Handbook of Research on

Applying Emerging Technologies Across Multiple Disciplines

Emiliano Marchisio

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Handbook of Research on Applying Emerging Technologies Across Multiple Disciplines

Emiliano Marchisio
Giustino Fortunato University, Italy

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This work analyzes the processes of innovation and change in economic-managerial studies, starting from the prevailing literature on the subject and subsequently providing an alternative interpretation key. The chapter focuses on the role that institutions have in organizational change and innovation and on isomorphic processes. If in management studies, on the topic of innovation and change, the processes of horizontal isomorphism are more analyzed, which lead organizations to imitate the behaviors of other organizations, considered as models, in this chapter the reflection is centered on vertical isomorphic processes, which are the result of regulatory and coercive pressures.

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In recent years, digitization greatly influences the production process of enterprises. In terms of competitiveness, we are more and more aware of the advantages that the use of digital technology entails for companies. However, there is still a digital divide between companies in northern Italy and those in the south due to the geographical position, which undoubtedly penalizes these companies in terms of costs, but also due a certain delay in terms of economic growth. To overcome this gap, it is necessary to undertake a process of change through greater cooperation between companies, creating supply chains that not only embrace different sectors, but also go beyond their borders and create an increasingly global system. Exactly for this reason, it is essential to perfect the knowledge and skills of digital tools. Only in this way can SMEs in the south have the opportunity to become more competitive in terms of international trade.

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The world has welcomed digital transformation during the COVID-19 pandemic. Citizens and governments began their travel from public services to e-public services. However, there are already launched programs for e-government of digital transformation. It is a fact that the COVID-19 pandemic accelerated the adaptation of digital transformation in public services in developing countries. This study aims to present new evidence for the management of e-public services through functional service management model. In this context, Turkey is selected as a sample country based on United Nations E-Government Development Index (EGDI) results. Turkey has accelerated its digital transformation in public services for five years. In addition, the Turkish government is observed to be successful in providing and sustaining public services through digital platforms. The study focuses on determining the functional management approach to examine the working way of e-public services.

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Innovation represents a process of profound change, which can concern production models, service characteristics, or forms of interface with users. There are many necessary and effective levers to drive change, but certainly one of the most effective and available drivers is technological innovation. The difficulty of innovating in depth is even more evident in public administrations because this means changing the composition of the services and therefore of the interests that are primarily protected, which are the result of long-established processes that have taken place between the various stakeholders for some time. In public administrations, innovation can concern the internal services of the organization or of the territory governed by the organization itself and therefore the production and consumption processes of businesses and citizens. The purpose of this work is to investigate the progress of the managerial culture in the path of renewal of the Italian public administration in the transition from e-government to e-democracy, through digital reporting.

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Antoine Trad, IBISTM, France

This chapter proposes the fundaments of artificial intelligence (AI) and is the basics of the author's framework that is specialized in transformation initiatives. The proposed natural language programming (NLP) concept is supported by the author's applied holistic mathematical model (AHMM) for AI (AHMM4AI) that is the result of research on AI, business, financial, and organizational transformations using applied mathematical models. This research is based on years of cross-functional research initiatives and on an authentic and proprietary mixed research method that is supported by an authentical version of an AI search tree, which is combined with an internal heuristics motor, which is applied to requirements

NLP strategy. The proposed AHMM4AI-based NLP fundamentally functions like the human empiric decision-making process that can be compared to the behaviour-driven development methods, which are optimal for complex software engineering.

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Maria Vittoria Zammitti, Università degli Studi di Palermo, Italy

The chapter will explore issues related to the Payment Initiation Service, currently subject to Directive 2015/2366/EU (Payment Services Directive II, PSD2) and, in Italy, to the Law Decree n. 11 of January 27th, 2010. It plays a relevant part in e-commerce payments establishing a software bridge between the website of the merchant and the online banking platform of the payer's account servicing payment service provider in order to initiate internet payments on the basis of a credit transfer. The transaction involves many actors, including some new entrants into the payment service market, such as third-party providers (TTPs). The chapter will deal with the nature of relations between payment service users and payment initiation service providers as well as those between the latter and account servicing payment service providers. It will also address criteria to allocate liability when a transaction initiated through a PISP was unauthorized, non-executed, or wrongfully or lately executed.

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Ida D'Ambrosio, Giustino Fortunato University, Italy

This chapter aims to examine the issue of cryptocurrencies and to develop in particular a reflection on the possibility of counting bitcoins, which represent the best known and most widespread of the existing cryptocurrencies, among the payment instruments suitable to extinguish a pecuniary obligation, recognizing in them the function of means of payment typical of currency. The reflection moves from the crucial question of whether bitcoins are currency, reconstructing first of all the meaning of currency and its function. The research aims to conduct a cross-sectional analysis of the bitcoin system through an argumentation that highlights its potentialities and limitations.

Chapter 8
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A smart contract is a technology that allows the creation of a negotiation process capable of running independently, without human intervention. This chapter intends to frame the figure of the "smart contract" from a legal point of view. It shows that the smart contract is an advanced tool in the context of a contractual relationship. The possibility of making a smart contract "the contract" in a legal meaning opens up scenarios which have hitherto been unexplored for contract law. It is still difficult to determine to what extent current rules are adequate to govern this phenomenon. The chapter will therefore conclude with a review of the strengths and weaknesses of the smart contract technology and with some suggestions for a future smart contract law.

Chapter 9
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Chiara Garilli, University of Palermo, Italy

New technologies making use of blockchains and smart contracts have been considered an efficient and innovative way to achieve the goal of effective copyright protection in the digital market. It is impossible to deny, however, that these innovative technologies raise serious questions about their compatibility with international, European, and national legislative frameworks, at least if we compare them with the original and most widely-used blockchain model (i.e., the so-called permissionless blockchain). Indeed, permissionless blockchains create a "law-free zone" resistant to any subsequent modification and judicial intervention. In this general context, this chapter aims to analyse the pros and cons of using blockchains and smart contracts in the context of copyright. It will also attempt to investigate possible legislative solutions at the national and supranational levels aimed at encouraging the use of these innovative technologies to the extent they are compatible with the existing regulatory framework.

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Emiliano Marchisio, Giustino Fortunato University, Italy

Artificial intelligence has innumerable applications in society. Algorithms have a certain degree of autonomy in their functioning. Therefore, their "behaviour" evolves over time, and the relationship of cause and effect, as regards causation of damages, may be not linear as we believe. Results of AI activity may be unpredictable despite no flaw in design or implementation. Many proposals were made in order to adapt civil liability rules in this. The author drafts here a proposal grounded on the ideas that (1) overall benefits of artificial intelligence evolution outweigh costs deriving therefrom, so that it should be encouraged or, at least, not hindered; (2) "traditional" civil liability rules (either based on fault or strict liability) may provide a negative incentive toward such evolution, insofar as they may impose the obligation to pay redress onto producers and programmers of AI devices despite no flaw in design or implementation. He proposes, in this respect, no-fault redress schemes as an interesting and worthy regulatory strategy to this end.

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Nadia Coggiola, Independent Researcher, Italy

The aim of this chapter is to investigate the features and problems posed by the damages that may be caused by the surge of new technologies, such as drones, artificial intelligence, and robots, and the solution found to those problems using the traditional civil liability tools of liability for fault, strict liability, and compulsory insurance. Notwithstanding the theoretically possible different remedies that could be applied in these cases, the authors discover that the traditional tools of liability for fault, strict liability, and compulsory insurance are most probably the best suited for the compensation of the damages caused by the new technologies.

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Flaminia Marasà, University of Macerata, Italy

Payment services user's personal data processing between European Directive no. 2015/2366/EU on electronic payment services (PSD2) and Regulation no. 679/2016 on the processing of personal data of natural persons (GDPR). This chapter focuses on the interference and possible conflicts between digital payments and personal data protection and processing rules, identifying and addressing certain issues. In particular, the work analyses and discusses three themes: 1) the role played by banking intermediaries (PSPs) and new payment service providers (third party providers – TPPs) and their involvement in the digital payments, 2) the cases where the PSPs and TPPs can lawfully use personal data and the limits imposed on them by both regulations to the processing of data of payment service users in order to verify whether the combined provisions of these pieces of legislation effectively achieve greater protection for payment service users, 3) the issue of unlawful use of personal data and the distribution of responsibilities and liabilities between intermediaries.

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Arianna Maceratini, University of Macerata, Italy

This work proposes a necessarily partial and evolving reflection on the dynamics by which information technologies have progressively changed the definition and interaction between privacy and knowledge, focusing on crucial points from a legal point of view. The relevance of the debate that has developed in recent years, on these issues, is evidenced by numerous initiatives and measures—both European and international—which offer answers to phenomena such as the development of the internet of things and, more generally, to progress in computer science and robotics. From this perspective, uncertainties are raised concerning the necessary respect for privacy and individual dignity to be balanced with the right to inform and to be informed, as evidence of an effectively shared knowledge. The critical point of the question is, in any case, the identification of a flexible balance between freedom and constraint, considering the violation of privacy not only as a mere limitation of individual potential, but as a factor capable of undermining the core of personal freedoms.

Chapter 14
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Ubaldo Comite, Giustino Fortunato University, Italy

Our society as a whole is facing a rapid and profound transformation due to the progressive development of digital technologies. Keeping up with this "digital world" is not easy and there are many companies that risk losing competitive positions. Successful digital transformation therefore requires businesses to develop a broad range of capabilities—digital and non-digital—to support new business models. On the one hand, therefore, there is digital literacy, relating to the supervision of tools and technologies; on the other hand, digital culture, which has to do with some specific aspects: 1) critical thinking skills, 2) thoughtfulness, 3) transformative capacity, 4) enhancement of intellectual capital, 5) preparation of a

corporate policy aimed at cybersecurity. The purpose of the work is to demonstrate how the company is able to reconcile the enhancement of intellectual capital and the problems associated with cybersecurity in the context of the digital economy, demonstrating that it knows how to manage complexity.

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Karolina Mania, Jagiellonian University, Poland

This chapter discusses practical applications of emerging technologies in the context of legal services. The newly established legal technology (legal tech) industry is based on the application of IT services in the legal sector, radically changing the current nature of the lawyer's work. Importantly, the COVID-19 pandemic has significantly accelerated the digitization of individual processes and fundamental aspects of lawyers' work, contributing to the development of legal tech. The first part contains definitions and descriptions of the term 'legal technology' and some related ones, pointing out to the context of the relationship between dynamic technological development, the use of artificial intelligence, and the practice of the profession. The following sections describe the research on the current legal tech scene in Poland, based on integrative literature review. Then follows an analysis of the collected material, looking for the industry's map and an analysis of its specification.

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The Digital Resurgence of Prisons 286
Giovanni Chiola, University Federico II, Naples, Italy

The aim of this research is first of all to analyze the importance within the prison reality of the right to affectivity and sexuality of prisoners to be understood as a set of human and personal relationships intertwined with external figures, family members, but also educators, psychologists, religious, and school and university teachers. The pandemic has made it possible to show the importance of distance learning as a means of supporting, if not even replacing traditional distance learning in person. The target audience will undoubtedly have to be made up of all prisoners, regardless of the title of the crime or the circuit to which they belong in order to access specific sites. The recognition of the internet as a right may subsequently be restricted in the face of certain offences, but this is diametrically opposed to the ban on all access to the internet. The difficulty or even in many cases the impossibility of access lies in the inertia of the legislator.

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Federico Gravino, Università della Campania "Luigi Vanvitelli", Italy

Technological evolution has redefined spaces and methods of communication also within the Catholic Church. The speed of information exchange, the possibility of reaching a large number of recipients, and the absence of costs represent the advantages of online communication. The diffusion of information and communication technology (ICT) involved also the publication of canon laws and it asks about the possibility of using the internet as a way of promulgating the law. The characteristics of the network make it possible to know the text faster than the printed one and its diffusion does not meet space limits, since the published norm reaches every territory, thus becoming binding. The restrictions imposed by the COVID-19 pandemic have further favored the spread of instruments of digital communication. In this perspective, online promulgation could constitute a solution to the limits of canonical legislative governance, allowing the diffusion of legal texts, the relative knowledge, and obligation.

Chapter 18
Technology and Innovation: Considerations on Digital Religious Celebrations During and After COVID-19 321
Paolo Palumbo, Giustino Fortunato University, Italy

During the first phase of the pandemic up to today, many religious activities, particularly liturgical celebrations, have been suspended, interrupted, re-organized. Drastic measures and choices were needed, always balanced with constitutional principles. In this social and historical contest, Facebook and similar digital platforms seem to have turned into liturgical spaces. Every kind of celebration is transmitted through them: "domestic" liturgies are held, retreat houses are switching to online activities, spiritual assistance is offered through a computer screen, and so on. The scientific contribution aims to highlight the problems and issues that have come to determine and present the practices used within the confessional systems. Also, a recent research on the subject, promoted by the Giustino Fortunato University, offers reflections that can favor a better relationship between the needs of worship, pastoral, and confessional regulations on the subject of sacraments and celebrations.

Chapter 19
"Don't Google It": The Effects of Google's Ads Dominance for Users and Competitors 333
Gianluigi Passarelli, University of Vienna, Italy

Through the analysis of some recent competition authority investigations as well as conduct adopted by Google on the online advertising platform Google Ads, the chapter provides insights on some commercial practices opted for by the giants of web marketing with the purpose to deepen the future legal and market challenges. In conclusion, this study aims to contribute to the current debate and the attempt to find remedies that offer appropriate protection to advertisers and consumers as well as granting support to the lawmakers, who in turn have a duty to carefully regulate the search giant.

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Bullying is defined as an oppression, psychological or physical, repeated and continued over time, perpetuated by a person—or a group—that is more powerful against another person perceived as weaker. Three characteristics define the phenomenon of bullying: voluntariness of the behavior, repetitiveness, and imbalance between the violent and the victim. Initial studies aimed at understanding the phenomenon and defining the dynamics and roles. It is now clear that not only the victim and the bully are involved but also all the people who participate as supporters or silent spectators. There has been a worrying increase in the cyberbullying phenomenon (i.e., forms of bullying, violence, offense, and exclusion) by IT tools. The understanding of cultural-psycho-socio dynamics and suitable forms of intervention require a multi-perspective that takes into account the psychological, sociological, institutional, and legal dimensions. It is from the integration of different perspectives and several prevention tools that adequate interventions can be devised.

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Science, Technocracy, and Artificial Intelligence: An Ethical-Juridical Reflection Prompted by the Current Pandemic 379
Giovanni Tarantino, Università del Salento, Italy

The chapter reflects the relationship between the advances that new scientific discoveries allow and their consequent and necessary legal regulation. Considering the fact that science does not always offer elements of definitive clarity and certainty on the issues, the reflections of this contribution must be read in the light of the current pandemic, considering the renewed relevance of the need to place ethical limits on scientific action today in order to guide the scientist toward the common good.

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Elvira Martini, Giustino Fortunato University, Italy
Raffaele De Luca Picione, Giustino Fortunato University, Italy
Antonio Ciaschi, Giustino Fortunato University, Italy

The global phenomena of our current time requires us to reflect on the nature of borders, as one of the main human devices to organize experience in sociological, psychological, cultural, and geographic terms. With the expansion of capitalism and the globalization processes, there has been an intense phenomenon of intersections and 'insemination' between different cultural forms and previously separate. The advent and widespread diffusion of ICT contributes and accelerates transformations. Therefore, the distance no longer seems to matter much, and space has ceased to be an obstacle. Paradoxically, in this intensification of contacts and displacements, it happens that the borders, rather than being zeroed out, undergo a multiplication. Therefore, borders raise many issues and concerns. Beyond a simplistic view of separation of an 'inside' and an 'outside', borders are always both limen (threshold) and limes (demarcation); they 'write' our personal and social space; it is that line along which two people can touch (cum-finis), allowing to define an identity and/or differentiate it.

Chapter 23
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Minou Ella Mebane, Giustino Fortunato University, Italy

In Italy there is still a diffused academic distrust the e-learning can transfer academic and professional skills especially in the field of psychology. Opponents of online teaching underline that teacher physical presence represents a "modeling asse" when transferring professional competencies which are also based on nonverbal behaviors. However, as Rudestam hypothesized, the characteristics of asynchronous CSCL may compensate the lack of nonverbal cues. Recent research has made a relevant contribution in this field, showing that CSCL can be an important tool, not only to increase knowledge on psychology, but also teach professional skills. This research also reveals that collaborative learning was effective in both learning settings, even with teachers with more or less experience. Overall, these studies, though with their limits, show that in Italy, to avoid psychology slipping behind other disciplines in online learning, CSCL could be applied to transfer knowledge and professional skills and social capital in the field of psychology.

Chapter 24
Universal Design for Learning to Support Integrated Digital Teaching 425
Elena Zambianchi, Giustino Fortunato University, Italy
Stefano Miotti Scarpa, Giustino Fortunato University, Italy

With the implementation of Integrated Digital Teaching for all school orders (DM 39/2020 and DM 89/2020), learning and digitization settings can be combined with the design of frontal and remote educational actions, allowing for better accessibility and inclusion. Universal Design for Learning is a model for building products and environments accessible to anyone as widely as possible, without the need for specialized planning or adaptations. In the pedagogical field, UDL is also a methodology that can be used to promote a fully inclusive curriculum, through a new interpretation of teaching-learning processes and strategic and reasoned use of technologies. The authors believe that Universal Design for Learning can support the implementation of integrated digital teaching.

Chapter 25
Triple Helix Model: A Device for Social Construction of Knowledge and Innovation 433
Elvira Martini, Giustino Fortunato University, Italy
Raffaele De Luca Picione, Giustino Fortunato University, Italy

Knowledge is the main tool for removing the obstacles that prevent a full equality between the social actors in order to compensate forms of social and economic disadvantage. In the authors' perspective, a social fabric organized on reticular models, capable of bringing together different organizations between people, artifacts, and social institutions, represents a system intrinsically rich in opportunities, for the creation of new knowledge and technology but also for the processes of dissemination of such knowledge. They try to reflect on how the triple helix model can represent a device for social construction of knowledge and innovation.

Chapter 26
Importance of Virtual Reality (VR) Tools in the Processes of University Orientation for Technological Degrees: An Application to the Degree in Digital Business 453
Fernando García Chamizo, ESIC Business & Marketing School, ESIC University, Spain
Julio Alard Josemaría, ESIC Business & Marketing School, ESIC University, Spain
Vicente Díaz García, ESIC Business & Marketing School, ESIC University, Spain

This chapter analyses the use of the virtual reality (VR) digital tool in the processes of university orientation, especially for those degrees that have important training on technologies in their curricula. To do so, a study on pre-college students through an experience with digital tools, like the use of VR headsets, was done. After that, the students completed a questionnaire to assess this activity. A total of 3,680 satisfaction surveys were taken, before and during the COVID-19 pandemic period. The obtained data demonstrate that when the satisfaction degree increases with the activity, the rate of students who eventually choose technological degrees like Digital Business improves.

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Preface

This book is addressed to a wide target audience. First of all, academics, researchers and scholars (including PhD students) are likely to appreciate the wide and problematic approach adopted within this volume. The first scope of the following chapters is to open debate for further discussion and raise problems and issues not settled, yet. Professionals and businessmen would also find it useful insofar as several chapters also provide practical and operative suggestions, paths of action and strategies to develop organizations into future technologies and take advantage of them. Journalists and other professionals of the media could benefit from up-to-date information on several topics much relevant for society. More in general, all people interested in new technologies could profitably read this volume, to increase their knowledge of the issue, deepen connected problems and develop a systematic and rigorous approach thereto.

