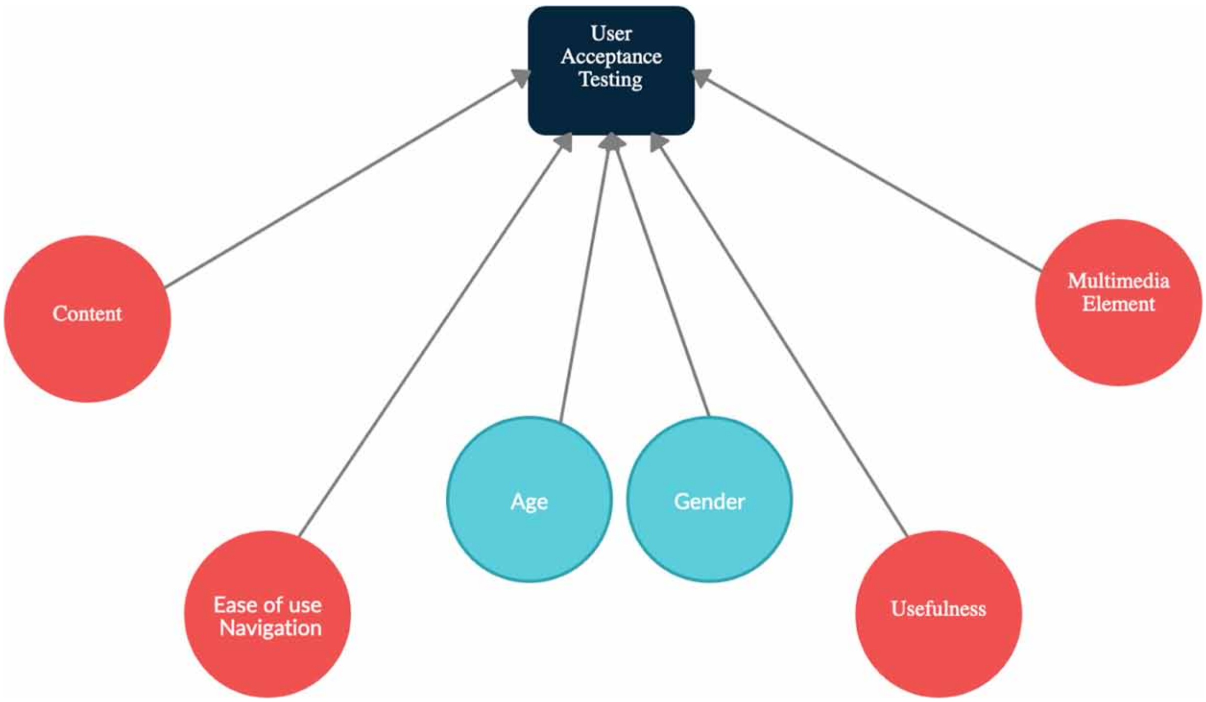
Perceived ease of use is defined as the extent to which an in-dividual believes using a system will be free of effort. Unlike perceived usefulness, it is expected that perceived ease of use will require direct experience to become well-formed, and will, therefore, not be stable over time if noninteractive mockups are used. Conventional wisdom suggests that actually performing (or attempting to perform) a behavior is a prerequisite for accurately judging how easy or difficult it is, and theory and research bear this out

H3: Navigation has a positive significant effect towards user acceptance testing

The significance of perceived usefulness derives from the TAM model that perceived usefulness affects attitudes and behavioral intentions both directly and indirectly. It has been found that user accep- tance of computer systems is driven to a large extent by perceived usefulness. Perceived usefulness influences user acceptance of systems due to the reinforcement value of outcomes. Davis et al. (1929) found that perceived usefulness is a major determinant of behavioral intentions as well as attitudes

H4: Usefulness has a positive significant effect towards user acceptance testing.

Figure 1. Research framework



Research Framework

Figure-1, shows research framework for this study. User Acceptance Testing as the dependent variables whereas age and gender as control factors. The independent variables constitute to four main factors which contributes as follows:

1. Content
2. Ease of use on Navigation
3. Usefulness
4. Multimedia Element

Data Collection

Quantitative Method

For this research study, Online survey will be conducted by using ‘Likert Scale’ questionnaire with scale from 1 to 5 (where 1= strongly disagree and 5= strongly agree). The main questionnaire informants for this research will be the millennials. According to Foot and Stoffman (1998), the millennials are a cohort born between 1980 and 1995. Hence it will be between age range from 25 to 40. To determine the sample size, Slovin formula is used in this research. Therefore, with 5% or 0.05 as the margin error, the sample size of respondents in this research is 100.

Before processing the data, reliability and validity test should be done. Reliability is necessary to measure the internal consistency of the data. Reliability can be measured by using Cronbach's Alpha score. All the constructs should have an adequate alpha value to pass the reliability test. Griethuijsen et al. (2014) referred that the values between 0.6 to 0.7 is still conclude as the acceptable values of reliability. Validity test for this research will be using Pearson Correlation. According to Malhotra (2010), the Pearson Correlation score should be more than 0.30. After pass the validity and reliability testing, the data will be analyzed by using Binary Logistic Regression. Logistic Regression can be used to model a relationship between a two-category or binary dependent variable and one or more independent or predictor variable.