The importance of each of the chapter submissions requires a brief presentation of each of them. This book opens with a first set of chapters relating to management and business issues.

In their chapter on "Innovation and Change Between Entrepreneurial Action and Institutional Framework," Mastroberardino, Calabrese, Cortese and Petracca analyze the processes of innovation and change in economic-managerial studies, focusing on the role that institutions have in organizational change and innovation and on isomorphic processes, with special reference to vertical isomorphic processes, which are the result of regulatory and coercive pressures.

In the following chapter, "Concrete Benefits of Technological Innovation for Small and Medium-Sized Enterprises," Pompò studies the way digitization influences the production process of enterprises, proposing to resolve the digital divide between Italian companies undertaking a process of change through greater cooperation between companies, creating supply chains and create an increasingly global system.

New technologies also relate to public sector. Yildirim and Bostanci, in their contribution, examine "Digital Transformation in Public Services: A Review of Turkey Case During the Covid-19 Pandemic." This study aims at presenting new evidences for the management of e-public services through functional service management model and shows that Turkey has accelerated its digital transformation in public services since five years and Turkish government has successfully provided and sustained public services through digital platforms.

Comite, on his side, highlights that the difficulty of innovating in depth is particularly evident in public administrations, because it implies changing the composition of the services and therefore of the interests that are primarily protected, which are the result of long-established processes that have taken place between the various stakeholders over time. In his chapter on "I&CT in the Public Administrations: From E-Government to E-Democracy Through Digital Reporting," he investigates the progress of the managerial culture in the path of renewal of the Italian Public Administration in the transition from e-government to e-Democracy, through digital reporting.

Moving to legal issues, some traditional concepts are reviewed in order to assess whether technological advances impose (or make somehow appropriate) an adaptation of current legislation and interpretation. Contract law is discussed in the first place. Cerrato, in his chapter on "Smart Contract: Towards a New Contract Law?" examines the "smart contract" as a technology that allows to create a negotiation process capable of running independently, without human intervention and claims that it is still difficult to determine to what extent current rules are adequate to govern this phenomenon. The chapter will therefore conclude with a review of the strengths and weaknesses of the smart contract technology and with some suggestions for a future smart contract law.

Garilli, on her side, claims that blockchains and smart contracts raise serious questions about their compatibility with international, European and national legislative frameworks, at least if we compare them with the original and most widely-used blockchain model (i.e., the so-called permissionless blockchain). In her chapter, "Blockchain and Smart Contracts: New Perspectives on Copyright Protection in the Digital Single Market," she analyses pros and cons of using blockchains and smart contracts in the context of copyright and attempts to investigate possible legislative solutions at the national and supranational levels aimed at encouraging the use of these innovative technologies to the extent they are compatible with the existing regulatory framework.

Also civil liability is addressed within technological evolution. In this book the same issue is deal with in two different chapters, where the authors take the opposite view and create a fruitful and interesting debate. Coggiola, in her chapter on "Old Rules for New Tools: Traditional Liability Rules and Technological Development," argues that, notwithstanding the theoretically possible different remedies that could be applied, traditional tools of liability for fault, strict liability and compulsory insurance are most probably the best suited for the compensation of the damages caused by the new technologies.

In his chapter on "Artificial Intelligence and Redress for Damages: Fault, Strict Liability, Mandatory Insurance, Legal Personality, or No-Fault Schemes?" Marchisio, taking a different approach, claims that algorithms' "behaviour" may evolve over time and the relationship of cause and effect, as regards causation of damages, may be not linear as we are used to believe. Since results of AI activity may be unpredictable despite no flaw in design or implementation, he supports adoption of no-fault schemes to provide redress to damaged users, since "traditional" civil liability rules (either based on fault or strict liability) may provide a negative incentive toward technological evolution, insofar as they may impose the obligation to pay redress onto producers and programmers of AI devices despite no flaw in design or implementation.

The three following chapters examine the way new technologies relate to payment services. In the first one, Zammitti explores issues related to the Payment Initiation Service, currently subject to Directive 2015/2366/EU (Payment Services Directive II, PSD2) and, in Italy, to the Law Decree n. 11 of January 27th, 2010. This chapter, named "New Frontiers in Payment Services: The Payment Initiation Service in the Directive 2015/2366/EU," deals with the nature of relations between payment service users and payment initiation service providers; as well as those between the latter and account servicing payment service providers. Criteria to allocate liability when a transaction initiated through a PISP was unauthorized, non-executed, wrongfully or lately executed are also addressed.

In the second one, "Are Bitcoins the New Payment Tools Suitable for Extinguishing a Pecuniary Obligation?" D'Ambrosio examines the issue of whether bitcoins may be considered "currency", reconstructing first of all the meaning of currency and its function. The research aims to conduct a cross-sectional analysis of the bitcoin system through an argumentation that highlights its potentialities and limitations.

In the third one, Marasà adopts an institutional approach to the issue and examines "Open Banking and Privacy: Users' Personal Data and Payment Service Providers' Liability." More in particular, she focuses on the interference and possible conflicts between digital payments and personal data protection and processing rules, identifying and addressing certain issues. In particular, the work analyses and discusses the role played by banking intermediaries and new payment service providers; the cases where PSPS and TPPS can lawfully use personal data and the limits imposed thereafter; unlawful use of personal data and the allocation of liability between intermediaries.

Several other chapters relate to various legal issues. Maceratini presents a chapter on "New Technologies and Privacy: Some Reflections on Subjects, Legal Categories, and Evolving Rights," where she reflects on interaction between privacy and knowledge. She highlights that respect for privacy and individual dignity needs be balanced with the right to inform and to be informed and proposes a flexible balance between freedom and constraint, considering the violation of privacy not only as a mere limitation of individual potential, but as a factor capable of undermining the core of personal freedoms.

Comite fears that many companies may not keep up with the progressive development of digital technologies and recalls what is required for successful digital transformation: critical thinking skills; thoughtfulness; transformative capacity; enhancement of intellectual capital; preparation of a corporate policy aimed at cybersecurity. The purpose of his chapter, named "Companies in the Digital Economy Between the Enhancement of Intellectual Capital and Cybersecurity Problems," is to demonstrate how companies are able to reconcile the enhancement of intellectual capital and the problems associated with cybersecurity in the context of the digital economy.

Mania discusses, in her "Legal Technology: The New Face of Legal Practice – Polish Perspective," practical applications of emerging technologies in the context of legal services. She points out that the newly established legal technology (legal tech) industry is radically changing the current nature of the lawyer's work and describes the current legal tech scene in Poland, based on integrative literature review.

Tarantino moves analysis into ethics and reflects on the relationship between the advances that new scientific discoveries allow and their consequent and necessary legal regulation. In his chapter, "Science, Technocracy, and Artificial Intelligence: An Ethical-Legal Reflection Prompted by the Current Pandemic," he considers the fact that science does not always offer elements of definitive clarity and certainty on the issues and builds on the renewed relevance of placing ethical limits on scientific action today, in order to guide the scientist towards the common good.

Gravino highlights that technological evolution has redefined spaces and methods of communication also within the Catholic Church and in his chapter on "Ecclesiastical Laws and Digital Publishing: The New Frontiers of Promulgation in Canon Law" questions whether Internet may be used as a way of promulgating legislation.

Remaining within the boundaries of ecclesiastical law, Palumbo presents a chapter on "Technology and Innovation: Considerations on Digital Religious Celebrations During and After COVID-19." He notes that during the first phase of the pandemic, many religious activities, particularly liturgical celebrations have been suspended, interrupted, re-organized. Facebook and similar digital platforms seem to have turned into liturgical spaces. The chapter aims at highlighting the problems and issues that have come to determine and present the practices used within the confessional systems.

The legal section of the book ends with two chapters, dedicated to specific issues. Passarelli contributes with a chapter named " 'Don't Google It' The Effects of Google's Ads Dominance for Users and Competitors," where he provides insights on some commercial practices opted for by the giants of web marketing with the purpose to deepen the future legal and market challenges. He contributes to the current

debate and the attempt to find remedies that offer appropriate protection to advertisers and consumers as well as granting support to the lawmakers, who in turn have a duty to carefully regulate the search giant.

The chapter on "Bullying and Cyber-Bullying: A Dialogue Between Psychology, Sociology, and Law to Understand and to Counteract the Youth Violence" has to do with bullying, that is defined as an oppression, psychological or physical, repeated and continued over time, perpetuated by a person - or a group - that is more powerful against another person perceived as weaker. The Authors suggest that not only the victim and the bully are involved in these dynamics but also all the people who participate as supporters or silent spectators. Their analysis aims at examining this problem in the cyber-context.

Chiola, on his side, deals with "The Digital Resurgence of Prisons." This chapter builds on the importance, within prison life, of the right to affectivity and sexuality of prisoners, to be understood as a set of human and personal relationships intertwined with external figures, family members but also educators, psychologists, religious and school and university teachers. In this view, he examines that recognition of the Internet as a right may be restricted in the face of certain offences, but this is diametrically opposed to the ban on all access to the Internet.

The book ends with six chapters relating to various disciplines, which ideally integrate and complete the overview on application of emerging technologies across multiple disciplines. Martini, De Luca Picione and Ciaschi present a chapter on "The Border: Between Hybridization and Separation." They reflect on the nature of borders, as one of main human device to organize experience in sociological, psychological, cultural and geographic terms. They highlight how the advent and widespread diffusion of ICT contributes and accelerates transformations. Therefore, the distance no longer seems to matter much and space has ceased to be an obstacle. Paradoxically, in this intensification of contacts and displacements it happens that the borders, rather than being zeroed out, undergo a multiplication. Therefore, it is discussed how borders arise many issues and concerns.

Mebane contrasts the diffused academic distrust the e-learning can transfer academic and professional skills especially in the field of psychology. Based on recent research, in her chapter "Computer-Supported Collaborative Learning and Psychology: An Option for the Future?" she claims that CSCL can be an important tool, not only to increase knowledge on psychology, but also teach professional skills. This research also reveals that collaborative learning was effective in both learning settings, even with teachers with more or less experience.

Zambianchi and Scarpa contribute to the volume with a chapter on "Universal Design for Learning to Support Integrated Digital Teaching." They observe how learning and digitization settings can be combined with the design of frontal and remote educational actions, allowing for better accessibility and inclusion. In pedagogical field, they note, UDL is also a methodology that can be used to promote a fully inclusive curriculum, through a new interpretation of teaching-learning processes and strategic and reasoned use of technologies. The authors believe that Universal Design for Learning can support the implementation of integrated digital teaching.

Martini and De Luca Picione identify the key factors of knowledge society as knowledge and creativity; so, the formation of human and social capital becomes the most powerful investment to produce value and respond to the challenges of global competition. In their chapter on "Triple Helix Model: A Device for Social Construction of Knowledge and Innovation," they claim that reticular models, capable of bringing together different organizations between people, artifacts and social institutions, represent a system intrinsically rich in opportunities, for the creation of new knowledge and technology but also for the processes of dissemination of such knowledge. In particular, they build their reflection on how the Triple Helix Model can represent a device for social construction ok knowledge and innovation.

Chamizo, Josemaria and Garcia analyse the use of the virtual reality (VR) digital tool in the processes of university orientation, especially for those degrees that have an important training on technologies in their curricula. Their research is presented in their chapter named "Importance of Virtual Reality (VR) Tools in the Processes of University Orientation for Technological Degrees: An Application to the Degree in Digital Business." The obtained data point out to demonstrate that when the satisfaction degree increases with the activity, the rate of students who eventually choose technological degrees like Digital Business improves.

Conclusively, it is likely that this book will bring an impact on the field of new technologies and contributes to the subject matter by raising problems, ideas and proposals for future regulation, exploitation, and research.

Section 1

Chapter 1
Innovation and Change Between Entrepreneurial Action and Institutional Framework

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ABSTRACT

This work analyzes the processes of innovation and change in economic-managerial studies, starting from the prevailing literature on the subject and subsequently providing an alternative interpretation key. The chapter focuses on the role that institutions have in organizational change and innovation and on isomorphic processes. If in management studies, on the topic of innovation and change, the processes of horizontal isomorphism are more analyzed, which lead organizations to imitate the behaviors of other organizations, considered as models, in this chapter the reflection is centered on vertical isomorphic processes, which are the result of regulatory and coercive pressures.

INTRODUCTION

Innovation is an ever-current topic in the managerial, political, social, and economic debate and finds its natural place in the broader reflections on the theme of *change*. What are the processes through which it starts, develops, accelerates, or slows down? What are the links between innovation and those that

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precede/follow it? Research has proposed numerous hypotheses about the dynamics of innovative processes to provide "understanding" schemes—or "explaining" models—of the emergence and spread of the new (Davies, 1979; Rogers, 1983; Von Hippel, 1990; Rosenberg, 1991). From the literature analysis emerges an overall vision of enlightenment and neo-positivist matrix, which associates to the theme of innovation those of scientific discovery, technical efficiency, and social progress and reconnects these "values" to "strong" archetypes of individual and collective rationality.

This chapter aims, far from exhaustively reviewing the extensive literature produced in the economic-business disciplines, to represent a synoptic framework functional to understanding some central issues, a helpful premise for presenting a different interpretative framework. Among the different perspectives of investigation, this work focuses on institutional analysis in organizational studies, with particular reference to the neo-institutional, marking a clear epistemological distance from the settings of strong rationality, both individual and systemic, placing at the center the understanding of the institutional environment (norms, customs, organizations, institutions). Between the social atom—the individual, unicum of analysis in the micro perspective of methodological individualism—and society as a whole—object of the macro analysis of systemic-collectivist approaches—the institutional approach interposes a meso-level filter, an intermediate lens through which to unravel the tangle of "material and symbolic conditioning that institutions exercise on human behavior" (Bonazzi, 2000, p. VII). Archetypes based on pure forms of rationality and integrated, coherent visions of organizations give way to weaker visions, with fewer "claims of knowledge" (Hayek, 1997), focusing on the complex interactional dynamics between a multiplicity of actors operating in concrete fields of action. New elements—institutional processes and power dynamics—contribute to stage a different epistemological option, identifiable as situationist, of innovation and business (Mastroberardino, 2006, 2010).

This chapter, contributing to the debate on innovation and organizational change processes, aims to propose the "situationist" approach, an alternative view to the prevailing that considers these processes animated by systemic rationality aspiring to justify linearity that is, in practice, plentiful naive. This chapter compares two paradigms providing a different view of the innovation: the political and neo-micro-institutional. The idea is to revisit the concept of innovation from immanent and, too often, simplified, attended by some actors who do not always link it to internal efficiency of effectiveness logic. On the contrary, it may result from decisions to legitimize the organization within the institutions and other key players operating in an "organizational field."

The situationist view can be seen as an element of originality since it suggests being aware of the political aspects (power) and the processes aiming to gain legitimation. Although this chapter is focused on a theoretical conceptualization, the lack of an empirical study can be seen as the main limitation of the work. The different insight into innovation processes allows us to increase the number of organizational and decision-making patterns with schemes and models focused on negotiation-based strategies. Moreover, acknowledging cognitive constructs, such as isomorphism and rationalizing myths, paves the way for a less naive approach to organizational dynamics that animate, in practice, innovation processes.

INNOVATION IN ECONOMIC-MANAGERIAL STUDIES

Focusing on the theme of innovation, the chapter focuses on a) nature and forms of innovation; b) dynamics of innovation and its diffusion.

In ontological terms, innovation—in its technical, technological, or scientific declination (Polanyi, 1967; Vaccà, 1989; Nonaka, 1991; Rullani, 1993, 2004)—is understood as the industrial application of "inventions." The distinction between the broader category of inventions and the narrower one of innovations can be traced back to the degree of diffusion of the new, to its commercial and social success (Schumpeter, 1971; Cafferata, 1995).

A further reflection area has developed around the forms that characterize the "new." In this way, innumerable classification schemes have come to light, starting with Schumpeter's (1971) first contribution, distinguishing five ideal-typical forms: product, process, commercial, procurement, and industrial. The Schumpeterian typology was then enriched by including, on the one hand, the forms of innovation concerning the intangible assets of the company; on the other, those generated by reticular models (Warglien, 1990; Malerba, 2000; Rullani, 2004). A different strand, referring to business activities for which innovation produces its "prevailing" effects, distinguishes between administrative, organizational, and managerial innovations and technological, product, and process innovations (Puddu, 1980; Corticelli, 1992). Further contributions focused on the innovation gradient concerning the reference framework, a paradigm placed on a more restricted (technical-technological, Panati, Golinelli, 1989, p. 221) or broader (economic-industrial and social, Freeman, 1988) level. Thus, innovations have been distinguished between incremental, radical, new technological systems, and new technical-economic (Davies, 1979; Dosi, 1984; Henderson, Clark, 1990).

As for the dynamics of innovation and its diffusion, in the face of the substantial void left on the point by the classical and neoclassical paradigms (Di Bernardo, Rullani, 1990; Paoli, 1992), a complete theory of innovation can be found in the Schumpeterian vision of creative destruction (Schumpeter, 1971, 1977), which connects the micro level to the macro level. On the one hand, the innovative entrepreneurial action that spreads between first movers and followers, on the other hand, general economic development as an effect—only partly intentional—of the aggregation of individual shares (Boudon, 1985; Hayek, 1997). Moreover, Schumpeter (1984), in analyzing the effects of oligopolistic capitalism, points out that it is not innovation that allows extra profits but, conversely, it is the accumulation of profits, the result of growing industrial concentration, to generate innovation based not on the action of the individual entrepreneur but on the R&D investment programs of big corporations.

It is precisely on this causal link between R&D and innovation that the technology-push view has been grafted since the 1940s: scientific discoveries ® technological/technical innovations ® economic progress (Arrow, 1962). Therefore, the primary causal factor is scientific knowledge: "*This essential, new knowledge can be obtained only through basic scientific research*" (Bush, 1945, p. 5). Despite the copious criticisms, this scheme is still the conceptual architrave of innovation that supports policies.

From the 1960s, new perspectives emerge. First of all, the demand-pull view (Schmookler, 1966; Scherer, 1982) states that scientific, technological, and technical progress is a creative potential, a necessary but not sufficient condition. Innovation, therefore, is not a self-propulsive process but is demand-pull: without a demand to satisfy, there is no self-propulsion. Subsequent approaches (coupling model; integrated model; system integration and networking model) highlight the existence of multiple interactions, interdependencies, self-reinforcing and self-correcting cycles (Rothwell, 1994), paving the way for further reflections including social dynamics, cultural and institutional in the analysis of innovation.

CHANGE: THE MAIN RESEARCH TRADITIONS

Expanding the focus from the category of innovation to change, it is stimulating to retrace the reflections of scholars in defining the "spaces" in which organizations operate and change. The main trajectories present in the literature on change have been traced back to the following three.

First of all, *theoretical perspectives focused on the organization*. The contributions of the *Resource-Based View* (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) can be included in this group, according to which organizational change is aimed at the search for new valuable resources and their combinations to achieve/implement/maintain dynamic capabilities (Rumelt, 1984). *Behavioral Theory* (March, Simon, 1958; Cyert, March, 1963; March, Olsen, 1976) can also be placed here, which qualifies organizations from the coalition point of view and sees change as a continuous process of routine construction and deconstruction (Nelson, Winter, 1982) between internal dynamics of power and external competitiveness. The *Punctuated Equilibrium Theory* (Utterback, Abernaty, 1975; Tushman, Romanelli, 1994), according to which long phases of continuity, of programmed incremental changes, are interrupted by short—but intense—degrees of discontinuity, of radical changes. Finally, the *Strategic Choice*, according to which management guides organizational change (Marris, 1963; Baumol, 1968; Miles, Snow, 1978).

A second research tradition includes theories that focus on the relationships between the organization and its *task environment*. First of all, the industrial economy places at its center sectoral analysis, starting from the *structure-conduct-performance* paradigm (Bain, 1959) up to Porter's contributions to competitive analysis (1985). The change is interpreted as a strategic action for repositioning the task environment. The *Economics of Transaction Costs* (Coase, 1937; Williamson, 1975), the *Contingency Theory* (Burns, Stalker, 1961; Chandler, 1962; Lawrence, Lorsch, 1967; Zajac et al., 2000), and the *Resource Dependence Theory* (Pfeffer, Salancik, 1978) are included in this framework.

The third and more recent research tradition focuses on the relationships between organizations and the *institutional environment* rather than on the individual organization. This includes the *Population Ecology Theory* (Aldrich, Pfeffer, 1976; Hannan, Freeman, 1977) and the *Neo-institutionalist approaches* (Meyer, Rowan, 1977; DiMaggio, 1977; DiMaggio, Powell, 1983). The first excludes change from intentional strategies and interprets it as a deterministic, supra-organizational process of natural selection. The focus is on "organizational populations:" no intentional change at the level of a single organization is possible as these are victims of powerful internal structural inertia (routines, procedures, cliques of power) and external (technology, institutions, culture).

INNOVATION AND CHANGE: AN ALTERNATIVE POINT OF VIEW

This paragraph intends to briefly provide the theoretical frame adopted in this work for innovation and change.

The epistemological matrix used is the situationist one (Sparti, 2002; Berger, Luckmann, 1969; Garfinkel, 1967) which emphasizes the concrete contexts of interaction and the role of actors in the continuous creation of the observed social reality. In this framework, the focus is represented by organizational "change," a continuous process that a *pro-tempore* dominant coalition, according to its preferences, tries to direct towards a specific state.

The topic finds its declination between the political approach and the neo-institutionalist approach on a theoretical level. The first (Crozier, Friedberg, 1978; Pfeffer, 1981; Friedberg, 1994; Crespi, 1999)

is based on the vision of a society populated by actors, individual and/or collective, bearers of particular interests, who interact strategically, between cooperation and conflict, to achieve their goals. The continuous power play searching for better/greater space for maneuver returns an institutional framework, in force *pro-tempore*, never definitive and stable, resulting from negotiation between different interests.

The analysis of the processes of change in this framework appears inextricably linked to the strategies of the different actors, to the power relations created between them, albeit within limits placed on their freedom by the institutional framework defined by the negotiation.

This micro perspective is approached by the neo-institutionalist vision (Meyer, Rowan, 2000; Zucker, 2000; DiMaggio, Powell, 2000), according to which the actors operate in an institutional framework, bearer of norms, rules, practices, and constraints, which carries out a standardization, training, and control actions on them. The actors conform their behavior to these conditions to obtain legitimacy, starting isomorphic processes.

The synthesis of the two —action and institutionalization (Mastroberardino, 2006; 2011; Mastroberardino et al., 2010)—allows us to read "change" as the ongoing process of construction, deconstruction, and reconstruction of the institutional framework—at the same time produced by the actors and constraint on their actions—and "innovation" as a stabilized *pro-tempore* structure, where "*stabilization is never definitive: tensions towards its maintenance its overcoming in favor of a different structure*" (Mastroberardino, 2011, p.155). At the same time, the actors are influenced by the institutions which define their space for maneuver with regulation and formalization; the actors, in such constraints, articulate and implement their strategies based on the satisfaction of their interests.

Therefore, change can be described, albeit only for explanatory purposes, as a synthesis of two processes: "vertical isomorphic processes," which emphasize the role of institutions and the relative pressures on collective actors; "horizontal isomorphic processes" which guide organizations to adopt homogeneous conduct, conforming themselves, and at the same time to strengthen the structuring/destructuring of the rules.

INNOVATION AND VERTICAL ISOMORPHISM, BETWEEN INSTITUTIONAL PRESSURES, AND RECOVERY OF MANEUVER SPACE

The reflections on vertical isomorphism find their roots in one of the first essays on neo-institutionalism. In a society densely populated by institutions, *"organizations are driven to incorporate the practices and procedures defined by prevailing rationalized concepts of organizational work and institutionalized in society. Organizations that do so increase their legitimacy and their survival prospects, independent of the immediate efficacy of the acquired practices and procedures*" (Meyer, Rowan, 1977, p.340).

Indeed, the neo-institutionalist perspective, focusing on the material and symbolic conditioning that institutions place on individuals and organizations, place isomorphisms at the center of its analysis. Actors seeking legitimation tend to resemble each other and adhere to institutionalized rules, often regardless of their immediate effectiveness.

It is appropriate to specify that:

- "Institutionalized rules" are classifications constructed within society as shared typification or interpretations (Berger, Luckmann, 1969). For example, norms, moral principles, codes of conduct, procedures, and conventions;

- The "search for legitimacy" leads organizations to obey the pressures of the institutional environment to demonstrate that they act appropriately and adequately for purposes positively evaluated by the community (Dowling, Pfeffer, 1975; Meyer, Rowan, 2000)
- Institutional isomorphic processes occur "*regardless of the immediate effectiveness*" of the rules or without any evidence that they increase internal and external organizational efficiency. Not infrequently, organizations searching for legitimacy make efforts in conflict with the needs of efficiency: for example, cutting-edge technology provides prestige to hospitals but can represent an excessive cost for the immediate production (Meyer, Rowan, 2000).

There are areas of organizational management (environment, quality, social responsibility, managerial and operational practices, information technology) concerning the existing regulatory apparatus that produces pressures capable of orienting the behavior of the actors. The latter decides to "respond" to these conditions, thus avoiding compromising their legitimacy, regardless of their evaluation. However, it is indisputable that the organization benefits from isomorphism: looking at competitive and institutional dynamics, greater compliance can facilitate relations with other organizations, increase the chances of attracting highly motivated personnel and allow the obtaining of funding (DiMaggio, Powell, 2000); looking at intra-organizational relationships, isomorphism reduces internal disorder, as conforming to legitimate rules also resolves the internal conflict on the objectives of the organization, maintaining the stability of the *pro-tempore* dominant coalition.

Some concepts specific to the neo-institutionalist theory will be mentioned below (types of pressures or institutionalized rules, methods of dissemination, and degree of institutionalization), which are functional to the understanding of the institutional framework; at a later stage, some reflections on the role of the strategic actor in such a defined institutional framework will be proposed.

Origin of Institutionalized Rules, their Diffusion, and Degree of Institutionalization

The institutional pressures referred to in this paragraph, despite the awareness of the difficulty of isolating the single influence and the indissoluble and circular link between them, refer to "coercive" and "normative" isomorphism (DiMaggio, Powell, 2000).

The first derives from the formal and informal pressures exerted on organizations by other organizations considered influential: these pressures are perceived by the actors as impositions, manifestations of force, attempts at persuasion. On the other hand, normative isomorphism is linked to professionalization and the role that the latter has in the institutionalization of rules: formal education creates professionals for a given position, "interchangeable" in their way of thinking, acting, and schemes to be respected.

The search for legitimacy is the basis of the homogenization process for both types of institutional isomorphism. In the first case, it seems evident that the failure of some organizations to comply with the imperatives of the environment would mean self-exclusion from the competitive context—for example, the use of new technologies for pollution control or workplace safety. In the second case, to appear professional, the actors are called to conform their behavior to institutionalized rules that produce a normative and symbolic framework for the category. Conforming to this framework makes the "rational" actors, legitimizing their actions; conversely, adopting a behavior that can be labeled as "deviant", creates the conditions for the failure of oneself and the organization. The membership of managers in professional

associations is undoubtedly the cause of the propagation of legitimate practices, but not necessarily effective (Ghoshal, 2005).

However, the first neo-institutionalists did not only provide a classification of institutional pressures but also took care to study the transmission of rules in the organization's network of relations. The reasons are identified by Meyer and Rowan in the "rational myths" and by Powell and DiMaggio in the "organizational fields."

Rationalized myths are carriers of socially approved beliefs and practices because they are considered rationally effective or legal. The affirmation of a myth creates fields of rationalized activity in which new formal organizations are born to satisfy needs fueled by that myth. For example, the professions, which rise to rationalized myths as they are believed to control a series of behaviors and effects, through role prescriptions and expectations of society, or the various institutionalized technologies—production procedures, accounting, personnel selection, or data processing—they have become binding myths for organizations (Meyer, Rowan, 2000) and a tool for external evaluation of their performance.

The spread of myths occurs by relapse: if the company has to adopt certain technologies, it is essential to train people for this purpose; training, in a vicious circle, leads companies to organize themselves according to institutionalized rules; the control of specific institutionalized rules requires the law to intervene on them, and so on. The adoption of a certification (i.e., environmental or quality) is a classic example of a rationalized myth: the organization sets up a formal structure, more or less dissociated from actual activities, in response to institutional pressures, to offer an image of rational and legitimate management (this is the case of the decoupling phenomenon). From this point of view, the search for legitimacy is linked to coercive isomorphism. Regarding the indissoluble link between the various types of institutional pressures, Reverdy (2005) underlines that the diffusion of environmental certifications can also be assimilated to mechanisms of mimetic and normative isomorphism: standardization is adopted in a context of uncertainty to communicate and affirm their legitimacy with the public and why the professional categories in which they operate act in the same way.

If for Meyer and Rowan it is rationalized myths that generate isomorphism, for Powell and DiMaggio (2000, p. 145), the reason for homogenization is to be found in the "organizational fields," defined as "*those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products.*" All the players who contribute indirectly to defining specific standards in technology, research, and development of new products, human resources management, and personnel policy are part of the organizational fields.

During the initial phases of the life-cycle of an organizational field, organizations are heterogeneous. However, once they have become structured in an effective field (also through the action of competition, the state, or the professions), a set of forces is generated which they lead to become more and more similar and to adopt the same innovations (mimetic isomorphism, DiMaggio, Powell, 2000).

For myths as well as for organizational fields, the dependence of one organization on another, in terms of legitimacy, resources, and skills, affects the homogenization process: for example, accounting rules, dependence on suppliers, or trust on academic credentials in the choice of managers (DiMaggio, Powell, 2000).

Concluding this quick and non-exhaustive review of the fundamental concepts of isomorphism from a neo-institutionalist perspective, a further reflection has to be edicated to the effect of institutional pressures on organizations. This effect depends on the degree of institutionalization of the rule. Zucker (2000) argues in this regard that institutionalization processes are endowed with different strengths in

preserving and transmitting specific cultural contents: the more an institutionalized act presents itself with a high degree of formality and solemnity, the more effective and lasting the transmission of its cultural contents will be, and less freedom will be left to the subjects in breaking and reconstructing the framework of rules and norms. The exogenous shocks that interrupt the reproduction process of institutionalized models, opening up to change, can be identified as opportunities to be exploited to recover maneuver space by the actor. Therefore, it is possible to affirm that the margins of intervention on the institutional framework are a function of the degree of "cultural persistence." This means that some organizations respond to external pressures faster than others, becoming homogeneous more quickly, while others change only after a long period of resistance.

Vertical Isomorphism and Strategic Behavior in Innovation Processes

At this point in the discussion, it is possible to embrace the meaning of "organizational innovation" as a conception of new rules or expression of the same rules in a different context (Burns, Dietz, 1992).

According to the theoretical framework adopted in this work, which sees actors, individual or collective, operate strategically for the recovery of maneuver spaces aimed at the creation and appropriation of value, albeit within the constraints of a *pro-tempore* institutional framework temporarily defined, it is possible to argue that the dominant coalition of the firm:

- "Chooses" to comply and/or in any case "responds" to institutional pressures in a different way;
- "Select" the institutional pressures to respond to;
- "Adopts deviant behavior" aimed at the deinstitutionalization of the rules and the reconstruction of the institutional framework, when it sees opportunities to be exploited or threats from which to defend itself.

The institutional framework results from power games, negotiating, and lobbying activities of *pro-tempore* dominant actors who work to satisfy their own interests. However, the same framework also becomes a constraint for the other actors who act in it. There is no doubt that there are actors interested in maintaining the *status quo*, who will strategically conform to its pressures, and others who will put up resistance to it, working, even strategically, and recovering maneuver space for its rupture and reconstruction.

However, the behavior of organizations is not resolved in conforming or not. In search of legitimacy, the *pro-tempore* dominant coalition of an organization reacts to institutional pressures in a more or less reactive or proactive way according to its interests, opportunities glimpsed or threats perceived.

Oliver (1991) classifies the organization's strategic responses to external pressures, ranging from compliance to compromise, from invalidation to resistance, to manipulation. Passive compliance is therefore only one of the possible responses of organizations to institutional requests. When institutional pressures conflict with their own interests, the organization can respond with:

- Compromise, aimed at reducing requests or modifying them;
- Invalidation, or an attitude through which organizations try to escape or, in some cases, openly reject pressure;
- Active resistance, which presents itself as the strategy most of all breaking with institutional norms and expectations and in any case aimed at their change;

- Manipulation, which is the most active response to institutional pressures, as it is opportunistically aimed at controlling the institutions.

Another aspect to underlie is that an organization can be subjected to a series of pressures, even in conflict with each other. It is the same institutionalized environments that produce extremely inconsistent myths. In the writer's opinion, the *pro-tempore* dominant coalition will strategically choose to comply with one rule rather than another based on the pursuit of its objectives.

Finally, even when the institutional norms appear fixed and almost natural, the emergence of deviant local behaviors can be observed, conveyed through coalitional dynamics that give rise to political processes of re-discussion of the institutional framework (Mastroberardino, 2011), providing nourishment to the trajectories of change of some actors. The adoption of a non-isomorphic behavior is always driven by the search for improvement of one's position. This attitude generates confrontation and conflict between the various actors; this situation can only converge towards negotiation processes at the basis of the dynamics of rupture and reconstruction of the reference framework.

In this regard, it should be emphasized that even if the actors' actions are intentional, the obtained effects are not always the desired ones. Change is, in fact, a process that cannot be determined or planned but is the result of particular circumstances, power games, adjustments, compromises, and negotiations.

EMPIRICAL RESEARCH PERSPECTIVES: AN EXEMPLIFICATION

This paragraph proposes some methodological reflections to analyze the institutional pressures on organizations.

As for the vertical processes that lead the organization to change and innovation, this section deepens the coercive and normative isomorphism (DiMaggio and Powell, 1983). As detailed in the previous paragraphs, the coercive isomorphism is the result of external pressures, both formal and informal, exerted by the government, by regulatory bodies, or by other agencies to adopt the structures or systems they prefer; the normative isomorphism, otherwise, describes the effect of the spread of professional standards on organizational characteristics, emphasizing on how organizations conform to these standards by adopting practices legitimized by relevant professional groups.

The diffusion of certifications deriving from ISO standards is a phenomenon rich in references to these types of isomorphism. Below, referring to the standards for the quality management of processes (ISO 9001), a methodological reflection will be proposed to analyze the phenomenon.

The ISO 9001 standards are the international standard for the quality management of processes of any organization, of any sector and size. They aim to pursue customer satisfaction, improve the effectiveness and efficiency of internal processes, and increase the competitiveness of organizations on the market. These standards allow the company to guide the processes' organization and management and constitute a reference for performance evaluation.

In brief, the ISO 9001 standard is a management tool based on the systematization and formalization of work to achieve the satisfaction of an internal and external customer. To get ISO 9001 certification is necessary to document what to do and check how it is done. The adoption of this type of standard is voluntary, even if in some sectors its application constitutes a "*de facto*" obligation (i.e., construction, automotive, energy, and telecommunications).

Table 1. Analysis grid for the institutional pressure for the diffusion of ISO 9001certifications

	Coercive pressures	Normative pressures
Secondary stakeholder	• Political system • Credit system • Economic system • Consumers associations	• ISO, EN, UNI • Professional organizations • Universities and scientific institutions
Primary stakeholder	• Customers • Competitors	

Source: (Personal development)

The ISO 9001 standards, in addition to being a model for the quality management of processes, are also a path that organizations follow to seek and/or strengthen their legitimacy with stakeholders. In fact, ISO certification is also a means of promoting their image, and organizations adopt it for two reasons:

- To achieve organizational efficiency: the implementation of the quality control system proposed by the ISO 9001 standards should help the company to make its production system more effective, leading it to achieve greater organization and transparency in its procedures;
- To obtain legitimacy in the organizational field: the right to use the ISO mark, guaranteed by the certification, provides the certified organization with legitimacy in the organizational field in which it operates, allowing it to improve its image.

The standard can be adopted due to pressures of external nature, not modeled by rationality and utility but bound by "rules," conventions, and shared values aimed at orienting the reference sector towards greater "stability" in a context of extreme uncertainty. Compliance with specific institutional rules creates structural similarities between the different realities and makes management practices increasingly similar or even "standardized."

The following table proposes an analysis grid to study the diffusion of ISO 9001 certifications, which aims to identify the main stakeholders participating in this process and the work of these actors to construct the institutional framework *pro-tempore* in force.

Looking at the coercive pressures, undoubtedly, the company's macro-environment has its role in disseminating regulations. Just by way of example, the pression of consumer associations, in terms of protection, on companies to adopt specific quality standards, or the recognition by the credit system of the certification as a guaranteed requirement in the relationship with the customer; in the competitive environment, especially in supply chain relations, not conforming to specific rules or requirements, can impact on the dynamics of the business and on its ability to create value.

Concerning normative pressures, the reference certainly goes to the bodies that deal with quality standardization, for example, the ISO, EN, UNI bodies, but also to professional organizations and universities and scientific institutions that train professionals who operate according to schemes, which adapt their behavior to institutionalized rules for the category, thus legitimizing their work.

If, on the one hand, organizations such as ISO become critical players in defining the framework for isomorphic processes, on the other, all the actors who suffer these pressures and who adapt to them to obtain legitimacy work to modify the constraints which they are subjected to.

However, it should be noted that the possession of ISO certification only provides information on the existence of a system that complies with specific standards. Still, it tells us nothing about the effective functioning of this system and the quality assurance of the processes. This introduces another concept, the decoupling, which happens when the adoption of ISO standards occurs only to acquire legitimacy in the organizational field and not as a driver for improving organizational efficiency. In this case, the goal is to obtain the certification with the least possible effort, making minor changes to the organizational structure and only superficially adopting the procedures proposed by the standard. In some cases, it arrives at the phenomenon of "window dressing," "dressing" the "windows" to demonstrate compliance with the regulations, minimizing the necessary investments.

CONCLUSION

This contribution offers an alternative reading of innovative business dynamics concerning the dominant paradigm in managerial disciplines. Taking a cue from the theme of innovative business processes, the above reflections culminate in the proposition of a concept of governability of business dynamics characterized by a higher degree of imperfection or indeterminacy. The authors' invitation is to reflect on the fact that business decisions are rational in procedural terms and not substantive: the isomorphism, in fact, is a phenomenon that occurs regardless of the actual increase in efficiency and effectiveness of business processes, but only to obtain social legitimacy.