Qualitative Method

Based on the interviewees will observe on the respective BookTia Platform, they will eventually fill in the questionnaire stated above in providing their feedback on 5 main independent variables which focuses on Content, Multimedia, Ease of Use on Navigation and Perceived Usefulness.

Measurement of Variables

The independent variables were determined as the most crucial factors in affecting the dependent variable in which, in this case, the factors that needs to be viewed in user acceptance testing based on past studies. The dependent variable, User Acceptance Testing (BookTia), is measured as per measurements taken from previous studies by Rosnizam & Zawiiyah (2011) and the units are shown below:

1. BookTia works according to the specification
2. BookTia is suitable to be used by the public
3. BookTia does not have error that will interfere operation
4. BookTia has achieved the objectives of the development
5. BookTia has a user-friendly interface

The independent variable, content, is measured as per measurements taken from previous studies by Nuraaini & Faaizah (2015) and the units are shown below:

1. The content is clear
2. The content is easy to understand
3. The content is related to Venue Booking
4. The content is consistent
5. The content is reliable
6. The content in BookTia is interesting

The independent variable, Multimedia Element, is measured as per measurements taken from previous studies by Nuraaini & Faaizah (2015) and the units are shown below:

1. Font type is appropriate
2. Font Size is appropriate

3. Graphics are appropriate
4. Buttons are appropriate
5. Color Scheme is appropriate
6. Pictures are relevant and appropriate

The independent variable, Ease of Use on Navigation, is measured as per measurements taken from previous studies by Azzam & Sina (2020), and the units are shown below:

1. Navigation is easy
2. Navigation is clear and concise
3. Number of buttons/links are reasonable
4. Links are consistent
5. Links are easy to access

The independent variable, Usefulness, is measured as per measurements taken from previous studies by Nuraaini & Faaizah (2015) and the units are shown below:

1. BookTia is useful for Millennials
2. BookTia is useful for Venue Seekers
3. BookTia is useful for Venue Providers
4. BookTia is useful for advertising vendors to the platform
5. Booktia is useful for all gender

As for first control factor variable, Age group for millennials, is measured as per measurements taken from previous studies by Wijaya & Kusumawati (2018)

1. 18 – 24
2. 25 – 30
3. 30 – 35
4. 35 - 39

As for the second control factor variable, Gender for millennials, is measured as per measurements taken from previous studies by Wijaya & Kusumawati (2018)

1. Male
2. Female

Pre-Test (Pilot Test)

In this research study, a pilot test was executed with an appropriate sample size of 30 respondents and the data collection is interpreted using Cronbach's Alpha analysis. According to Bland & Altman (1997), the acceptable range of scales for Cronbach's Alpha analysis is from 0.70 to 0.95; by means, the greater alpha value means the higher reliability and validity of the data. Table-1 below shows the outcome of

Table 1. Cronbach alpha for user acceptance testing on Booktia

Reliability Statistics			
Variable	**Cronbach's Alpha**	**N**	**Level of Reliability**
BookTia	0.740	5	Acceptable
Content	0.823	6	Good
Multimedia	0.767	6	Acceptable
Navigation	0.835	5	Good
Usefulness	0.729	5	Acceptable

Cronbach's Alpha reliability statistics on the measure of user acceptance testing on booktia platfotm, content, multimedia, navigation and usefulness.

The result shown in the table above shows that User Acceptance Testing on Booktia has reliability figure of 0.740 which is acceptable. Content with 0.823, which is good. Multimedia with 0.767, which is Acceptable. Navigation with 0.835, which is good and Usefuleness with 0.729 which is Acceptable. Since all the Cronbach alpha figure is above 0.7, hence it is reliable and accepted to conduct further tests.

FINDING

BookTia Platform

Figure-2 showing the landing page for BookTia platform. Venue seekers are able to filter their venue based on their criteria. For instance, venue seekers can filter based on district, purpose of the venue booking, type of space they are trying to book and number of capacity to suites their events. The buttons' function are as follows (Table-2):

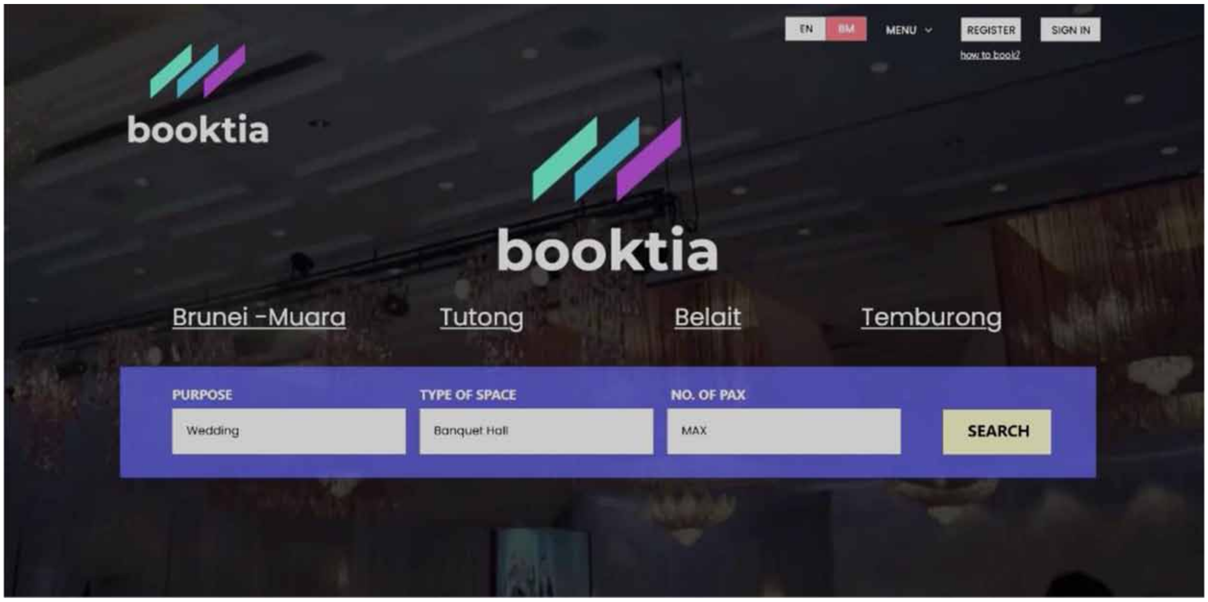
The example of a non-fixed rate venue pricing. Basically, this is where venue providers imposing a compulsory inhouse catering to book and secure their venue booking (figure-3). Some of the features for a non-fixed rate pricing sections are as follows:

1. Signature Dish Section
   a. Venue seekers are able to look up to most favorite dish in that particular venue to ease selection
2. Package choosing
   a. Venue seekers are able to look up catering packages that suites their events
3. Filter number of capacities for catering
   a. Venue seekers are able to filter number of pax for catering.

Data Management

This study conducted interviewee consists of people who have experience in booking a venue whether physically going to venue providers and book venue or booking them online. The interviews consist of 89 male and 61 females within the age range of 18 – 40 (Millennials). Interviewees will then be introduced

Figure 2. BookTia platform



on Booktia Platform before answering the questionnaire that focuses on the independent variables which consists of content, multimedia, navigation and usefulness.

The table 3 illustrates the respondents age data. Out of 150 participants, the highest is 68 (45.3%), with age range of 18 - 24. It is then followed by 61 (40.7%), with age range of 25 - 30. Age range of 30 – 35 falls the third with total of 14 participants with 9.3%. The lowest is 7 (4.7%) with age range of 35 – 39.

The table 4 showing frequency analysis for the result of the questionnaire for the dependent variable which is User Acceptance on the BookTia. There are 5 questions for this section. For the first question, *BookTia works according to the specification,* respondents mostly 'Agree' to this statement with 114 (61.3%) responses. About 19 (10.2%) stated 'Neutral' and 13 (7%) stated 'Strongly Agree'. However, 3 (1.6%) stated 'Strongly Disagree' and 1 (0.5%) stated 'Disagree' with the statement. For the second

Table 2. The buttons' function

Buttons	Functions	Buttons	Functions
EN BM	This is a language setting whereby users are able to change to English or in Bahasa Melayu based on their preference.	SEARCH	Once user filter their venue criteria, then they can click on the 'search' button to get venue results.
REGISTER how to book?	This is sign up/register button for new user (venue seekers) in order to book preferred venue.	SIGN IN	This is sign in button for pre-existing user (venue seeker) in order to book preferred venue.

Figure 3.