Undoubtedly, the ex-post understanding of business dynamics leads to a more realistic vision of the innovation phenomenon, but indeed less reassuring in terms of management's governability of the process.

Author Contributions

The chapter is the result of the joint work of the authors. In the editing phase, Piero Mastroberardino oversaw "Introduction," "Change: the main research traditions," "Innovation and change: an alternative point of view," and "Conclusion" sections, Giuseppe Calabrese oversaw "Innovation in economic-managerial studies" section, Flora Cortese oversaw "Innovation and vertical isomorphism, between institutional pressures, and recovery of maneuver space," "Origin of institutionalized rules, their diffusion, and degree of institutionalization," and "Vertical isomorphism and strategic behavior in innovation processes" sections, and Miriam Petracca oversaw "Empirical research perspectives: an exemplification" section.

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Chapter 2
Concrete Benefits of Technological Innovation for Small and Medium-Sized Enterprises

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ABSTRACT

In recent years, digitization greatly influences the production process of enterprises. In terms of competitiveness, we are more and more aware of the advantages that the use of digital technology entails for companies. However, there is still a digital divide between companies in northern Italy and those in the south due to the geographical position, which undoubtedly penalizes these companies in terms of costs, but also due a certain delay in terms of economic growth. To overcome this gap, it is necessary to undertake a process of change through greater cooperation between companies, creating supply chains that not only embrace different sectors, but also go beyond their borders and create an increasingly global system. Exactly for this reason, it is essential to perfect the knowledge and skills of digital tools. Only in this way can SMEs in the south have the opportunity to become more competitive in terms of international trade.

INTRODUCTION

In economic literature, and in particular according Schumpeter, innovation determines a change in the social order, without forgetting that policy plays a crucial role too. Undoubtedly, economic innovation and, therefore, digitization, are some of the "neo-Schumpeterian" approaches, causing a change in economic life and giving rise to a new economic development; in the Theory of Economic Development he wrote:

What seems to us to be received doctrine: Industrial expansion, automatically incident to, and moulded by, general social growth – of which the most important purely economic forces are growth of population

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and of savings – is the basic fact about economic change or evolution or "progress"; wants and possibilities develop, industry expands in response, and this expansion, carrying automatically in its wake increasing specialization and environmental facilities, accounts for the rest, changing continuously and organically its own data. (Schumpeter, 1928, pp. 375-6).

According to Schumpeter, progress, the expansion of industries and the growth in demand derive from "new combinations" of already existing factors of production, that means from "innovations". He wrote:

What we, unscientifically, call economic progress means essentially puttingproductive resources to uses hitherto untried in practice, and withdrawing them from the uses they have served so far. This is what we call -innovation-. What matters for the subject of this study is merely the essential discontinuous character of this process, which does not lend itself to description in terms of a theory of equilibrium. (Schumpeter, 1928, pp. 378).

Innovation is important not to be confused with invention. Therefore, innovation is a technological transformation also linked to digitization. The technological change present in the modern economic system is synonymous with industry 4.0, which undoubtedly creates productive efficiency, well-being and greater wealth on the one hand, but can also create unemployment, due to the qualitative changes of the workforce.

RELATIONSHIP BETWEEN DIGITIZATION AND SMES

The relationship between digitization and SMEs, has many critical points, which derives from the organizational structure of companies. It is not easy for companies to adapt to technological changes and give up their habits, therefore, it is not easy to reach an optimal level; We talk about Organizational Inertia: companies need time to change, they are unable to realize deep and rapid changes. This aspect is described as a competence trap, as the limits that the company shows depend on its own resources and strengths. For SMEs, the difficulties described above are even more evident because of their size and features. Carrying out a process of technological innovation requires a commitment that is not easy for SMEs.

The production system, not only in Italy but also in Europe, is characterized by the large presence of SMEs, in fact in Europe SMEs represent 99.8% of all enterprises, involve about 67% of the workforce and participate in the 58% of production (Eurostat). In Italy the presence of SMEs is even stronger than in the rest of Europe. Italian SMEs exceed the European average both in terms of added value and employed. However, SMEs in Italy have difficulties in terms of *performance* and growth rates. It is important for these companies to improve the regulatory aspects and the policies in their favor; this means that the public administration will necessarily have to approach the needs of SMEs. Therefore, is necessary to: crate a context businesses can grow, helping weaker companies, giving the more opportunities and not letting them die after the first mistake, much less if they are in insolvency; facilitate access to credit; give SMEs the opportunity to take advantage of innovation, research and all the possibilities offered by the market; businesses have to care about sustainability and the environment too; It is important to enable companies to generate knowledge: we are talking about Learning by grafting, that is, the acquisition of knowledge through the hiring of new staff or the acquisition of a company.

In Italy, SMEs are micro-enterprises mainly concentrated in the manufacturing sector and with an average number of three employees.

As a percentage, in Europe the manufacturing sector is the one with the greatest added value and the highest level of employed workforce (31% and 24.8%) but it is also the sector that was most affected by the 2007-2008 crisis. However, already in 2017 it recorded positive signs, in fact, it had an added value of 2.7%, which was higher than the levels before the crisis, while employment is still struggling to restart today (Eurostat).

For SMEs, implementing a digitalization process means creating new business models and giving life to the following points:

- digital infrastructures; • Investments and access to finance.

Through digital transformation, each company manages to differentiate itself, to create its own individuality, which allows it to be a digital leader. Digital transformation implies a new way of relating with its customers which, to make their purchases, interfaces not only with traditional channels but also and above all with digital ones.

Digital transformation is not limited only to innovative businesses, digital start-ups or large companies in Silicon Valley, but it is a process that affects all companies, regardless of the size or market in which they operate. An innovative technology and a start-up (even if it has little capital) is enough to dominate a market, eliminating highly experienced players.

To dominate in a market, in addition to digitization, it is necessary to change the organizational structure, taking into account the digital transformation.

In general, digital is the driving force for SMEs, for example in Italy 5.1% use e-commerce. The overall turnover achieved by companies through e-commerce is equal to 4.8%.

The economy generated by the internet in Italy is equal to 3.5%, slightly more than the French one which stops at 3.4%, while in Germany it stops at 4% and, in all advanced countries, at 5.5%.

21% of Italian companies with at least 10 employees have introduced social networks into their business model, while the European average is higher: about 27% companies (EU-27); in Spain the number of companies is equal to 29%, in the United Kingdom it is 40%, in France the average number of digitized companies stops at 17%. For SMEs that are permanently present on the Web and are able to achieve a 10% increase in productivity, the turnover grows and the level of exports doubles compared to that of offline SMEs (Unioncamere, Confindustria, 2016). It is above all young companies led by young people that are very active on the Web: for example, about 65% of companies founded in 2014 have been active on the web since the beginning of their activity; 57% of these have their own website and 55.9% have a Facebook page. (Unioncamere, Confindustria, 2016).

It is clear that digital innovation changes the way companies act and communicate and we must continue on this path.

THE DIGITIZATION PROCESS IN HISTORY

Industry 4.0 was first talked about in 2011 in Hanover, Germany, at the "Hannover Messe" fair, a large fair for international investors, regarding new industrial technologies and all cutting-edge energy systems. On that occasion, scholars Henning Kagermann, Wolf-Dieter Lukas and Wolfgang Wahlster presented

their report entitled " *Mit dem Internet der Dinge auf dem Weg zur* 4. *industriellen Revolution*". They tried to highlight how technological innovation in the future would change production systems, creating the foundations of a new industry based on "cyber-physical systems"[1]. All this would also have affected people's lifestyles.

They have tried to influence the industrial policy choices of the German government, inviting it to implement the "*Project for the Industry of the Future 4.0*"[2]. Actually, already in 2006, Germany had tried to create a national program to promote technological innovation and increasingly become a leading country in the *High-Tech* sector[3]. Research Minister Annette Schavan at the time was firmly convinced that this path must be followed; this is clear from reading her speeches in which she said: "*We want to transform Germany into the most research-friendly nation in the world by 2020 (…). We need new ideas, new products and new system solutions to ensure our standard of living today and the standard of living of our children tomorrow. We cannot win the competition on the lowest labor costs (...). To achieve this, we must follow the High-Tech strategy with concrete actions (...)*[4]".

In the following years, the German government carried out industrial policies that were inspired by that program, pledging to implement a high-tech policy. In 2013, the research group "Industrie 4.0: Working Group" presented the report "*Securing the future of German manufacturing industry. Recommendations for implementing the strategic initiative INDUSTRIE 4.0. Final report of the Industrie 4.0 Working Group"*, which reaffirmed the intention to continue on this new path, in fact, "Industrie 4.0 Platform" was established: working groups that have contributed to the growth of the country. The German industry has grown thanks also to investments made in 2013, amounting to 14.5 billion euros in R&D, of which 8.3 are managed directly by the Ministry for Education and Research, (Italian Pardo Embassy, 2015)[5]

The growth of German companies has led the government to continue to finance the industrial sector, in fact, in the Industrie 4.0 industrial plan of 2017, the government made investments of 1.5 billion, also trying to favor medium and small enterprises.

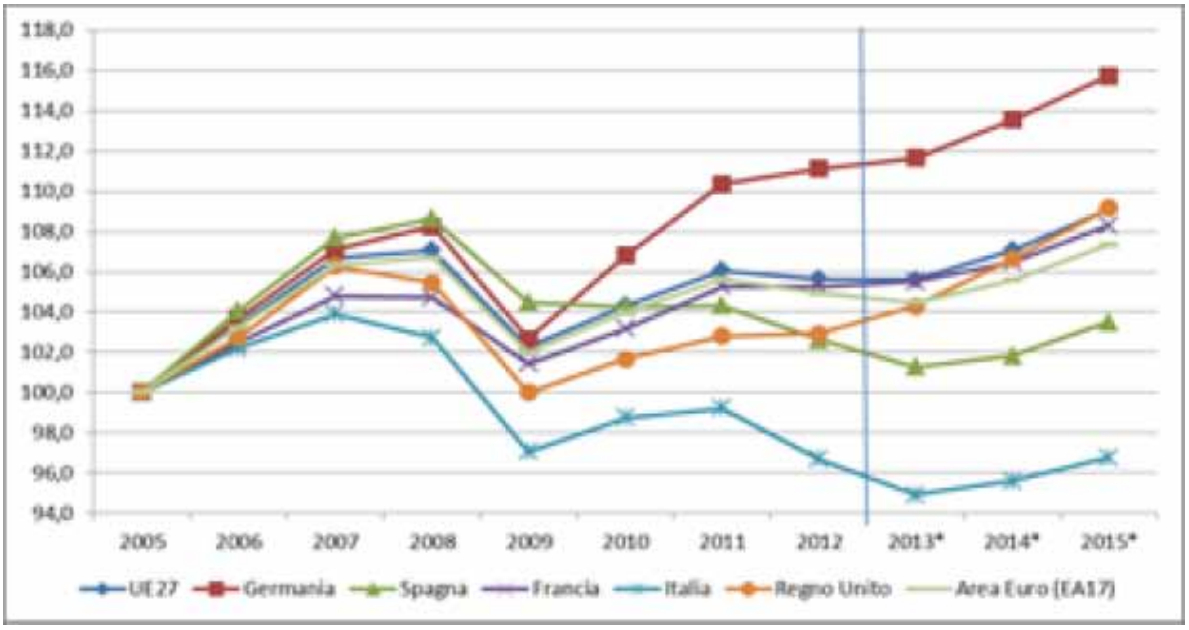
Today Germany is the first country in the world for the development of Industry 4.0: it has 15 million jobs, which are closely linked to the digitization of the manufacturing sector. Therefore, the German government has been implementing various strategies related to industry 4.0 for years, including the "Digital 2025 Strategy" of 2016.

Not only Germany but the whole European Union is aiming at the digitalization of the industrial sector, since the industrial sector represents 15% of the added value; 80% of the EU's research and innovation activities are represented by industry, where 75% of its exports represent the crux of productivity. The analysis carried out above makes us clearly understand the evolution and importance of industry 4.0.

So, as already mentioned, the fourth industrial revolution starts in 2011. There are different definitions given to the fourth industrial revolution, for example Alasdair Gilchrist writes:

Best understood as a new level of organization and control over the entire value chain of the lifecycle of products, it is geared towards increasingly individualized customer requirements(…).The basis for the fourth industrial revolution is the availability of all relevant information in real time by connecting all instances involved in the value chain. The ability to derive the optimal value-added low at any time from the data is also vital. The connection of people, things and systems creates dynamic, self-organizing, real-time optimized value-added connections within and across companies. These can be optimized according to different criteria such as costs, availability and consumption of resources (…). A framework for Industry 4.0 depends on 1) the digitization and integration of the horizontal and vertical value chains. 2) The digitization of products and services and 3) the introduction of innovated business models(...)

Figure 1. GDP trend in the EU countries 2013-2015
Source*: DPS elaborations on Eurostat data; 2013-2015 Eurostat estimates*



a collective term for technologies and concepts of value-chain organizations...Over the IoT, CPS communicates and cooperates witheach other and humans in real time. (Gilchrist, 2016) [6].

THE WEIGHT OF INNOVATIVE INVESTMENTS IN THE ITALIAN ECONOMY

Italy is a country that currently grows little, has a growth rate below the European average (Fig. 1). All the policies concerning digitization have not focused on achieving an economic and social change typical of an industrial revolution, but on modifying and renewing the processes already present. It must be said, however, that a Digital Agenda has been presented by the institutions, which offers opportunities for growth and change. Naturally, it is necessary to involve the main economic players, families and businesses, and to make investments and structural reforms.

Digitization is seen as a transversal process involving the public and private sectors. An example can be the digitization introduced in schools.

It is appropriate to start with the creation of a digital single market, as proposed in 2014 by the European Council. This is an important step that is worth 3% of GDP every year. Digital development requires the use of public resources to foster business change and to have a more skilled workforce. Through this strategy it is possible to achieve "digital growth",

also intervening on the public administration, which will act as a means to increase digital demand[7]. Italy, therefore, has thought of a Digital Strategy[8] to create more supply and be competitive. However, our Digital Agenda highlights some limitations of our country: for example, Italy has a broadband equal to that of the European average, while it has a serious delay in the ultra-broadband. Italian citizens who

regularly use the Internet between the ages of 16 and 74 represent 56% of the population, while 34% of citizens have never used the Internet.

The European average of the population using the internet is naturally higher, equal to 72%, and only 21% of European citizens have never used the internet (Digital Agenda 2014-2020). In Italy, online services are used to a lesser extent than the Union average.

All this highlights the great distance between Italy and the Union. This is also due to socio-demographic reasons linked to the internet population. If we look at the age group of 16-24, the difference from the European average is 10%; as higher age groups are considered, the difference increases: in the 25-54 age group the distance from the European average is 15%, which reaches 18% in the 55-74 age group (Digital Agenda, 2014-2020). It is clear that the internet is used above all by young people, especially in the 18-19 age group where the percentage is 99%, while in the 35-44 age group the percentage is 75%, and in the age 55-59 is 50% and reaches 10% in the age group of 75-over (Digital Agenda, 2014-2020).

Looking at the geographical areas, the internet has a circulation of 60% in the North-East, while in the South, especially in the islands, it has a circulation of 50%. 85% of families with minors have an internet connection, the percentage decreases as the number of families with only elderly members increases, where the internet connection is equal to 12.7%.

The gap didn't exist only for the internet. There is also a disparity in terms of digital skills (ICT skills). In fact, in the 16-74 age group, 61% of people have a low level of digital skills, with a percentage of 21%, while 40% have no skills at all.

Our reality is behind Spain where in the same age group 46% have low digital skills, Great Britain has a percentage of 42%, in Germany the percentage stops at 40% and in France at 37%, in Finland and the Netherlands the percentage is 30%.

Then wanting to take a look at the use of the internet for activities other than communication[9], there is a high gap compared to the EU average as regards the use of the internet for services, such as online banking, where in Italy the percentage is 37%, while the European average is 55%.

Surely compared to 2011 there was an increase in the internet for the search for services, health, financial, newspapers, with growth of over 5 percentage points (Istat, Citizens and new technologies, December 2013 - Istat, Citizens and new technologies, December 2017) (Digital Agenda, 2014-2020).

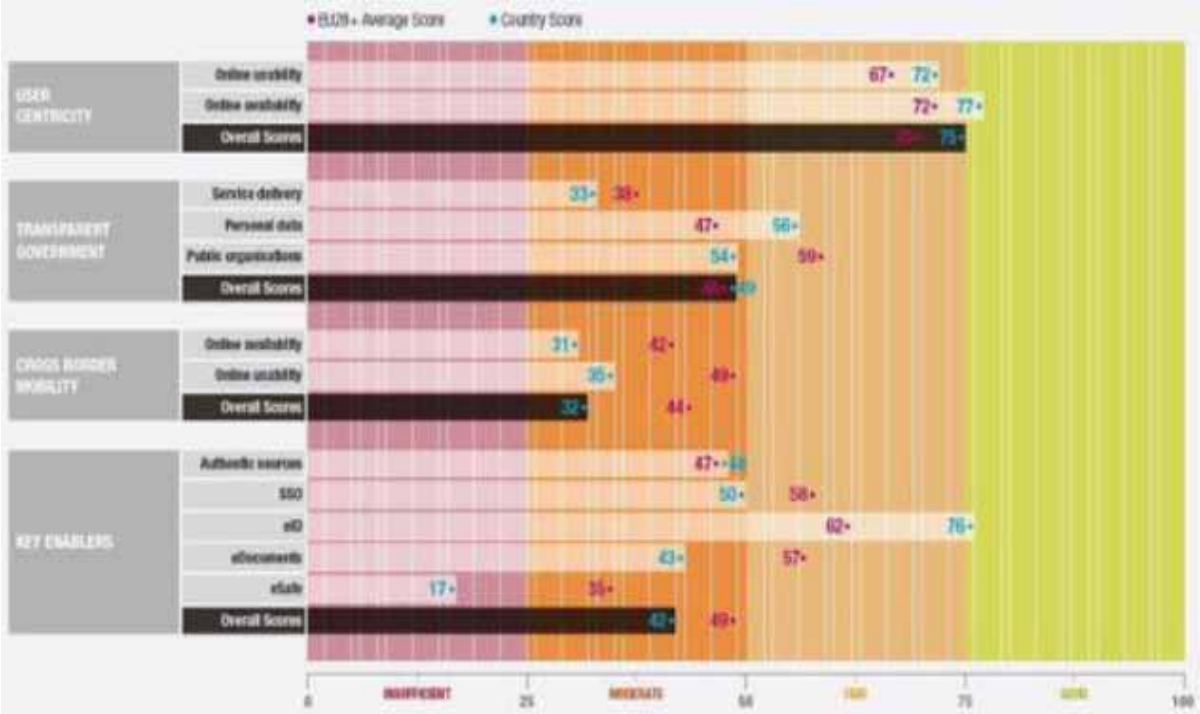
Looking at the online services of the Public Administration, we see that most people (64%) still prefer direct contact, so they go to the counter and only 20% use online services, while 18% prefer the telephone; use also depends on the level of education and age, in fact, young people under 30 make extensive use of the internet and use traditional channels less (Digital Agenda, 2014-2020). This is certainly not explained by the fact that families do not have the internet, in fact 64% of families have internet and 87.1% have a PC, but rather because of poor digital skills, where the percentage is 43%, there is then 27% who consider it unnecessary to have digital skills (Digital Agenda, 2014-2020). so far it is clear that costs are not the obstacle to the development of digitalization and online services.