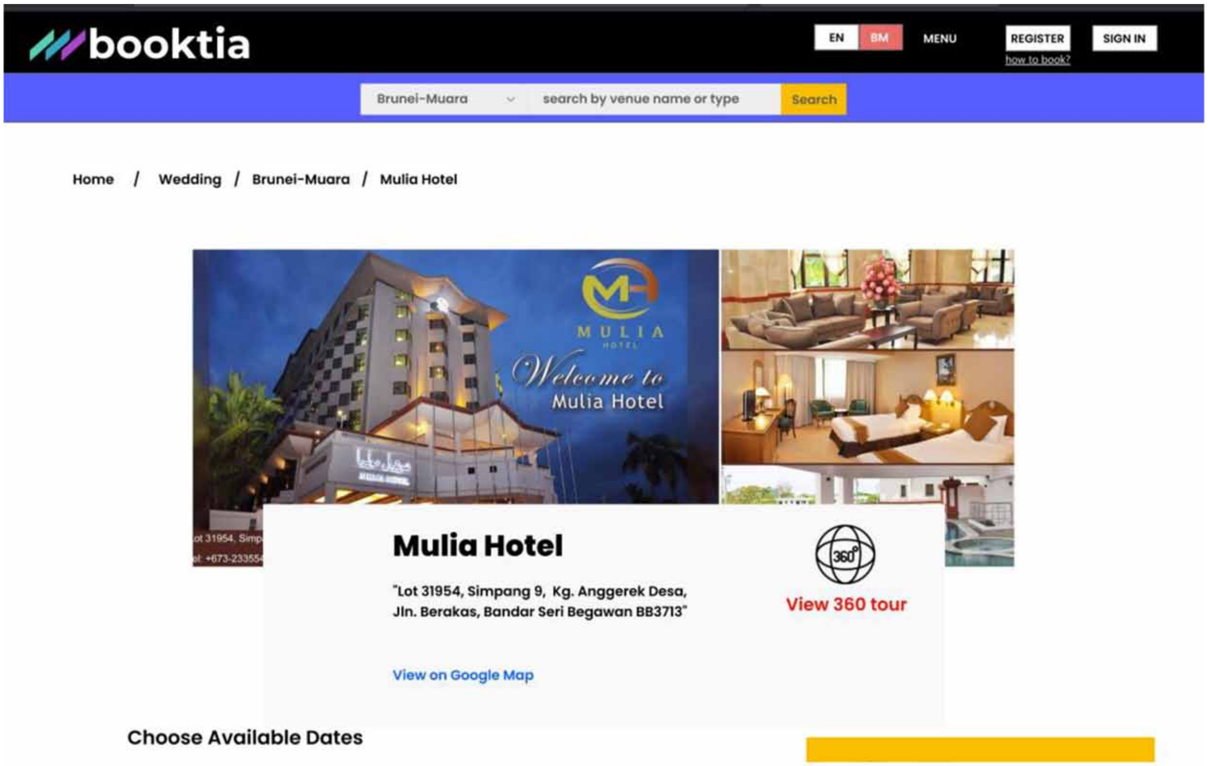


Figure 4. Venue booking

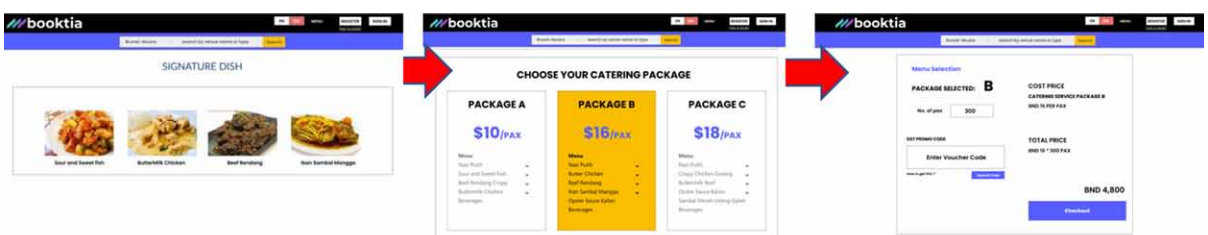


Table 3. Age distribution

Frequency Analysis for Age Distribution			
Age Group	**Frequency**	**Valid Percent**	**Cumulative Percent**
18 - 24	68	45.3	45.3
25 - 30	61	40.7	86.0
30 - 35	14	9.3	95.3
35 - 39	7	4.7	100.0
Total	150	100.0	

Table 4. Frequency analysis

BOOKTIA	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
Survey Questions	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	
BookTia works according to the specification	3	1.6%	1	0.5%	19	10.2%	114	61.3%	13	7%	150
Booktia is suitable to be used by the public.	5	2.7%	1	0.5%	9	4.8%	117	62.9%	18	9.7%	150
BookTia does not have error that will interfere operation	4	2.2%	1	0.5%	25	13.4%	90	48.4%	30	16.1%	150
BookTia has achieved the objectives of the development	3	1.6%	1	0.5%	13	7%	123	66.1%	10	5.4%	150
BookTia has a user-friendly interface	2	1.1%	2	1.1%	8	4.3%	118	63.4%	20	10.8%	150

question, *BookTia is suitable to be used by the public,* respondents mostly 'Agree' to this statement with 117 (62.9%) responses. About 9 (4.8%) stated 'Neutral' and 18 (9.7%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 1 (0.5%) stated 'Disagree' with the statement.For the third question, *BookTia does not have error that will interfere operation,* respondents mostly 'Agree' to this statement with 117 (62.9%) responses. About 25 (13.4%) stated 'Neutral' and 30 (16.1%) stated 'Strongly Agree'. However, 4 (2.2%) stated 'Strongly Disagree' and 1 (0.5%) stated 'Disagree' with the statement.

For the fourth question, *BookTia has achieved the objectives of the development,* respondents mostly 'Agree' to this statement with 123 (66.1%) responses. About 13 (7%) stated 'Neutral' and 10 (5.4%) stated 'Strongly Agree'. However, 3 (1.6%) stated 'Strongly Disagree' and 1 (0.5%) stated 'Disagree' with the statement. For the fifth question, *BookTia has a user-friendly interface,* respondents mostly 'Agree' to this statement with 118 (63.4%) responses. About 8 (4.3%) stated 'Neutral' and 20 (10.8%) stated 'Strongly Agree'. However, 2 (1.1%) stated 'Strongly Disagree' and 2 (1.1%) stated 'Disagree' with the statement.

The table 5 is showing the result questionnaire for the first independent variable which is Content. There are 5 questions for this section. For the first question, *The content is clear,* respondents mostly 'Agree' to this statement with 115 (61.8%) responses. About 8 (4.3%) stated 'Neutral' and 19 (10.2%) stated 'Strongly Agree'. However, 6 (3.2%) stated 'Strongly Disagree' and 2 (1.1%) stated 'Disagree' with the statement.

For the second question, *the content is easy to understand,* respondents mostly 'Agree' to this statement with 117 (62.9%) responses. None stated 'Neutral' and 24 (12.9%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 2 (2.2%) stated 'Disagree' with the statement.For the third question, *The content is related to Venue Booking,* respondents mostly 'Agree' to this statement with 105 (56.5%) responses. None stated 'Neutral' and 37 (19.9%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 3 (1.6%) stated 'Disagree' with the statement.

For the fourth question, *The content is consistent,* respondents mostly 'Agree' to this statement with 86 (46.2%) responses. About 6 (3.2%) stated 'Neutral' and 49 26.3%) stated 'Strongly Agree'. However, 7 (3.8%) stated 'Strongly Disagree' and 2 (1.1%) stated 'Disagree' with the statement.For the fifth question,

Table 5. The content is easy to understand

CONTENT	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
Survey Questions	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	
The content is clear	6	3.2%	2	1.1%	8	4.3%	115	61.8%	19	10.2%	150
The content is easy to understand	5	2.7%	4	2.2%	-	-	117	62.9%	24	12.9%	150
The content is related to Venue Booking	5	2.7%	3	1.6%	-	-	105	56.5%	37	19.9%	150
The content is consistent	7	3.8%	2	1.1%	6	3.2%	86	46.2%	49	26.3%	150
The content is reliable	5	2.7%	2	1.1%	31	16.7%	69	37.1%	43	23.1%	150
The Booktia content is interesting	7	3.8%	11	5.9%	28	15.1`%	88	47.3%	16	8.6%	150

The content is reliable, respondents mostly 'Agree' to this statement with 69 (37.1%) responses. About 31 (16.7%) stated 'Neutral' and 43 (23.1%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 2 (1.1%) stated 'Disagree' with the statement.For the sixth question, *The Booktia content is reliable,* respondents mostly 'Agree' to this statement with 88 (47.3%) responses. About 28 (15.1%) stated 'Neutral' and 16 (8.6%) stated 'Strongly Agree'. However, 7 (3.8%) stated 'Strongly Disagree' and 11 (5.9%) stated 'Disagree' with the statement.

Table 6. Multimedia features

MULTIMEDIA	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
Survey Questions	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	**X**	**%**	
Font type is appropriate	5	2.7%	5	2.7%	9	4.8%	105	56.5%	26	14%	150
Font Size is appropriate	7	3.8%	8	4.3%	3	1.6%	111	59.7%	21	11.3%	150
Graphics are appropriate	3	1.6%	14	7.5%	16	8.6%	99	53.2%	18	9.7%	150
Buttons are appropriate	5	2.7%	11	5.9%	1	0.5%	110	59.1%	23	12.4%	150
Color Scheme is appropriate	3	1.6%	13	7%	1	0.5%	104	55.9%	29	15.6%	150
Pictures are relevant and appropriate	4	2.2%	5	2.7%	8	4.3%	100	53.8%	33	17.7%	150

The table-5 is showing the result questionnaire for the second independent variable which is Multimedia. There are 6 questions for this section with Likert Scale type of question. For the first question, *Font type is appropriate,* respondents mostly 'Agree' to this statement with 105 (56.5%) responses. About

9 (4.8%) stated 'Neutral' and 26 (14%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 5 (2.7%) stated 'Disagree' with the statement. For the second question, *Font Size is appropriate,* respondents mostly 'Agree' to this statement with 111 (59.7%) responses. About 3 (1.6%) stated 'Neutral' and 21 (11.3%) stated 'Strongly Agree'. However, 7 (3.8%) stated 'Strongly Disagree' and 8 (4.3%) stated 'Disagree' with the statement. For the third question, *Graphics are appropriate,* respondents mostly 'Agree' to this statement with 99 (53.2%) responses . About 16 (8.6%) stated 'Neutral' and 18 (9.7%) stated 'Strongly Agree'. However, 3 (1.6%) stated 'Strongly Disagree' and 14 (17.5%) stated 'Disagree' with the statement.

The fourth question, *Buttons are appropriate,* respondents mostly 'Agree' to this statement with 110 (59.1%) responses. About 1 (0.5%) stated 'Neutral' and 16 (8.6%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 11 (5.9%) stated 'Disagree' with the statement. The fifth question, *Color Scheme is appropriate,* respondents mostly 'Agree' to this statement with 104 (55.9%) responses. About 1 (0.5%) stated 'Neutral' and 29 (15.6%) stated 'Strongly Agree'. However, 3 (1.6%) stated 'Strongly Disagree' and 13 (7%) stated 'Disagree' with the statement.

Table 7. Navigation features

NAVIGATION	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
Survey Questions	X	%	X	%	X	%	X	%	X	%	
Navigation is easy	5	2.7%	3	1.6%	3	1.6%	105	56.5%	34	18.3%	150
Navigation is clear and concise	5	2.7%	7	3.8%	8	4.3%	101	54.3%	29	15.6%	150
Number of buttons/links are reasonable	4	2.2%	15	8.1%	10	5.4%	98	52.7%	23	12.4%	150
Links are consistent	4	2.2%	12	6.5%	2	1.1%	95	51.1%	37	19.9%	150
Links are easy to access	5	2.7%	6	3.2%	1	0.5%	99	53.2%	39	21%	150

For the sixth question, *Pictures are relevant and accurate,* respondents mostly 'Agree' to this statement with 100 (53.8%) responses . About 8 (4.3%) stated 'Neutral' and 33 (17.7%) stated 'Strongly Agree'. However, 4 (2.2%) stated 'Strongly Disagree' and 5 (2.7%) stated 'Disagree' with the statement.