Wanting to take a look at our companies, it can be observed that as regards integrated management applications (ERP) and electronic invoicing we are in line with the European average.

Instead, there is a significant delay of our businesses in online sales, only 5% use e-commerce; the delay concerns in particular small and medium-sized enterprises with fewer than 10 employees (SMEs), which in Italy represent 94% of Italian enterprises.

Certainly Italian companies use social media to spread their business and production, the percentage of companies that use social media is 25%; Almost all of the Italian companies (86%) use the internet to interact with the Public Administration (Digital Agenda Scoreboard, 2014).

Figure 2. E-government services in Italy
Source*: European Commission, Digital Agenda Scoreboard, 2014*



As regards the offer of services, in particular the digital services offered by the Public Administration, in Italy there is a dualism: on the one hand it occupies a high position in terms of service offer, on the other it occupies a low position for the provision of services (Fig. 2).

Italy offers many online services but less cross-border services. Furthermore, all e-government services are centrally efficient but lacking locally. All municipalities have a website, but only 20% of them provide online services; municipalities with more than 60,000,000 inhabitants offer settlement services online, while only 15% of municipalities with less than 5,000 inhabitants are able to offer such services. Taking a look at the regions, Emilia Romagna and Veneto that are able to offer fully transactional online services; the situation is critical in Basilicata, Molise, but also Valle d'Aosta and Trentino, where there are very small municipalities.

Taking a look at tourism, it appears that all municipalities have their own web page, but only 14% of municipalities are also able to offer hotel reservations, while only 3% allow the online purchase of museum tickets. To make cities safer, all municipalities have installed a video surveillance network, but only 16% of municipalities are able to provide online services.

Although Italy is committing itself through the Digital Agenda to transform the public administration and, consequently, to improve the well-being of the community and the economic system, yet each single region has its own economic and social reality, which represents strengths or weaknesses. Therefore, the strategy for digitization has focused on the following points:

1)identify the strategic sectors that are decisive for the change in the Public Administration;

Figure 3. EU member states' innovation performance
Source: *Digital Agenda Scoreboard, 2014*

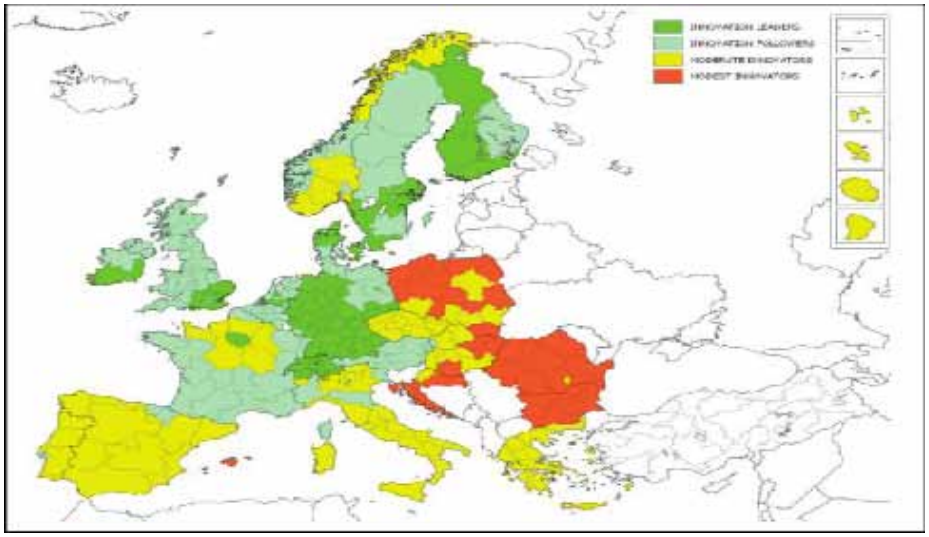
2) examine the territorial gap;
3) identify, on the basis of qualitative and quantitative indicators, the appropriate tools to achieve the objectives of the Union;
4) identify the actions necessary to achieve the objectives.
5) Monitor the results.

To get a broad picture of the digital strategy implemented not only by Italy, but by the individual countries of the Union, we can refer to the Regional Innovation Scoreboard (RIS), which compares the results achieved by 190 regions of the European Union and of Switzerland, in terms of innovation performance (Fig. 3).

The figure above (Fig. 3) shows that only 34 regions are leaders in terms of innovation, while 57 regions have an average innovative capacity, 68 regions have moderate innovative capacity and 31 regions a modest capacity for innovation. The regions of the states of the Union that have a prominent position in terms of technological innovation actually belong only to Denmark, Germany, Finland, France, Ireland, the Netherlands, Sweden and the United Kingdom. While for Italy only Piedmont and Emilia-Romagna occupy an average high position in terms of innovation (Fig. 4).

To create and develop online services, it is advisable to reflect on the limits of supply and demand for online services. On the supply, in particular, we found in the previous pages that its development in Italy is conditioned by the low level of use compared to other industrialized countries, as well as the level of technological skills (ICT skills), which is below of the European average. It is a heterogeneous

Figure 4. The geographical distribution of innovation in the regions of the Union
Source*: Digital Agenda Scoreboard, 2014*



supply, not very competitive, and this is also linked to the fact that Italian companies are mostly micro-enterprises, which despite having good communication are lacking in transactional services.

Italy has a delay in digitization: there is a scarce diffusion of technological innovation among companies, families and the Public Administration, this slows the growth of highly technological productive sectors, which could favor productivity growth.

With regard to the Public Administration, we can see the effort made by Regions and Municipalities to undertake a process of digitization.

It is appropriate to seize the opportunities offered by digitization and increasingly involve the families, to involve more and more human capital in digitization.

More and more families are connecting to the internet: it is estimated that in Europe, in 2018, 81% of people went online at least once a week (European Commission, 2018)[10], however, the percentage of people with basic digital skills remains low, the percentage is around 43% (European Commission, 2018). Today the internet is used for various reasons: music, videos, games, online purchases, online banking; European Union companies also use online services to lower costs and expand the market. Companies will certainly benefit from the digitization of the Public Administration, as they will find themselves operating in a more efficient environment. For some years now, the European Commission has published a report that contains the data of the DESI Index, which indicates the level of digitization of the countries of the Union: it is a photograph of the digital agenda made by the various countries of the Union. .

The indicator takes into account digital public services, internet use, connectivity and human capital. The 2018 Desi index highlights an antinomy between the digitization of the European Union and that of Italy. Therefore, we are still a long way from achieving a *single large digital market.* In 2018, Italy occupied the 25th place out of 28 countries. The highest place in digitization is occupied, as already mentioned above, by the Nordic countries: Denmark, Sweden, Finland, the Netherlands, followed by Luxembourg, Ireland, Great Britain, Estonia.

As for ultra-broadband connectivity, while in Europe it is used by 58% of households, in Italy only by 22%. 91% of the Union population has a subscription to mobile networks, in Italy 86% of the population; regarding the digitization of public services, 58% of the population uses online services, in Italy only 30%. The position has improved with regard to the use of the internet for online purchases, a channel used by 41% of the population against a European average of 68%; online banking is used by 43% of the population, in Europe by 68% of the population. Furthermore, digital technologies are little used by our SMEs: online sales are carried out by only 7.9% of Italian SMEs against a European average of 17.2%. For digital services of the Public Administration, Italy is in 19th place (DESI, 2018). In terms of human capital, Italy lacks digital skills, because our country still invests too little; the position occupied is the 25th place. However, it must be said that the whole European Union does not invest much in digital skills. The DESI data show a delay in Italy, placing it close to the countries of the Union which are below the European average, namely, Romania, Poland, Bulgaria, Hungary, Slovakia, Croatia, Greece.

(The Italian delay in technological innovation)

Italy is lagging behind in the use of technological innovations, let's say that the policies in favor of industry 4.0 started late compared to the other countries of the Union, even though Italy is a country that in terms of productivity is at the second place in the Union, but in terms of digitization it is below the European average. Digitization is crucial in an increasingly competitive and globalized market.

Italy has greatly felt the weight of competition from the Asian economy and our companies have tried to respond through de-localization and concentrating production in niche sectors. All this has led to a fall in investment rates, thus widening the gap with the rest of the EU countries and leading the Italian economy towards stagnation. Our country tried to get out of this negative economic background: in fact, at the end of 2015 it paid attention to enabling technologies and the government at the time published a report, which would also have favored the digitization of Italian companies. In 2017, the government presented the "National Plan for Industry 4.0", the first example of concrete measures[11] (and with tax breaks), to make private investments in 4.0 enabling technologies and thus provide our companies with the tools to be competitive in terms of digitization and innovation. The 2017 National Plan provides for 13 billion in public investments and tax benefits.

It was aimed at companies (and in particular for small and medium-sized enterprises) that would have made investments starting from 1 January 2017, for training[12], that is, for Competence Center and Digital Innovation Hub. To achieve perfect digitization in our country, it is important to coordinate political will with the will of businesses. Achieving skills in industry 4.0 is essential, also for overcoming the critical issues in the labor market, where youth unemployment is high, but also because it is not easy for companies to find the workforce with the right skills. Indeed, in the labor market there is a skill mismatch: the phenomenon whereby the needs of businesses and the training of the workforce do not match. In Italy there is a scarce availability of workforce in mathematics, engineering, science. In this regard, the 2017 plan indicated the training of over 3,000 managers.

This aspect makes it clear that human resources (human capital) and, in particular, their training, which is crucial for the growth of businesses, should not be underestimated. The industry 4.0 revolution is a technological revolution, but enabling it from an organizational, process and production point of view. It is a revolution that facilitates internet connection, thanks also to low costs; it is a revolution that embraces the entire production system, but also our daily life. In fact, there are more than 14 bil-

lion sensors connected to the production system; by 2030 they should reach 100 billion sensors. It is a revolution in constant motion.

CONCLUSION

There is a challenge to face, where it is necessary to change production systems, and to review the strategies and organization of companies. It is undoubtedly a technological but also cultural change, which leads the worker to have more stimuli and to work with greater harmony and balance.

Great confidence is placed in Industry 4.0 and this is evident from the growth in investments and the new organization of work. Although the change is based on technologies, however, we try not to neglect the person, who remains the core of the company. It is advisable to invest in the worker to improve his skills and provide training in step with the times. Certainly, as the philosopher Julian Nida Rumelin observed, digitization should not be considered as a "new humanism": it is not possible to think that a digital intelligence, a robot, is able to do a work of discernment, cannot act in full autonomy. However, it is a real revolution that certainly highlights anthropological aspects as well: humanity realizes its limitations and wonders where this global technological innovation will lead. Undoubtedly, this digital intelligence will never get the better of human intelligence, you cannot think of the universe as an algorithm. A "cybernetic paradise" will never be created.

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ENDNOTES

1 "*Cyber Physical System*".

2 "*Zukunftsprojekt Industrie 4.0*"

3 In 2006, the Minister of Education and Research proposed the "Ignite Ideas! High Tech for Germany" program, which concerned the development of innovations in the industrial sector in such a way as to become increasingly competitive and conquer the entire market.

[4] Dr. Annette Schavan, Federal Minister of Education and Research in "Ignite Ideas! The High-Tech Strategy for Germany", Berlino 2006.
[5] Italian Pardo Embassy "The research system in Germany", August 2015
[6] Alasdair Gilchrist, (2016), "*Industry 4.0-The Industrial Internet of Things"*.
[7] In Italy this demand is below the European average.
[8] Called the Digital Growth Strategy 2014-2020.
[9] In this case, there is no gap with the other countries of the Union.
[10] In 2017, the percentage was 79%, two points less (European Commission).
[11] In billions of euros.
[12] Training also in high school.

Chapter 3
Digital Transformation in Public Services:
A Review of Turkey During the COVID-19 Pandemic

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ABSTRACT

The world has welcomed digital transformation during the COVID-19 pandemic. Citizens and governments began their travel from public services to e-public services. However, there are already launched programs for e-government of digital transformation. It is a fact that the COVID-19 pandemic accelerated the adaptation of digital transformation in public services in developing countries. This study aims to present new evidence for the management of e-public services through functional service management model. In this context, Turkey is selected as a sample country based on United Nations E-Government Development Index (EGDI) results. Turkey has accelerated its digital transformation in public services for five years. In addition, the Turkish government is observed to be successful in providing and sustaining public services through digital platforms. The study focuses on determining the functional management approach to examine the working way of e-public services.

INTRODUCTION

The digital transformation causes to start new expectation and market for the world. From private sector to public sector, the delivery of services has moved to digital platforms. When considering the impact of Covid-19 pandemic, it can be said that digitalization gives so many solutions to keep economic and

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social activities. In fact, the Covid-19 pandemic has given higher level of digitalization for the humanity. Digital economy, online education, online health services or online public services have all significantly increased during the Covid-19 pandemic (Yıldırım, 2021; Yıldırım and Bostancı, 2021; Yıldırım et.al., 2022; Öncü et.al., 2021; Yıldırım et.al. 2021). The public services which are supplied by the government management (both central and local authorities) can be determined as services to meet citizens' need and want in a country (Ateş and Nohutçu, 2006: 246). These services support the social, economic and environmental sustainability in the long term. In addition, countries can be evaluated for their development level when comparing their level of sufficient public service delivery. Before digital age, the government services or public services were all mostly provided in the context of strict bureaucratic orders (Lee, et.al., 2008). Accordingly, the rise of digital government approach or e-government is welcomed by citizens when considering access to government services easily and quickly. Since the 90s years, the governments focus on improving their ICT (Information and Communications Technology) to integrate with public services. At this point, the concept of e-government gives the framework of the management of digital public services in general (United Nations, 2002).

This study aims to show new evidences for the functional management approach for e-public services based on investigating Turkey case. According to United Nations E-Government Development Index (2020), Turkey is ranked by 53 (0.7718 value) of 193 countries (UN E-Government Knowledge, n.d.a). Turkey is included in Asia region by presenting Western-Asia sub-region in the United Nations EGDI's report (UN E-Government Knowledge, (n.d.b). Turkey has better performance comparing to most of member countries in the UN according to the UN (2020) report of EGDI (Yıldırım and Bostancı, 2021). Table 1 presents main indicators for Turkey's EGDI performance:

United Nations EDGI Report determines the e-government performance of member countries in the world (UN E-Government Knowledge, n.d.c). When observing the results between 2003 and 2020, it is seen that the world leader and region leader are all changed over the time. For example, the period of 2003-2005, the world leader was ranked as the United States of America in the world. Between 2010 and 2014, the Republic of Korea was ranked as the world leader. And Denmark is the current world leader for EDGI based on UN EDGI report (2020). The first time of adaptation of e-government and digital transformation in public services, Turkey had lower performance. Then, it can be said that Turkey has improved its e-government performance since five years. Especially, Turkey increased its EGDI value and ranking between 2018 and 2020. In addition, Turkey reduced the gap between the world leader's EDGI value or the region leader's EGDI value and its own EGDI value (see table 1).

Turkey is thought to be a great sample country for beginners in digital transformation. Turkey improved its digital transformation in government and public services by the time. To provide current profile for e-public services, some descriptive analysis methods are used in the study. The analysis includes two main parts as follow:

- The future demand for e-public services,
- The functional management model of e-public services

This study is consists of four main parts. The first part of the study includes introduction and the second part explains the concept of e-government to examine how governments manage digital public services in a country. Third part gives empirical findings of Turkish case for functional e-public service management. Then, last part gives conclusion. The introduction part gives recent issues for digitalization in government and public service management.

Table 1. Turkey's EGDI performance profile

Years	EGDI value*	EPI Value*	World leader value for EGDI*	Region Leader value for EGDI*	Sub-Region Leader value for EGDI*
2003	0.50551	0.20690	0.9271(United States of America)	0.7463(Singapore)	0.6633(Israel)
2004	0.48919	0.29508	0.9132 (United States of America)	0.8575(Republic of Korea)	0.6805(Israel)
2005	0.49595	0.28571	0.9062(United States of America)	0.8727(Republic of Korea)	0.6903(Israel)
2008	0.48340	0.13636	0.9157(Sweden)	0.8317(Republic of Korea)	0.7393(Israel)
2010	0.47800	0.21428	0.8785(Republic of Korea)	0.8785(Republic of Korea)	0.7362(Bahrain)
2012	0.52812	0.05260	0.9283(Republic of Korea)	0.9283(Republic of Korea)	0.8100(Israel)
2014	0.54428	0.49019	0.9462(Republic of Korea)	0.9462(Republic of Korea)	0.8162(Israel)
2016	0.58995	0.62712	0.9193(United Kingdom of Great Britain and Northern Ireland)	0.8915(Republic of Korea)	0.7806(Israel)
2018	0.71120	0.85960	0.9150(Denmark)	0.9010(Republic of Korea)	0.8295(United Arab Emirates)
2020	0.77180	0.89290	0.9758(Denmark)	0.9560(Republic of Korea)	0.8731(Cyprus)
*The information is based on UN E-Government Knowledgebase					

Source: UN E-Government Knowledge, (n.d.b)

DIGITAL TRANSFORMATION IN PUBLIC SERVICES: E-GOVERNMENT

E-government is a form of digital transformation of using ICT (Information and Communications Technology) in government services and governments can provide better and quick public services with lower costs (Behzadi et.al., 2012:90). On the other side, the digital systems or portals have also some threats such as space radiation, huge natural disaster or hacker attacks. In addition, the adaptation of citizens and public employees to the digital transformation may have some challenges (Samsor, 2020). There are also questions regarding this telecommunication infrastructure in some countries. In a sense, these digital systems can be more or less vital based on the population of the countries. Accordingly, it can be said that, the management of e-government services will be more important issue for countries with higher population such as Turkey.

Citizen trust is an important factor for the adoption of digital transformation that policy makers should increase the accessibility and usability of digital platforms. Also, some characteristics of user or citizens can influence the adoption of digital transformation in public sector. For example, Çınar et.al. (2018) revealed that personal and social factors influenced the adaptation of e-government. The concerns about the inability to technology adaptation, the accessibility of personal data by the state and the possibility of the information being seized by risky groups due to the system vulnerability are considered as sources of personal concern and also, factors such as trust in the state, trust in the internet, risk perception, public value perception and culture are belonged to social concern (Çınar, et.al., 2018). The e-government portal can support the management of interactive communication with citizens and participation system (Tolbert and Mossberger, 2006). The education level and internet skills can support citizens' benefits from e-government usage. In this case, it can be claimed when citizens have ability

to use digital and mobile tools efficiently for internet access, e-government portal can be improved and developed through new developments easily (Kumar et.al., 2007; Alshehri and Drew, 2010; van Deursen and van Dijk, 2011; Pérez-Morote et.al,2020). Open state, citizen-centered administration, active citizen, network structuring, transformation of production and distribution patterns and new communication forms are the institutional components of the e-government system"(Ateş, 2003). Meydanlı (2010: 32-36) determined the aim of e-government as below:

- Saving in expenses and transactions,
- Providing easy access to information,
- Increasing efficiency and productivity in public services,
- Taking the informal economy under control,
- Ensuring transparency in public administration,
- Prevention of bribery and corruption by reducing bureaucracy,
- Providing coordination between public institutions.