The table 7 showing the result questionnaire for the third independent variable which is Navigation. There are 5 questions for this section. For the first question, *Navigation is easy,* respondents mostly 'Agree' to this statement with 105 (56.5%) responses. About 3 (1.6%) stated 'Neutral' and 34 (18.3%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 3 (1.6%) stated 'Disagree' with the statement. For the second question, *Navigation is clear and concise,* respondents mostly 'Agree' to this statement with 101 (54.3%) responses. About 8 (4.3%) stated 'Neutral' and 29 (15.6%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 7 (3.8%) stated 'Disagree' with the statement.For the third question, *Number of buttons/links are reasonable,* respondents mostly 'Agree' to this statement with 98 (52.7%) responses. About 10 (5.4%) stated 'Neutral' and 23 (15.4%) stated 'Strongly Agree'. However, 4 (2.2%) stated 'Strongly Disagree' and 15 (8.1%) stated 'Disagree' with the statement. The fourth question, *Links are consistent,* respondents mostly 'Agree' to this statement with 95 (51.1%) responses. About 2 (1.1%) stated 'Neutral' and 37 (19.9%) stated 'Strongly Agree'.

However, 4 (2.2%) stated 'Strongly Disagree' and 12 (6.5%) stated 'Disagree' with the statement.For the fifth question, *The Links are easy to access,* respondents mostly 'Agree' to this statement with 99 (53.2%)responses. About 1 (0.5%) stated 'Neutral' and 39 (21%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 6 (3.2%) stated 'Disagree' with the statement.

Table 8. BookTia usefulness

USEFULNESS	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Total
Survey Questions	**X**	%	**X**	%	**X**	%	**X**	%	**X**	%	
BookTia is useful for Millennials	4	2.2%	7	3.8%	12	6.5%	107	57.5%	20	10.8%	150
BookTia is useful for Venue Seekers	5	2.7%	5	2.7%	1	0.5%	97	52.2%	42	22.6%	150
BookTia is useful for Venue Providers	5	2.7%	4	2.2%	7	3.8%	109	58.6%	25	13.4%	150
BookTia is useful for advertising vendors to the platform	4	2.2%	6	3.2%	2	1.1%	114	61.3%	24	12.9%	150
Booktia is useful for all gender	6	3.2%	3	1.6%	51	27.4%	78	41.9%	12	6.5%	150

The result questionnaire for the fourth independent variable which is usefulness. There are 5 questions for this section. For the first question, BookTia is useful for Millennials, respondents mostly 'Agree' to this statement with 107 (57.5%) responses. 12 (6.5%) stated 'Neutral', 20 (10.8%) stated 'Strongly Agree'. However, 4 (2.2%) 'Strongly Disagree' and 7 (3.8%) 'Disagree' with the statement (Tabel 6). For the second question, BookTia is useful for Venue Seekers, respondents mostly 'Agree' to this statement with 97 (52.2%) responses. About 1 (0.5%) stated 'Neutral' and 42 (22.6%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 5 (2.7%) stated 'Disagree' with the statement.For the third question, BookTia is useful for Venue Providers , respondents mostly 'Agree' to this statement with 109 (58.6%) responses. About 7 (3.8%) stated 'Neutral' and 25 (13.4%) stated 'Strongly Agree'. However, 5 (2.7%) stated 'Strongly Disagree' and 4 (2.2%) stated 'Disagree' with the statement.

For the fourth question, BookTia is useful for advertising vendors to the platform, respondents mostly 'Agree' to this statement with 114 (61.3%) responses. About 2 (1.1%) stated 'Neutral' and 24 (12.9%) stated 'Strongly Agree'. However, 2 (2.2%) stated 'Strongly Disagree' and 6 (3.2%) stated 'Disagree' with the statement.For the fifth question, Booktia is useful for all gender, respondents mostly 'Strongly Agree' to this statement with 78 (41.9%) responses. About 51 (27.4%) stated 'Neutral' and 12 (6.5%) stated 'Strongly Agree'. However, 6 (3.2%) stated 'Strongly Disagree' and 3 (1.6%) stated 'Disagree' with the statement.

Descriptive Analysis

The table-7 shows the different average score of the 150 respondents. Based on the output data. It illustrates that the minimum score of each variable which includes UAT for Booktia (1.0), content (1.0),

Table 9. BookTia descriptive

Descriptive Statistics										
	N	Min	Max	Mean		Std. Dev	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
BOOKTIA	150	1.00	5.00	3.9387	.03849	.471	-3.393	.198	19.796	.394
CONTENT	150	1.00	4.67	3.9578	.05055	.383	-3.490	.198	13.582	.394
MMEDIA	150	1.00	4.83	3.9100	.04681	.329	-2.141	.198	7.542	.394
NAVIGATION	150	1.17	5.00	3.9773	.05485	.451	-.2.349	.198	7.941	.394
USEFULNESS	150	1.00	4.80	3.9040	.04547	.310	-2.806	.198	10.027	.394
Valid N (listwise)	150									

multimedia (1.0), Navigation (1.17) and Usefulness (1.0). Whereas the maximum for variable for UAT for Booktia (5.00) content (4.67). multimedia (4.83). navigation (5) and usefulness (4.80). Meanwhile, the mean for each independent variable is explained as follows:

- UAT for Booktia is 3.9387, which means most of the respondents answer between 3 and 4 which also equals to neutral and agree, thus indicating that the respondents agreed to content statement in the survey.
- Content is 3.9578, which means most of the respondents answer between 3 and 4 which also equals to neutral and agree, thus indicating that the respondents agreed to content statement in the survey.
- Multimedia is 3.910, which means most of the respondents answer between 3 and 4 which also equals to neutral and agree, thus indicating that the respondents agreed to multimedia statement in the survey.
- Navigation is 3.9773, which means most of the respondents answer between 3 and 4 which also equals to neutral and agree, thus indicating that the respondents agreed to navigation statement in the survey.
- Usefulness is 3.9040, which means most of the respondents answer between 3 and 4 which also equals to neutral and agree, thus indicating that the respondents agreed to usefulness statement in the survey.