E-Government's process has four stages as cataloging, processing, vertical and horizontal integration (Layne and Lee, 2001; Akman, et.al, 2005). The stakeholders in e-government are consists of the government, public, employee, business and citizens (Ateş and Yavuz, 2019). E-government applications ensure that government aids reach everyone and create an important database for people who need government aids and services (Venkatesh, et.al, 2014). In this context, e-government can be an effective tool for social policy. E-government system also has big data analysis techniques that allow policy makers to keep up to date with developments. Big data analysis enables the analysis of economic and development indicators. In developing countries, e-government system can support the development of rural communities (Venkatesh, et.al, 2014).

On the other side, social, economic and political challenges and security problems block the development of e-government systems (Hashemi, 2013). The performances of countries in e-government management can be measured by e-government index. The e-government index evaluates a country's official online presence, telecommunications infrastructure and human development capacity (Reffat, 2003). Another issue related to this index is e-participation index. E-participation index evaluates activities such as online-reading about social and political issues, online commenting about social issues and services, using applications, responding to petitions and participating in public consultations (Vicente and Novo, 2014). Some factors can facilitate e-participation. Tornatzky and Fleischer (1990) discussed the concepts of e-decision-making, e-information sharing and e-consultation which could facilitate e-participation based on Technology-Organization Environment (TOE) theory (Krishnan, et.al., 2013). E-participation mechanism forms the basis of the e-democracy. E-democracy aims to produce functional democratic processes through communication, electronic public dialogue, decision-making and information provision after voting (Krishnan, et.al., 2013). The e-democracy development of a country depends on complex internal factors such as political norms and citizen pressures (Lee, et.al., 2011). To sum up, e-government has two sides as: (1) E-government system provides democratic participation, transparency and accountability in service delivery; (2) E-government system holds a big data bank of citizens and has an ability to use it for government management authority.

This study focuses on explaining a sample implication of e-Government Portal in the context of the functional management approach. Accordingly, the study will answer these research questions:

RQ1: What does e-government portal do for the users?
RQ2: How does Turkey manage its e-Government Portal due to the functional public service management approach?
RQ3: What kinds of public services can be provided by e-government portal?

The Future Demand for Digital Public Services in Turkey

In this part of the study, it is aimed to explain the future demand for online public services in Turkey. Based on Turkish Statistical Institute's open access data, the relationship between household and internet usage is determined. It is assumed when households are close to digital service delivery, e-government or the demand of e-public services will be higher. Turkish Statistical Institute's recent findings showed that Turkish households mostly used mobile phone to use internet and digital applications. Especially, the observation has showed that almost every household has a mobile phone (%99.4; 2020). But, the proportion of having desktop computer, portable computer or tablet computer etc. was mostly decreased in last decades (TURKSTAT, 2020a). Table 2 shows the proportion of mobile phone users in Turkey based on TURKSTAT open access data.

Table 2. The proportion of Turkish households with devices

Devices	2016	2017	2018	2019	2020
Desktop computer	22,9	20,3	19,2	17,6	16,7
Portable computer (Laptop, netbook)	36,4	36,7	37,9	37,9	36,4
Tablet computer	29,6	29,7	28,4	26,7	22,0
Mobile phone (incl. smart phone)	96,9	97,8	98,7	98,7	99,4

Source: adapted from TURKSTAT, 2020a

As seen in Table 2, mobile phone is the most used devices by Turkish households to access internet. Almost all of Turkish households use mobile phone in general. It can be revealed that Turkish households mostly use internet by mobile phone.

Table 3 shows information society statistics for Turkey during the period of 2015-2020. There are two main sides as enterprise and household/individual for ICT usage in the society. It can be determined that, information and communication technology (ICT) was mostly used by enterprises since 2015. The proportion of households/individuals in ICT usage increased since 2015.

Turkish households also welcome digital public services. Turkish e-government portal provides many public services for individuals, enterprises, corporates, public institutes etc. It is observed that the proportion of Turkish people interact with digital public services increased from 2015 to 2020. Especially, most of Turkish households used online public platforms to get information since 2015 (see Table 4).

The future of digital public services is seen so bright. To provide fully-satisfied service to citizens, the quantity and quality of services should meet citizen's needs and wants. At this point, the demand should be estimated as possible as it can be. Table 1 shows the proportion of Turkish households having internet access between 2011 and 2020. As seen in Table 5, internet access was increased to %90.7 in 2020. Comparing to previous years, the proportion of internet access is getting higher that it can be de-

Table 3. Information society statistics

	Year					
ICT* Usage in Enterprises	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Computer Usage	95.2	95.9	97.2	97.0	96.7	-
Internet Access	92.5	93.7	95.9	95.3	94.9	94.9
Having Website**	65.5	66.0	72.9	66.1	51.5	53.7
ICT Usage in Households and Individuals	**2015**	**2016**	**2017**	**2018**	**2019**	2020
Computer usage	54.8	54.9	56.6	59.6	-	-
Internet Usage	55.9	61.2	66.8	72.9	75.3	79.0
Households with access to the Internet	69.5	76.3	80.7	83.8	88.3	90.7

*ICT: information and communication technologies
** having web site issue does not include having social media tools.

Source: TURKSTAT, (2020b)

Table 4. The proportion of Turkish people interact with digital public platforms

Year	Individuals interact with public authorities	Obtaining information from web sites	Downloading official forms	Submitting completed forms
2015	28.4	27.0	12.8	12.1
2016	36.7	32.6	16.3	22.6
2017	42.4	37.6	22.5	30.4
2018	45.6	41.7	25.5	30.1
2019	51.2	45.8	29.2	35.5
2020	51.5	48.7	24.5	28.6

Source: adapted from TURKSTAT (2020c)

termined households probably want to access more public services by digital applications or platforms. In addition, there is a positive trend between internet access and the growth of the population in Turkey.

The population was calculated as 83.614.362 in 2020 (TURKSTAT, 2021a). In 2020, the population aged between 15 and 64 was calculated as 56.592.570 (TURKSTAT, 2021b). Based on TURKSTAT (2018), this paper presents three scenarios of Turkish population growth as main, low and high scenario for 2023, 2040, 2060 and 2080 by Figure 1. According to estimated three scenarios, it can be said that the proportion of the population aged between 15 and 64 will be always higher. The need of public services can be varied by age of users. Thus, the numbers of sub-services will be an important indicator to determine the efficiency of online public services.

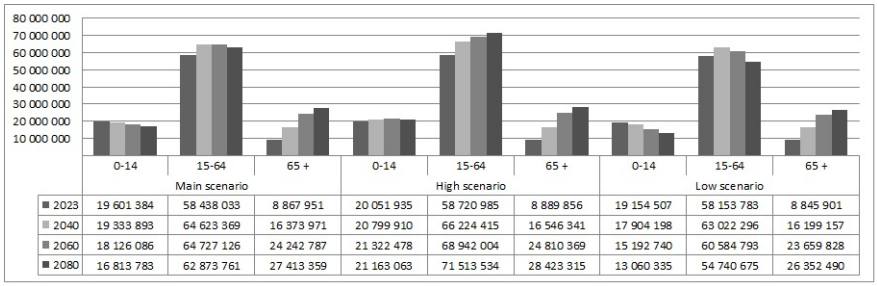
Policy makers should pay attention to improve e-Government platform and digital public services based on target group/users. The target group or users in the population is important to estimate the demand of E-government.

Table 5. The proportion of households having internet access

Year	Proportion of households*	The population (Address Based Population) (thousand)**
2011	42.9	74 224
2012	47.2	75 176
2013	49.1	76 148
2014	60.2	77 182
2015	69.5	78 218
2016	76.3	79 278
2017	80.7	80 313
2018	83.8	81 407
2019	88.3	82 579
2020	90.7	83 385

Source: *adapted from TURKSTAT, 2020d and **TURKSTAT, 2021a

Figure 1. Three Scenarios for Population Growth
Source: TURKSTAT, 2018



	0-14	15-64	65 +	0-14	15-64	65 +	0-14	15-64	65 +
	Main scenario			High scenario			Low scenario		
2023	19 601 384	58 438 033	8 867 951	20 051 935	58 720 985	8 889 856	19 154 507	58 153 783	8 845 901
2040	19 333 893	64 623 369	16 373 971	20 799 910	66 224 415	16 546 341	17 904 198	63 022 296	16 199 157
2060	18 126 086	64 727 126	24 242 787	21 322 478	68 942 004	24 810 369	15 192 740	60 584 793	23 659 828
2080	16 813 783	62 873 761	27 413 359	21 163 063	71 513 534	28 423 315	13 060 335	54 740 675	26 352 490

The Covid-19 Pandemic and the Demand of Digital Public Services

This study assumes that the Covid-19 pandemic has encouraged the adoption of digital public services and e-Government services in general. At this point, recent news can prove this assumption. We summarize the important news about the link between the Covid-19 pandemic and e-Government services as follow:

- The Head of the Digital Transformation Office said that Turkish citizens benefits from e-Government Gateway to get public services during the Covid-19 pandemic. In 2020, most of public services were digitalized efficiently and some new public services have been launched by e-Government Portal. For example, citizens applied a service as e-Government Gateway "Pandemic Social Support Pre-Application" through the e-Government Gateway provides digital services including "Structuring SGK Debts", "Short Work Allowance Application" and "Temporary Workforce Support Application" for citizens during the Covid-19 pandemic. In addition, e-Government Gateway presented new services as "Income Loss Support for Tradesmen and Craftsmen" and "Lease Support" in the last days of the year (Presidency of the Republic of Turkey Digital Transformation Office, 2021).

- During the Covid-19 pandemic, the mostly used (111 million 892 thousands 759 times) public service was determined as 4A Service Scheme by Social Security Institution. The Pandemic Social Support Pre-Application service of the Ministry of Family, Labor and Social Services with 111 million 148 thousand 326, and the Social Assistance Information service ranked third with 85 million 519 thousand 479 inquiries (Ünal, 2020).
- By 2020, the importance of digital transformation in government services has been proved due to the numbers of used e-services by Turkish e-Government portal. The Head of the Digital Transformation Office determined that citizens can access many public services by using Turkish e-Government Portal without going out. In addition to, 95 percent of citizens were found to be pleased in e-services of Turkish e-Government Portal. 91.5 percent of them also said that they could access to public services by 7/24. The total number of enters was calculated as over 2.3 billion. (Anadolu Agency, 2021a).

Table 6. The ranking of the most popular e-service from the e-Government Gateway during the Covid-19 pandemic

Ranks	Service authority	Public Service
1	Ministry of Justice	Case File Query
2	Social Security Institution	4A Service Statement (Last 6 months)
3	President of revenue management	Tax Debt Inquiry
4	Union of Turkish Notaries	Registered Vehicle Inquiry (Real Person)
5	Ministry of Family and Social Services	Social Assistance Information Inquiry
6	Ministry of Health	HES Code Generation and Listing
7	Social Security Institution	SGK Registration and Service Statement / Workplace Title List
8	General Directorate of Security	Criminal Inquiry Written on Vehicle Plate (Real Person)
9	Ministry of Family and Social Services	Pandemic Social Support Pre-Application
10	General Directorate of Land Registry and Cadastre	Deed Information Inquiry
11	general Directorate of Security	Inquiry for Parking Information Where My Vehicle Was Taken (Real Person)
12	Ministry of Justice	Execution File Query
13	Social Security Institution	Receiving 4A / 4B Incapacity Payment
14	Turkish Employment Agency (İŞKUR)	Unemployment Benefit / Job Loss Compensation and Short Work Allowance Inquiry
15	Information Technologies and Communication Authority	Mobile Line Inquiry
16	National Defense Department	Inquiry of Private Classification Result and Application for Referral
17	National Defense Department	Military Status Document Inquiry
18	Ministry of Interior	E-Application
19	Social Security Institution	4A Retirement Monthly Information
	Ministry of Transport and Infrastructure	Barcode Vehicle Inspection Report Query

Source: adapted from e-Government Gateway, n.d.a, *(02.05.2021).*

- During the Covid-19 pandemic, citizens with 65 age and upper can apply their e-government password by E-Government Gateway and then the password is delivered to their home addresses (Anadolu Agency, 2021b).
- E-Government Gateway launched new e-services including health and social security services during the pandemic. For example, The Head of the Digital Transformation Office determined that questioning and tracking information about medical supplies and hearing aids used by insured citizens can be done easily, quickly and securely through the e-Government Gateway. Citizens can now inquire about the medical supplies they have purchased, learn about the ongoing medical supplies that are still in use, access medical prescriptions and see report information (Anadolu Agency, 2021c).

Table 6 shows the most popular digital public services of e-Government Gateway which the citizens mostly used them during the Covid-19 pandemic. The ranking of public services is changed by the time. The demand or need of public services can change based on the conditional periods or generation. For example, "HES Code Generation and Listing and Pandemic Social Support Pre-Application" are public services which are produced during the Covid-19 pandemic.

The Functional Management Model of Digital Public Services

The classification of public services is a useful tool to plan and set management model for public services in a country. In Turkey, the classification of public services is a related with public finance and public administration. According to public finance side, public services are categorized as institutional, functional, financing type and economic through analytical budget classification. In another classification related to public services can be presented as public service in an organic-based, material-based and form-based (Akyılmaz, et.al., 2013; Ateş and Banazılı, 2020). At this point, this study keeps the functional classification approach to categorize public services and e-services. Table 7 presents a general functional classification for public services.

Table 7. The functional classification of public services in Turkey

I (code)	Functional Classification
01	General Public Services
02	Defense Services
03	Public Order and Security Services
04	Economic Affairs and Services
05	Environmental Protection Services
06	Settlement and Community Welfare Services
07	Health Service
08	Recreation, Culture and Religious Services
09	Education Services
10	Social Security and Social Assistance Services

Source: The Presidency of Strategy and Budget, 2019

Turkish public administration system can be divided into two main dimensions as "central government management and decentralized (local) government management". Central government management consists of the capital organization and the provincial organization. On the other side, decentralization management is divided into geographic and functional decentralization organizations (Eryılmaz, 2010; Ateş, 2019). Central government management is based on the presidency of the republic and council of ministers and decentralized government management consists of location-based corporations, service-based corporations and public-based professional organizations (Yördem and Şeker, 2018).

Table 8. The main e-public contents for Turkish Digital Government System

Contents*:	The digital platform*:	Authority*:
Planning and Development	www.sbb.gov.tr	Presidency of Strategy and Budget
Education	www.meb.gov.tr	Ministry of Education
Health	www.saglik.gov.tr	Ministry of Health
Social Protection and Welfare	www.ailevecalisma.gov.tr	Ministry of Family, Labor and Social Services
Employment and Decent Work	www.ailevecalisma.gov.tr	Ministry of Family, Labor and Social Services
Environment	www.csb.gov.tr	Ministry of Environment and Urbanization
Energy and Water	www.enerji.gov.tr www.tarimorman.gov.tr	Ministry of Energy and Natural Resources Ministry of Agriculture and Forestry
Finance and Taxation	www.hmb.gov.tr	Ministry of Treasury and Finance
Industry and Trade	www.sanayi.gov.tr www.ticaret.gov.tr	Ministry of Industry and Technology Ministry of Trade
*The information is based on United Nations E-Government Survey 2020 - Member States Questionnaire (MSQ).		

United Nations E-Government Survey (2020) gives useful information about the implementation of e-public services in Turkey. The main parts of the findings about e-public services can be summarized as Table 9:

In Turkey, most of digital public services can be provided by e-Government portal which called as e-government Gateway. e-Government Gateway aims to provide e-services to its all kinds of users by one point. The management of e-Government Gateway is monitored by The Presidency of the Digital Transformation Office and Türksat Company (e-Government Gateway, n.d.b).

e-Government Gateway provides digital public services with 7/24 access options. The last calculated e-services were 5764 and the number of users was calculated as 54.308.337 (e-Government Gateway, n.d.c). When observing e-Government Gateway web site, it is seen that, two main public authorities are ministries and municipalities. On the other side, e-Government Gateway is seen to design based on functional usage. There are classifications for service providers such as (e-Government Gateway, n.d.d):

- Public Authorities including ministry, presidency and public institute
- Public universities and foundation universities
- Municipalities
- Private enterprises

Table 9. The results of the United Nations e-government survey (2020) for Turkey

Contents and Questions*	Findings*
The official e-government portal:	There is an official e-government portal in Turkey. The users can access this portal by the link as: www.turkiye.gov.tr
How does Turkey provide e-Participation?	Turkey provides e-participation by these options: www.cimer.gov.tr edilekce tbmm.gov.tr
Is there an open government data?	Turkey gives an official statistical portal as: https://www.resmiistatistik.gov.tr/
What does Turkey do for government/ public procurement?	Turkey gives an official digital portal for public procurement as: ekap.kik.gov.tr
Are there any different digital government portals for the citizens?	Turkey provides many e-portals for digital services as: www.uyap.gov.tr ivd.gib.gov.tr spor.sgm.gov.tr eokulyd.meb.gov.tr ais.osym.gov.tr enabiz.gov.tr mersis.gtb.gov.tr eba.gov.tr nvi.gov.tr
Who is the charge of e-government in Turkey?	In Turkey, two main official departments are responsible for e-government portal management. These are: - Digital Transformation Office of the Presidency - http://www.cbddo.gov.tr - Ministry of Transport and Infrastructure - http://www.uab.gov.tr

Source: adapted from United Nations E-Government Survey 2020

This study aims to give sample implication for the functional management of digital public services by government. In this context, we summarize main digital public services provided by the ministries in Turkey as:

1. **The Ministry of Education**: The education services including pre-school, primary school, secondary and high school education is monitored by The Republic of Turkey Ministry of National Education in Turkey (T.C. Millî Eğitim Bakanlığı Strateji Geliştirme Başkanlığı, 2019). The Ministry of Education provides users for e-Service portals as:
   - “MEBBİS
   - e-Okul
   - DYS
   - e-İmza
2. **The Ministry of Justice:** The Ministry of Health manages 9 e-services via Turkish government portal. The citizens can benefit from e-Government Gateway to query their case file. In addition, the web site of the ministry of justice provides 7 e-justice services to citizens (Republic of Turkey Ministry of Justice, n.d). These e-services can be presented as:
   - Citizen Portal
   - E-Sales Portal
   - Lawyer Portal

- Arbitrator Portal
- Expert portal
- Institution portal
- Mediator portal

UYAP ensures the internal automation of the central and provincial organization of the Ministry of Justice, its affiliated and related organizations, all judicial and administrative judicial and judicial support units as hardware and software, and similarly, the integration of public institutions and organizations with external units that have established information automation systems, by using all the necessary technological developments of today. UYAP is an information system that constitutes the e-Justice pillar in the e-Transformation process. UYAP Citizen Portal Information System is a service provided by the Ministry of Justice in order to enable our citizens to follow all the files in all judicial and administrative courts and enforcement offices in Turkey electronically, and has been developed with the aim of enabling our citizens to access the judiciary faster and make the best use of judicial services. (UYAP, n.d.a).

Some documents that were archived in the past and were difficult to access have become easily accessible thanks to this system. It stands for the National Judicial Network Information System. In this way, it provides the opportunity to connect the organizations, administrative and judicial bodies in all provinces affiliated to the Ministry of Justice in terms of hardware and software. In short, we can say that UYAP is the operation of the entire judicial system. UYAP also helped all judicial units to transfer their fields of activity to the electronic environment. The below documents can be obtained through the National Judicial Network Information System as follows (Milliyet, 2020):

- Criminal records,
- MERNIS population records
- Address records in the address recording system
- Driving license records
- Central bank exchange rates
- TAKBİS land registry and cadastral records

We can summarize the main justice services by UYAP portal as (UYAP, n.d.b):

- Services including the litigation: Lawyer Portal and Citizen Portal
- Services including the pursue a lawsuit: Lawyer Portal
- Document Display: All Authorized Documents
- File Display: Law, Criminal, Enforcement, Supreme Court, Council of State
- Phases Display: Law, Enforcement
- Sending Documents
- Examination Procedures: Exam Application for Arbitrator and Mediator
- Registration Procedures: Application for Arbitrator and Mediator
- Document Verification: Verify the documents produced in UYAP
- File Accept / Reject: Arbitrator and Mediator
- Fee Calculator: Lawyer Portal and Citizen Portal
- Payment Transactions: Lawyer Portal and Citizen Portal

3. **The Ministry of Health:** The Ministry of Health manages some e-services via Turkish government portal. The main digital portals can be classified as:

- Central physician appointment system (MHRS)
- E-Nabiz Personal Health System
- Republic of Turkey Ministry of Health Communication System
- Republic of Turkey Ministry COVID-19 Information Page
- HES code

The Ministry of Health classifies its e-services through two main categories as "e-devltet Turkish e-Government Portal implications" and "corporation implications". In Turkish e-Government portal, there are eleven e-services and corporation implications include thirty two e-services. The users can access e-nabiz and MHRS system by web site and mobile application. The mobile application can be downloaded from AppStore (Apple) and Google Play Store (Android Apps) (Ministry of Health, n.d).

4. **The Ministry of Environment and Urbanization**: The Ministry of Environment and Urbanization classified its e-services as "projects, urban implications, environment implication, corporation implications and general implications" The ministry of environment and urbanization provides some e-services by digital portal systems. On the other side, some of e-services aim to inform users or give new links to their purposes. The numbers of e-services can be given as Table 10 (Republic of Turkey Ministry of Environment and Urbanisation, n.d):

Table 10. The number of e-services of The Ministry of Environment and Urbanization

The category	(n)
Projects	42
Urban implications	16
Environment implications	32
Corporation implications	6
General implications	9

5. **The Ministry of Energy and Natural Resources:** The Ministry of Energy and Natural Resources gives a digital portal as https://portal.enerji.gov.tr/my.policy for its users.
6. **The Ministry of Agriculture and Forestry:** The ministry of agriculture and forestry provides some e-services by Turkish e-Government Portal. The functional e-services of the ministry of agriculture and forestry can be classified as (e-Government Gateway, n.d.e):
    a. E-services from Turkish e-government Portal:
        i. Livestock Services includes four e-services
        ii. Agricultural land evaluation services includes one e-service
        iii. Agricultural services includes one e-service
        iv. Loss and Loss of Income Payments includes four e-service
        v. Land consolidation services includes sixty seven e-services
        vi. Agriculture and Livestock Support / Grant Services includes four e-services

   b. There are two hundreds seventy five e-services based on the function of authentication service
   c. The main web site of the ministry provides three e-services for its users.
7. **The Ministry of Treasury and Finance:** The web site of the ministry of treasury and finance classified sixteen e-services. (Republic of Turkey Ministry of Turkey and Finance, (n.d.).
8. **The Ministry of Labour and Social Security:** The Ministry of Labour and Social Security provides fifteen integrated public services and four identity verification services by e-Government Gateway (e-Government Gateway, n.d.g).
9. **The Ministry of Family and Social Services:** The Ministry of Family and Social Services provides integrated twenty two public services and one identity verification service by e-Government Gateway (e-Government Gateway, n.d.h).
10. **The Ministry of Industry and Technology:** The web site of the ministry of industry and technology gives a segment for e-services on its web site. When users Access into the segment of e-services, the new digital platform can be accessed (Republic Of Turkey Ministry of Industry and Technology, n.d.a). Based on this platform, the users can see all e-services on the one page. In the context of BAMS (Reducing Bureaucracy and Simplifying Legislation) Project, there are one hundred seventy nine e-services can be accessible via Turkish e-Government Portal. Electronic services, which is a big step in the transition to Digital Ministry, make it easier for citizens to apply. BAMS provides time-efficient public service management from the side of users to the public authority (Republic Of Turkey Ministry of Industry and Technology, n.d.b).
11. **The Ministry of Trade:** The web site of the ministry of trade guides its users for e-services. There is a segment for e-functions on the web site. When the users access into this segment, seventy one e-services are all arranged in the one page (Republic of Turkey Ministry of Trade, n.d).
12. **The Ministry of Transport and Infrastructure:** The web site of the ministry of transport and infrastructure presents e-services by their functional category. (Republic of Turkey Ministry of Transport and Infrastructure, n.d.). The e-services can be classified as below:
    a. e-Rail Service category provides two main e-services for its users.
    b. e-Shipping Service category provides two main e-services for its users.
    c. e-Communication Service category provides thirteen e-services for its users.
    d. e-Aviation Service category provides six e-services for its users.
    e. e-Land Transportation Service category provides three e-services for its users.

The Ministry of National Defence, The Ministry of Interior, The Ministry of Foreign Affairs, The Ministry of Culture and Tourism and The Ministry of Youth and Sports provide some public services through e-Government Gateway for the citizens.

Like as e-ministry, Turkish digital government system provides a model of e-Presidency/e-Office. Turkish centralized government management (the presidency of the republic) includes new public organizations as "Digital Transformation Office, Finance Office, Human Resources Office and Investment Office" which have been established under the Presidency. These public organizations have a special budget with administrative and financial autonomy (Presidency of the Republic of Turkey Finance Office, (n.d). We can give brief information about the digital transformation in the Presidency/Offices in Turkey as below:

1. **The Presidency of Strategy and Budget:** This presidency aims to plan strategic development management of Turkey and set a plan for budget in the long term. This e-presidency provides 6 main digital service portals as "budget management information system (e-budget), program budget management information system, public investment information system (KaYa), Presidential Plan Program Monitoring evaluation system, e-signed official letter confirmation, sustainable development". (Presidency of the Republic of Turkey Strategy and Budget Office, n.d.)
2. **The Presidency of the Digital Transformation Office:** This presidency is responsible for digital transformation in public services and provides innovative projects for digital government system. Recently, the presidency of the digital transformation has launched thirteen projects to achieve digital Turkey in the long term (Presidency of the Republic of Turkey Digital Transformation Office, n.d.).
3. **The Presidency of Turkey Directorate of Communication:** This presidency aims to improve and support citizen-government relationship through effective and accessible communication channels and platforms (Presidency of the Republic of Turkey Directorate of Communication, (n.d.).
4. **The Presidency of Turkey Finance Office:** The web site generally performs to communicate with users and inform them (Presidency of the Republic of Turkey Finance Office. (n.d.).
5. **The Presidency of Turkey Human Resource Office:** The web site guides users bout employment career and job. The users can see new projects of the presidency of Turkey Human Resource Office. Recently, ten projects have been launched. (Presidency of the Republic of Turkey Human Resources Office, n.d).
6. **The Presidency of Turkey Investment Office**: This presidency aims to provide financial services to its investors by giving services as "Customized Consulting; Coordination with Stakeholders; Business Facilitation; Site Selection Support; Tailor-Made Delegation Visits; Project Launch; Partnership Development Assistance and Ongoing Support". In the web site, users can find useful information about investment in Turkey. There is a segment as "Investment guide" and users can access every kinds of information about investment (Presidency of the Republic of Turkey Investment Office, n.d.).

According to e-Government Gateway, the functional classification of the public services can presented as Table 11:

Table 11 presents an alternative functional classification of digital public services through e-Government Gateway in Turkey. The main categories are "justice, education, job and career, traffic and transportation, environment, agriculture and livestock, social security and insurance, general information, personal information, complain and information, tax, fee and penalties, government and legislation, security, health, telecommunication" and every categories includes some digital public services for the citizens (users). When observing these categories, it is seen that several ministries can have a public service for the related category. In this context, it can be determined that the category of the public service is more important to design the e-Government Portal due to the functional management approach.

E-Government Gateway also provides public services of the local government such as municipalities. In addition to the services provided by 367 municipalities in 81 provinces, with the e-Government Gateway, municipal transportation, water, sewerage, etc. Citizens can also benefit from the information and application services provided by 27 local service institutions that provide services (e-Government Gateway, n.d.f).

Table 11. The functional classification of public services by e-Government Gateway

Functional Classification*	Service Type*	Public Authorities (Ministry and Presidency)*
Justice	Services including access to judicial files and file details.	Ministry of Justice
Education	Services including education and scholarship. Citizens can access their exam result Library services Query of the exam result Query of the formal document (higher education degree, associate professorship etc.)	Ministry of Family and Social Services Presidency The Ministry of Labor and Social Security Energy and Natural Resources Ministry Ministry of Youth and Sports culture and Tourism Ministry Ministry of Education Turkish Employment Agency (İŞKUR) Ministry of Transport and Infrastructure Council of Higher Education
Job and Career	Services including job application Query of the result of job application e-bordro (payroll) Access service scheme	Ministry of Justice Ministry of Family and Social Services Presidency Directorate of Communications Presidency Human Resources Office The Ministry of Labor and Social Security environment and urban ministry Ministry of Foreign Affairs President of revenue management Ministry of Treasury and Finance Ministry of Education National Defense Department Ministry of Health Social Security Institution Ministry of Agriculture and Forestry Parliament Presidency Ministry of Trade Turkish Employment Agency (İŞKUR) Ministry of Transport and Infrastructure Council of Higher Education
Traffic and Transportation	Services including query of the documents Access to documents related to public authorities.	The ministry of environment and urban President of revenue management National Defense Department PTT Ministry of Trade Ministry of Transport and Infrastructure
Environment, Agriculture and Livestock	Services including the query of the documents related to agriculture and livestock	The Ministry of Labor and Social Security The ministry of environment and urban Ministry of Agriculture and Forestry
Social Security and Insurance	Query of social benefits Access to social benefits Apply social benefits Query of other documents related to social security and insurance	Ministry of Family and Social Services The Ministry of Labor and Social Security Ministry of Treasury and Finance Ministry of Health Social Security Institution Turkish Employment Agency (İŞKUR)
General Information	Services including query of the documents Access to documents related to public authorities.	Ministry of Justice Ministry of Family and Social Services Presidency Presidency Digital Transformation Office Presidency Finance Office Presidency Directorate of Communications Presidency Strategy and Budget Office Presidency Human Resources Office The Ministry of Labor and Social Security Presidency Investment Office Energy and Natural Resources Ministry environment and urban ministry Ministry of Youth and Sports Ministry of Interior Ministry of Treasury and Finance culture and Tourism Ministry National Defense Department PTT Ministry of Health Ministry of Industry and Technology Social Security Institution Ministry of Agriculture and Forestry Ministry of Trade Turkish Employment Agency (İŞKUR) Ministry of Transport and Infrastructure

continued on following page

Table 11. Continued

Functional Classification*	Service Type*	Public Authorities (Ministry and Presidency)*
Personal Information	Services including query of the documents Access to documents related to public authorities.	Ministry of Justice Presidency Directorate of Communications The Ministry of Labor and Social Security Ministry of Youth and Sports Ministry of Treasury and Finance culture and Tourism Ministry Ministry of Interior Ministry of Education PTT Ministry of Health Social Security Institution Ministry of Agriculture and Forestry Turkish Employment Agency (İŞKUR) Ministry of Trade Ministry of Transport and Infrastructure
Complain and Information	Services including query of the documents Access to documents related to public authorities. Monitoring denunciation	Presidency Directorate of Communications The Ministry of Labor and Social Security Ministry of Youth and Sports Ministry of Interior Culture and Tourism Ministry PTT Ministry of Health Social Security Institution Ministry of Agriculture and Forestry Ministry of Trade
Tax, fee and penalties	Services including query of the documents related to tax, fee and penalties	PTT Ministry of Transport and Infrastructure
Government and Legislation	Services including query of the documents Access to documents related to public authorities.	Ministry of Justice Ministry of Family and Social Services Presidency Directorate of Communications Presidency Strategy and Budget Office The Ministry of Labor and Social Security environment and urban ministry Ministry of Youth and Sports Ministry of Treasury and Finance Ministry of Interior culture and Tourism Ministry Ministry of Education National Defense Department Ministry of Health Social Security Institution Ministry of Agriculture and Forestry Ministry of Commerce Ministry of Transport and Infrastructure Ministry of Family and Social Services Ministry of Interior Ministry of Transport and Infrastructure
Security	Services including query of the documents Access to documents related to public authorities.	Ministry of Family and Social Services Ministry of Interior Ministry of Transport and Infrastructure National Defense Department
Health	Services including query of the documents, medical reports etc. Access to documents related to social security and insurance	Ministry of Family and Social Services Ministry of Health Social Security Institution
Telecommunication	Services including query of the documents Access to documents related to public authorities.	PTT Ministry of Commerce Ministry of Transport and Infrastructure
*The info is based on e-Government Gateway, n.d.d		

Source: created by authors

Table 12 summarizes the general public services of the municipality by e-Government Gateway in Turkey. It is seen that there are three main public service classifications as standard service, personal service and water and sewage service" for the municipality service type in e-Government Gateway. These services can change according to local government of the city and region.

To sum up, the functional management of public services can be a good guide for e-Government portal. Both of managers and users can benefit from the functional management approach. When observing

Table 12. Services of the municipality on the e-Government Gateway

Service*	Service Contents*
Standard services	Land Fair Value Inquiry Questioning The Pending Development Plan Municipal Services Inquiry Garbage Collection Information Inquiry E-Receipt Council Agenda Questioning Interrogation Of Council's Decision Event Information Inquiry Paperwork Daily Activity Plan Inquiry State Product Information Inquiry Tender Inquiry Zoning Status Inquiry Parliamentary Agenda Inquiry Questioning Parliament Decision Burial Interrogation Wedding Hall Status Inquiry Pharmacy Information Inquiry On Duty Fee Schedule Inquiry Death Information Inquiry
Personal services	Declaration Information Inquiry Obtaining Information, Application And Inquiry Request To Be Informed Registry Information Inquiry Accrual Information Inquiry Collection Information Inquiry Request / Suggestion Application And Inquiry
Water And Sewage	Fault And Maintenance Information Inquiry Dam Occupancy Rate Water Subscription Water Analysis Report Water Bill Inquiry

Source: adapted from e-Government Gateway, (n.d.f).

Turkish e-Government Portal, it is seen that the functional management approach is mostly used for the management of digital public services through digital government portal in Turkey.

SOLUTIONS AND RECOMMENDATIONS

Being a service, e-government is a tool to monitor citizens. It is necessary to gain citizen trust in the adoption of e-government as well as its benefits such as increasing efficiency, diversifying services and reducing costs (Warkentin, et.al., 2002). While e-government portals produce citizen-based services, these portals also provide information about citizens to governments (Silcock, 2001). However, ICT is still developing system and the future may welcome new concepts for government policy makers in the future.

When there is a rising population rapidly, developing countries such as Turkey, digital transformation is inevitable in the long term. This study is thought to be useful as providing the below contributions:

- Firstly, this study gives a sample case for designing e-government portal to achieve successful functional digital public service management in developing countries. In other words, it is thought to guide other developing countries to achieve successful digital transformation in public sector. Especially, this study can guide countries who are beginners in digital transformation.
- Secondly, there is a strong link between digitalization and future public services. In this point, governments can't sustain their public services without any digital applications or online platforms. There should be adaptable digital platforms to be improved in the long term.

FUTURE RESEARCH DIRECTIONS

Digital transformation in public services is a key issue globally. However, the management of public services of every country is a national issue in the practical view. Countries can manage their public services by digital portal and e-Government system. The management view of digital public services can be changed due to the main government management approach or other public policies. The implication of this study is limited with Turkey case and e-Government Gateway in Turkey. Accordingly, different e-Government portal management can present different implications.

CONCLUSION

Recently, e-Government is a rising trend in public management at the global level. Especially, the Covid-19 pandemic has showed the importance of the adoption of e-Government. According to Turkey case, the digital transformation in public services is seen as a vital issue for public policy in the long term. Since last decades, the digital transformation of government services has been evaluated and countries are ranking by their e-Government performances. The United Nations determines e-Government performance of member countries frequently and gives a rank for each country from 193.

The management of e-government portals is also important issue to achieve successful digital public service delivery to citizens or other users. At this point, this study investigates e-Government Gateway and other digital government portals whether they are functional or not for the citizens. As a result of observing main e-government portals form Turkey, it is seen that functional categorization is a key factor for the management of the digital public services. In addition, e-government Gateway which is the primary e-Government portal including every public authorities to give e-service, presents service classification based on functional factor.

As a result, it can be said that functional classification or categorization can be more useful for the adoption of e-government portals by the citizens or users in general. The citizens and users can find the public service easily and access it according to its category. In other words, the functional management and design can guide the users and citizens when using e-Government portal.

NOTE

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KEY TERMS AND DEFINITIONS

Digital Public Service: A digital service which is produced by digital government portal (central and local management) to meet citizen's needs and wants in a country.

Digital Transformation: The integration with ICT (Information and Communications Technology).

E-Democracy: It defines the opportunities for citizens to use information technologies as opportunities to participate in decision-making and management processes.

E-Government: As a result of using ICT (Information and Communications Technology) in public services, a digital government management system is created.

E-Government Development Index: The index which is developed by the United Nations to measure member countries' e-Government performance.

E-Government Gateway: Turkish e-Government Portal that provides

E-Government Portal: A digital portal which performs to give digital public services to the citizens.

E-Participation: It refers to the contribution of information technologies in improving the potential of citizens to organize communication and cooperation processes by providing solidarity with each other, beyond just expressing their demands to state institutions in very comprehensive participation opportunities and benefiting from state services.

Chapter 4
I&CT in the Public Administrations:
From E-Government to E-Democracy Through Digital Reporting

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ABSTRACT

Innovation represents a process of profound change, which can concern production models, service characteristics, or forms of interface with users. There are many necessary and effective levers to drive change, but certainly one of the most effective and available drivers is technological innovation. The difficulty of innovating in depth is even more evident in public administrations because this means changing the composition of the services and therefore of the interests that are primarily protected, which are the result of long-established processes that have taken place between the various stakeholders for some time. In public administrations, innovation can concern the internal services of the organization or of the territory governed by the organization itself and therefore the production and consumption processes of businesses and citizens. The purpose of this work is to investigate the progress of the managerial culture in the path of renewal of the Italian public administration in the transition from e-government to e-democracy, through digital reporting.

INTRODUCTION

Innovation represents a deep change process, in a company, that can interest the production models, the features of the services or the forms of user interfaces. It is always difficult to innovate a company in depth, because of the natural tendency to recreate historical behaviours of a consolidated power structure, a reassuring stratification of known competences, an organizational culture and a related self-representation that confers stability to the company.

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Many levers are necessary and efficient to guide change (new models of service, new competences amongst workers, incentives toward change, outsourcing of some services), but, for sure, one of the most efficient and available drivers is technological innovation. It is part of a more ample system of change levers, but surely, it constitutes one of the mainstays, especially in this historical phase.