Hypothesis Statement

H1: *Content has a positive significant effect towards user acceptance testing*

Since there is a significant result of 0.005 whereby the content in Booktia shows a positive effect towards user acceptance testing there, hypothesis is to be accepted.

H2: *Multimedia Content has a positive significant effect towards user acceptance testing*

Since there is a significant result of 0.002 whereby the Multimedia in Booktia shows a positive effect towards user acceptance testing there, hypothesis is to be accepted

H3: *Navigation has a positive significant effect towards user acceptance testing*

Since there is a significant result of 0.001 whereby the navigation in Booktia shows a positive effect towards user acceptance testing there, hypothesis is to be accepted

H4: *Usefulness has a positive significant effect towards user acceptance testing*

Since there is a significant result of 0.000 whereby the usefulness in Booktia shows a positive effect towards user acceptance testing there, hypothesis is to be accepted

DISCUSSION

There are over 372 venue facilities in Brunei Darussalam that can be booked by venue seekers for events such as wedding reception, birthday party, graduation, anniversary, training and meeting space, self-study, working space and many others. The venue facilities derives from government owned primary and secondary schools' halls, University MPH e.g. UBD chancellor Hall, community buildings e.g. Dewan Kemsyarakatan Lambak, private halls e.g. Bridex, Maven Hives, Hotels e.g. Mulia Hotel, Rizqun Hotel and many others. The main objective of Booktia is to ease the pain for venue seekers in finding venues and at the same time to ensure they can secure and manage their booking without any disappointment. According to the survey '*how far do they agree finding a venue is time consuming*', out of 150 respondants 130 (87%) of the respondents 'Strongly agree' to this statement. This is time consuming as venue seeker need a day off (bride or groom to be specifically), to go physically to the venue providers and asking repetitive question '*how much is it*? '*whats the capacity*? And preferred an online platform to get rid of the hassle. This statement is more supported when the respondents being as '*Booktia is useful for venue seekers'*, out of 150 respondents 97 (52.2%) 'Agree' to this.

The target user (venue seekers) for this is the millennials (18 – 40) years of age. According to the result male is dominating the survey with 89 (59.3%) respondents and followed by female with 61 respondents. In terms of age range, the younger respondents are more likely to engage with booktia, with age range 18 – 24 dominating the survey with 68 respondents (45.3%). This is followed by age range 25 – 30 with 61 (40.7%). The middle (31 – 35) and the eldest millennials (36 – 40) have low participants with 14(9.3%) and 7(4.7%) respondents. According to survey to 150 respondents, the most sought events for the millennials to book a venue would definitely wedding events with 90 respondents (60%) and second goes to sports e.g., football events with 40 (26.7%). With the hassle of booking a particular venue for their respective events, 130 (87%) of the respondents would prefer to book and secure the venues with a centralized venue booking platform e.g. Booktia. The result of the correlation for the dependent variables which is User Acceptance Testing on Booktia and the four independent variables are showing aa positive relationship and significant result (0.000) to one another. Majority of the answers are in the mean of between 4 ('Agree') with the statement. This can be deduced that millennials are accepting the functionality and operational ease of use of Booktia when testing it.

Moreover, this study is focusing on 4 main independent variables which includes content, multimedia, navigation and usefulness. Some of discrepancies issue would be the Navigation, whereby the link generated by AdobeXD. The link itself provides a static landing page whereby there should be a video regarding venue facilities e.g., wedding reception content playing upon user going to the landing page. Some of secondary button are not functioning due to the platform is at 70% development when testing was conducted. The problem had to be resolved by transforming it to another system link via anima.app (An application software that transform Figma, AdobeXD, and Sketch designs to developer-friendly React and HTML code automatically). However according to the survey conducted, the Navigation (3^{rd}

independent variable) section result shows a significant value (0.001) towards the user acceptance testing on Booktia. The respondents 'Agree' that navigation is easy, clear and concise. Out of 150 respondents 105(56.5%) 'Agree' to this. 99 of respondents also 'Agree' that Links are easy to access. 98 respondents also 'Agree' that number of buttons are reasonable when testing Booktia. Despite the discrepancies occurred during UAT process, it does not affect the overall booking management system and millenials can still use the primary navigation in order to test in booking their respective venues.

However, the result of the analysis shows a satisfactory as there is a correlation between user acceptance testing and the four other main independent variables. This means that when testing the platform there are more likely to accept the content, perception and objective of Booktia to be used in near future. According to the study, user acceptance and content shows a positive Pearson correlation of 0.378 with a significant value of 0.000. This shows that all the content e.g. venue providers information, that is seen by the users are acceptable upon testing. As for user acceptance and multimedia, there is a positive Pearson correlation of 0.464 with a significant value of 0.00. This shows that all the multimedia e.g. images, 360 video, fonts size, fonts type are more likely to be accepted by millennials when testing it.

As for user acceptance and navigation, despite some discrepancies occurring, there is a positive correlation of 0.382 with a significant value 0.000. This means that all the navigations e.g., links, buttons are more likely to be accepted by the millennials upon testing it. As for user acceptance and usefulness shows a positive correlation of 0.413 with a significant value of 0.000. This means that all the usefulness e.g. to be for venue booking are more likely to be accepted by millennials when testing it. According to the survey and analysis that have been conducted Booktia is at 85% ready for execution. However, to ensure the efficiency and effectiveness of users for both venue providers and venue seekers that will be using booktia platform in the near future, it is best to only execute it at 100% completion without any discrepancies.

Implications of Study

Benefits Towards Booktia

The theoretical contribution of this study will definitely help to contribute to literature on user acceptance testing of Booktia on Millenials. Additionally, this study provides Booktia platform some assistance in providing some understanding for user perspective primarily the millennials when testing the platform. The feedback from this study do help in altering some context and features that would suit their preference that would make their booking a venue in more effective and efficient experience. As for the practical implications, this study is expected to benefit myself and my team that will be pitching our business idea (BookTia platform) to respective DST representatives in providing some hands-on practical validation to our potential Booktia users.

Benefits to Venue Providers and Venue Seekers

Once Booktia is at 100% development and have met the criteria and preference of the venue seekers, the platform will be then be given a proposal to at least 20 venue providers where by UTB MPH (under estate department) will be in the pilot list for platform execution. The platform thus will help venue seekers in finding venues for the respective events. Hence, they are no longer have to go through the hustle of finding information on the venues such as the venue rental price, the maximum capacity, the inhouse catering provided by the venue providers and all sort of facilities that brings up an event. The platform is also aimed to provide a better booking management for venue providers in ensuring they are able to engage with their respective customers in effective and efficient manner. The platform allows venue providers in to manage their booking in more effective eyes with the introduction on calendar feature to block certain dates if its necessary, payment feature to allow them in receiving booking payments and at the same time to track down any customers that are still pending to finalize their payment. According to the result, the sought-after venue in Brunei is Halls in Brunei for wedding events. Brunei Darussalam is inevitable has a rich culture primarily the wedding functions. The tradition has shifted to conducting from home-based wedding reception to private halls e.g. Bridex or Rizqun Hotel has become a trend. The survey also concluded that the trends are due to several reason such as conveniency, packaged catering services, space area, parking spaces comes becomes some of the main reason to choose private or public venues over home-based reception. However, some inefficient faced by venue seekers were lack of information as stated and in finding venues, as there is no centralized venue booking platform up to this date to do so. Hence booktia is developed.

Despite, the popular choice of booking public and private venues, the millennials also seek for other types of venues for bookings such as conference, meeting room and seminar. On a side not, Booktia platform caters all sort of venues ranging from training room to even sports venue facilities. Booktia is aimed and hoped to ease the pain for venue seekers to look for the best venues that would suit their criteria and manage their venue bookings a tip of the finger using the platform once the platform is ready to be executed.

By implementing this digitalized venue booking platform, booktia is hoped to alter the mindset of people to in using technology in managing venue booking and the same time to aspire the nation to ensure Bruneians are IR4.0 (Industrial Revolution) ready. According to the survey, millennials who already got married majority spend on average budget range of BND 10,000 – BND 20 000. The cost includes the halls booking fee, compulsory inhouse catering that imposed renting fee based on catering services. With the current statistics, based on estimation the market value for venue booking in 2019 alone was BND 15 million. Booktia is hoped to aid the country to have a fully diversify economy. With the aim to have a successful venue booking platform, booktia is hoping to engage with more or new venue providers, thus encouraging local venue providers to compete in a healthy manner, as venue providers detailed information are centralized on Booktia, thus providing heavy traffic users to venue provides to book their venues. With this will definitely benefit those venue providers that is less popular to ensure their existence are known to potential venue providers and indirectly hope to boost their revenue respectively.

In the future plan, booktia is aiming to diversify the objective to allow participating merchants as it is known to be a complimentary service whenever anyone one to conduct any events such as makeup artist, Emcee services, catering services to be integrated to Booktia platform, allowing better experience for venue seekers in conducting their events. This hopes to impose high traffic to local entrepreneurs and increase their monthly revenue. With this platform, Booktia is hoping for primarily millennials to spend in their beloved home country and support local business and entrepreneurs. With the merchant participating features as stated above, it is hoped to ease talented locals to engage in more potential customers and at the same time encouraging locals to be self-independent and get passive income. With this, it is hoped to provide job opportunities to the local and ensuring unemployment rate can be reduced, thus increasing GDP and economic growth in this country.

CONCLUSION

The main objective is to reveal the views on challenges of user when using BookTia, to book their venue for their respective venue and to understand their viewpoints for Booktia by conducting User acceptance testing to ensure it can be executed for future use. According to the result analysis. There are positive relationship for User acceptance testing to all independent variables. The analysis stated that the User Acceptance testing on booktia has a positive relation towards content and shows a significant result of 0.000. There is also a positive relation between user acceptance testing and multimedia with coefficient of .303 and a significant result of 0.005. The relation between user acceptance testing on booktia and navigation also shows positive relation and provide a significant result of 0.002. The final relation is user acceptance testing and usefulness which shows a positive relation with coefficient of 0.060 and shows a significant result of 0.000. This can be deduced that all the features that have been developed are being accepted by millennials when testing for future booking in booktia.

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