The difficulties with innovating in depth is even more evident in public administrations because it means that they have to modify the composition of their services, and, therefore, of the primarily protected interests, which are the fruit of long historical and reciprocal adjustment processes between the stakeholders. Innovation physiologically activates processes of reallocation of public value produced and, therefore, it reactivates the political negotiation and allocation cycle of the benefits amongst the parties legitimately in competition.

In public institutions, innovation may interest internal services of the entity or of the territory governed by that entity and, therefore, the production and consumption processes of enterprises and citizens. In other terms, exemplifying on a local level, innovation may interest the Council (intended as public entity and, therefore internal innovation) or the City (territory innovation). Even in the second case, the innovation of the city, the public administration plays a decisive addressing, supporting, financial incentive and regulatory role.

Both on a comparative international level, and on an Italian level, in the course of the last twenty years, the innovation policies have been active on a system level, which is, with the higher-level coordinated entities changing the subordinate administrations. All the European Union Countries have adopted their e-government plan that indicates the investment priorities and the related objectives. The European Union itself has defined several initiatives of development support to the e-government in the member states.

Even Italy has introduced several information tools to ease the achievement of the simplification objectives, such as, the digital signature, the information protocol, the certified email and several services to the citizens that are, today, offered via digital platform. In 2012 a systematic development plan of the ICTs in Italian public administrations, defined Italian Digital Agenda (AGID) was approved. Even at the level of single institutions, in the last few years the important of innovation through the technological lever has progressively increased. If, in the past, the attention was focused on information tools as simple automation support to repetitive and very structured activities, today the attention as moved toward the strategic role of the information system as a lever of total and general innovation.

In this context, digital transformation and the tools made available by new technologies make it possible to significantly innovate the measurement of social, environmental, and economic performance and to make the communication of sustainability increasingly accountable. The digitization of accountability paths produces benefits both from a strategic-organizational point of view - reinforcing the internal governance of these aspects - and from a communicative-relational point of view - opening new channels of dialogue that allow to increase the involvement of citizens and stakeholders and raise confidence levels.

The new forms of digital reporting, therefore, can be effectively adopted by all public subjects who, increasingly in a systemic logic, are called to act and give an account of their choices and the results and effects produced in terms of social responsibility and sustainability.

THEORETICAL FRAMEWORK AND LITERATURE OF REFERENCE

This article is contextualized in the framework of the so-called “corporatization of the public administration”, a process that is concretized in the progressive introduction of public companies in a system of

managerial, organizational and government logics of economic-corporate matrix (Anselmi, 2003). On an international level, new idea of public management has been codified in the principles of the New Public Management first, and then in those of the Public Governance (Hood, 1991; Barzelay, 1992; Rhodes, 1996; Ferlie et al., 1996; Meneguzzo, 1997; Ongaro, 2002; Pollit & Bouckaert, 2002).

There have been remarkable consequences on the front of the management of companies and public administrations: proliferation of hybrid forms between internal and external management to the advantage of private subjects (Mussari, 1995; Padovani, 2004; Mulazzani & Pozzoli, 2005), new strategies for the enhancement of the public estate heritage (Amatucci, 2009; Vermiglio, 2012), innovative project for the re-use of dismissed buildings and areas (Anselmi et al., 2014), computerization and web based technology exploitation to support the provision of services. Regarding this last aspect, the literature concerning it has dwelled on the contribution Information Technology (IT) to the improvement of the management processes of public administrations.

Schedler and Scharf (2001) have observed how, thanks to the advent of innovative technologies, upon which the e-government system has been consolidated, new technology-driven strategic approaches have been created. Through these processes, public companies have been able to express a potential that had to date remained secondary.

The topic of e-government has been debated both on a technological level, oriented toward the study of technologies, systems, languages and applications developed in order to favour innovative forms of interaction with the community, and on an institutional-political plane, with reference to the benefits that the new technologies might generate regarding the level of inclusion and participation of the citizen to public life (Lenk, 1997; Reddick, 2005), the digital divide problem overcoming (Norris, 2001; Mossberger et al. 2003; Chen & Wellman, 2004; Helbig et al., 2009; Gulati et al., 2014), the organizational/managerial barriers in support of services and information to the community (Moon, 2002).

Other authors have remarked the role taken on by the new technologies in creating the conditions that allow the citizen to assume more control on the public services rendered by public administration (Dunleavy et al., 2006), as the thick network of inter-organizational relations deriving from the IT exploitation (Haveri, 2006; Osborne, 2010) and the need to redesign the provision modalities of the services, as well as the participation modality of the parties of the entire project (Pestoff, 2006; Pestoff et al., 2006; Bovaird, 2007; Needham, 2008; Boivard et al., 2009).

It is important to notice how the research lines proposed in literature in the last few years, albeit testifying interests in the e-government, may not define themselves as consolidated and universally shared (Heeks & Bailur, 2007; Yildiz, 2007). Some empirical studies (Barnes & Vidgen, 2004; Wong & Welch, 2004) have focused on the e-government processes shaped to the use of the website has a main tool. More recent studies have highlighted the implications and impacts deriving from the adoption of e-government tools on the degree of transparency reached by the public administrations (Bearfield & Bowman, 2016), on the efficacy of the administrative adoption (Wallis & Zhao, 2017), on the quality of the internal information (Alenezi et al., 2015). Cordella and Tempini (2015) highlight the circumstances in which the e-government initiatives may contribute to the simplification of bureaucracy and those in which they can make it worse.

In reference to the management results of the e-government, part of the doctrine is quite critical: some authors (West, 2004) think that e-government is a missing opportunity for a radical transformation of the public administration, whereas Norris and Reddick (2012) affirm that the process of adoption of the e-government technologies has not met the expectations of a radical reform, being them rather limiting changes. Most of the doctrine supports the many advantages deriving from the adoption of these tech-

nologies to support management process, since the e-government 2.0 has been establishing itself in the last few years. In relation to this, some authors (Sun et al., 2015) have already proposed a framework.

In more recent years, this stream of literature has found many fertile contaminations with the co-production one, which had already highlighted the importance of the involvement of the users/citizens in the production of public services (Sharp, 1980; Whitaker, 1980; Brudney & England, 1983; Levine & Fisher, 1984; Normann, 1991; Pollit et al., 2007).

Some scholars (Osborne et al., 2016; Bryson et al., 2017) underline the importance of co-production in creating public value. Other authors (Williams et al., 2016) analyse the conditions based on which, the co-production processes may destroy the public value (public value failures) instead of creating it. In some studies (Boviard et al., 2016) the mechanism of participation to co-production are deepened, concluding that results and dynamics may be different in cases of collective or individual participation. One stream of literature has deepened the potential benefits and the issues linked to the co-production processes in relation to specific public services: for example, Wiewiora (Wiewiora et al., 2016) has highlighted the possible opportunities and challenges deriving from the involvement of the citizens in the co-production of services linked to public infrastructures. Some more theoretical streams, such as Howlett (2017) have tried to conceptualize coproduction not only as a public management tool, but also as a policy tool to the service of public companies in an interdisciplinary perspective. The doctrine has highlighted some criticality aspects: Osborne (2010) has affirmed that part of the literature and of the practice adopts a partial vision of the co-productive phenomenon, conceived as the integration of new elements in the provision of specific public services rather than as the innovative rethinking of the way to see the public service in general. Osborne (2017) highlights how the topic of co-production is still scarcely researched compared to other public management topics. This demonstrates that the phenomenon is still partly unexplored and there are no universally shared theories about it.

From this review emerges the need to deepen, through empirical studies, the impacts, and the contribution of the e-government tools on the co-production processes, putting in relation these two study streams.

Osborne (2010) affirms, in this respect, that the e-government tools can stimulate and furtherly develop the co-production processes, while Margetts (2006) maintains that digital governance has the potential to generate a spontaneous and genuine involvement and commitment from the citizens within the provision processes of the public services. In such perspective, the e-government tools are seen as the "engine" for the enhancement of the co-production processes. The Literature review allows to affirm that, despite there have been several empirical contributions that have studied the impact of the e-government tools on the management processes (web sites, digital platforms, social networks), the studies regarding the functioning and implications, on the public administration, of the technological solutions in the perspective of the co-production of public services, result to be absent.

THE FUNCTION OF INFORMATION AND COMMUNICATION WITHIN THE PUBLIC ADMINISTRATION

Amongst the several functions conducted by the public administration (functions of regulation of the economic system, of coordination between institutions and social actors, etc.) the one that stands out is the function of information and communication (Borgonovi, 2000).

Such function, that in the facts is realized with several forms of regulation and with the provision of services (even technologic and computerized ones) concerns an asset that has features that are very peculiar and critical to the functioning of the economic and social system

The information and their elaboration in knowledge that is useful to the decisions and the actions, cover a role that is fundamental to the financial markets (for example, the information on the quarterly results of a company or on the trend provided for the GDP), in the protection of people's privacy (in this case in terms of circulation of sensible information). However, at the same time, they are useful in crime fighting activities, in consumers' protection and for the opportunities that are offered by the public administration entities.

The acquisition and management of the information has become so important in the social and economic life, and it presents such problems in its management through the market, that the public institutions are called to define rules and to provide services that ease the spreading of information that are relevant for the improvement of production and consumption processes, including those of financial nature.

In affirming this new role of the public administration, information and communication technologies assume a growing importance, since they may represent the tool through which the entities support the coordination of the management of the activities through the several subjects involved in the provision of the service, stimulating the accountability through information transparency.

In particular, ICTs have contributed to modify, in a radical way, the access to information, as well as the space-time borders between individuals and public institutions (Pollifroni, 2003).

This progressive convergence of the change objectives of the public sector with the introduction of new technologies having the characteristics of making transparent and shared the information and of reducing the communication times has been defined e-government[1].

THE CONCEPT OF TRANSPARENCY AND ITS IMPLICATIONS WITHIN THE PUBLIC SECTOR

The reforms in the public sector, which have widely involved several spheres of daily life, register the progressive growth of the autonomy of the single organizations, enhancing the function of management, its autonomy and the attribution of the related responsibilities, the introduction of new methodologies, managerial tools, evaluation, and accountability measurement systems. The reforms have emphasized the aspect of responsibility, of having to account for the results obtained, which is reinforced in case the resources used are not owned (Matacena, 2002).

In this context, we have seen an attempt to create a system of almost-markets to stimulate competition and benchmarking through the activation of virtuous evaluation, accountability, and social reporting paths, as well as of an enhanced information access.

The study of the literature takes into consideration the concept of transparency, linked to the information regarding the employment of resources and the results obtained, and proposes a summary of the definition found in the academic sphere and of the implications that transparency has regarding accountability and performance. Most of the definitions recognize that transparency is related to the degree to which an organization reveals information related to its own decision-making processes, to its own procedures, to its own functioning, to the use of resources, to the efficacy and efficiency in providing services, to the reporting of results and to the impacts of the administrative activity (Mussari, 1997; Welch & Wong, 2001; Anessi Pessina, 2002; Steccolini & Marcuccio, 2005; Curtin & Meijer, 2006).

Hood (2010), for example, defines transparency as "*the conduct of business in a fashion that makes decisions, rules and other information visible from outside "*, whereas Armstrong (2005) associates it to an "*unfettered access by the public to timely and reliable information on decisions and performance in the public sector"*. Other authors (Grimmelikhuijsen & Welch, 2012) define transparency as the "*disclosure of information by an organization that enables external actors to monitor and assess its internal workings and performance"*. According to Bartocci (2003) and Guarini (2008), public administration is called to report to society regarding its own actions and results in a transparent and exhaustive way, opening itself toward the public through communication policies based on transparency (disclosure). Furthermore, Kopits and Craig (1998) affirm that transparency requires the possibility to quickly access "a *reliable, comprehensive, timely, understandable, and internationally comparable information (…)*. Finally, OECD (2002) defines transparency as "*the capacity of regulated entities to identify, understand and express views on their obligations under the rule of law",* and affirms that "*the access to information, consultation and active participation in policy-making contributes to good governance by fostering greater transparency in policymaking, more accountability through direct public scrutiny and oversight"*, therefore arriving to intend transparency as the intermediate result of the correct application of the three explained dimensions. According to OCSE, the availability of the information exposed to public control represent a necessary condition in order to respond to the needs of the subject involved in the activity of the public administration. Furthermore, even the inclusivity would lead back to the extent to which the government is transparent, accessible, and reactive toward all subjects. (the more evident the passage from the mere transparency to inclusivity, the higher the degree of openness and accountability in the public administration). Regarding the access to information, OECD (2001) has identified some structural pre-conditions, such as the presence of a legislation in matter of the rights to information and transparency, of the definition of the institutional mechanisms able to guide the tangible application of interventions to support higher transparency and information, of the existence of self-sufficient autonomous control structures (ex. Supervisory boards). Other authors have tried to also identify possible incentives in order to increase disclosure for information purposes (Lüder, 1992; Fisher et al., 2005), identifying some categories of possible incentives (political, financial, social, institutional or administrative). The literature has also highlighted the strict link between transparency, good governance, accountability, and performance under many aspects. In the first place, transparency is seen as an incentive factor of the "good governance" since it is supposed to contribute to:

- Better use of resources (with the consequent improvement of the achieved outcomes), encouraging the continuous performance improvement (Hood, 2006);
- Modification of power relations, since it hinders self-referentiality and makes it more difficult to use information as a source of power (Hinna et al., 2006; Meijer, 2012);
- "Social legitimation" and the reduction of the corruption rate (Meijer, 2009), increasing the level of trust and the perception of integrity toward the public administration (Campbell, 2003; Curtin & Meijer, 2006; Tolbert & Mossberger, 2006; Osimo, 2008; Cook et al., 2010).

To this purpose, Heald (2006) affirms that there exists a triangular relationship between transparency, openness and surveillance and it arrives to observe that transparency might substitute accountability, in case an open democracy is realized, that is, when the public control is exercised directly from the citizen.

In second place, transparency is a primary condition of accountability (intended as availability and access to useful actions meant to satisfy the knowledge needs of the interested subjects), and it needs

the path toward accountability to be developed around the frameworks on which a judgement on added value is requested (Meijer, 2003; Guarini, 2008). According to Hood (2010), indeed, accountability is intended as answerability, that is, as the ability of the public administration to respond, that implies the sharing of information with those required to be accountable, whereas transparency is intended as opening, that is, as the way to account for one's own conduct, whether it is an individual or an organization. Accountability expresses, therefore, an informative responsibility, and it substantiates in that "*system of communications, both internal and external, that, within transparency and result control find their full conformation*" (Matacena, 2002). This means that, through accountability is realized the control power on the results of the activities of those who will bear the effect of them.

Transparency and access to the information regarding the processes and the results represent key principles of performance and of the relations between performance and accountability (Piotrowski & Rosenbloom, 2002; Dubnick, 2005), because, if the government processes (and their related results) are not transparent, the fundament of accountability is dropped (Bovens, 2007). The strategies of the New Public management for the measurement and improvement of performance imply the introduction of new concepts and tools such as benchmarking and the identification of the best practice for the comparison of performances between entities (Montesinos & Brusca, 2009), which are possible only if there are information to be compared. The publication of the data related to performance is, therefore, in literature, conventionally considered useful to its improvement, since it allows the control and the comparison of it; also, in many contexts, it is perceived as a right (Stan, 2007; Talbot, 2007), even if the contribution deriving from it is not clear (Tillema, 2010) and there are many authors that maintain that the excesses of transparency do not necessarily need to positive results (Hood & Head, 2006; Bannister & Connolly, 2011).

On the basis of the researches conducted by Meijer (2012) and of the definitions stated above, we may then intend transparency as an institutional relation between a subject of the social-economic system, that opens up to another subject, whom, in this way, is able to monitor the first, relatively to the input used for the production and service provision processes, to the output and the outcomes deriving from such activities, and, finally, concerning the way in which the public administration reaches the results in terms of decision-making and transformation/provision processes.

THE EVOLUTIONAL PATH OF E-GOVERNMENT: OPENNESS

The e-government represents one of the most important reform paths pursued by the public administrations to the purpose of raising transparency and increasing the participation of the citizens (Garcia-Sànchez et al., 2012). It positively influences the efficacy of the government action, but its diffusion does not seem to depend on the wealth of the Countries that adopt it (Garcia-Sànchez et al., 2012). The open government, or openness, characterized by principles of transparency, participation, and cooperation, represents the last phase of the evolutional path of the e-government.

To define the e-government it is possible to take approaches that focus on different aspects (Yildiz, 2007). In some cases, the aspect of the recourse to the internet is emphasized, as a mean to transmit information and provide services to the citizen (United Nations, Aspa, 2002), sometimes is emphasized the recourse to databases and automation and traceability means (Jaeger, 2003). In other approaches is emphasized the possibility to establish relational processes between public administrations, suppliers, and citizens, thanks to the recourse to new technologies (Means & Schneider, 2000) and three main

categories of relations are identified: Government to Government, (G2G), Government to Citizen (G2C) and Government to Business (G2B) (Jeong, 2007). Other studies focus their attention on a development path of the e-government characterized by growing levels of organizational and technological complexity (Layne & Lee, 2001; Howard, 2001; United Nations, Aspa, 2002). The first level of introduction of the e-government is characterized by the digital presence, that is, the presence of simple information on the public administration's web sites; the information is transferred from paper to digital, but the relation between public administration and citizens remains unidirectional. In increasing the recourse to e-government processes, the public administrations recur to technologies that allow the conduction of transactions and, subsequently, realize "horizontal" processes of inter-organizational cooperation aimed at the sharing of databases and provision of services thanks to portals that are open even in the relation with the citizens. These development stages, as all social-organizational processes, do not follow a linear trend, and are affected by the context diversity. However, the direction toward which the e-government process seems to move, underlined by its development phases, is that of openness, or open government. Openness is set as the last stage of the e-government path.

The American guideline on open government, which codifies the principles of the open philosophy within the institutions and the public administrations, defines the open format of the public data as an independent aspect compared to the platform, easy to read for the calculator and made available to the public without the reuse of the transmitted information being impeded. The data themselves have no relational features: they are cold. They simply are data, not usable singularly, but only by grouping them in order to extrapolate value from their relations. In order to make the data available, it is necessary to educate sharing and to overcome the so-called "database embrace syndrome", that is, the difficulty felt by the owners of the data in letting them go and in making them available to be reused (Formez, 2011). Open data is a means to favour the realization of sharing and participation processes that correspond to the last phase of the evolutional journey of the e-government. It is not enough to make the data available, but it is important to stimulate their reuse, encouraging the citizens to create applications by triggering civil hacking phenomena.

In Italy, the Legislator, intervening with several provisions, has decided to enhance and make available the information produced in the public sector. Lgs. D. 36/2006 has accepted the European guideline 2003/98 on the Public Sector Information regulating the modality of re-use of the documents containing public data. The Digital Administration Code (CAD) (Lgs. D. 82/2005) has provided that … *"the public administrations, in order to enhance and make available public data they own, promote projects of elaboration ad spreading of these data even through the use of project finance tools, using open format that allow their reuse* (art. 52. par 1-bis).

With the subsequent reform of the Digital Administration Code (Lgs. D. 235/2010) the open data doctrine has been expressly accepted, urging the administrations to open to the public their information storage. The Development Decree 2012 has established the Agency for a Digital Italy (AGID) with the task to elaborate the addresses, the technical rules and the guidelines for the full inter-operability and application cooperation amongst the information systems of the public administrations, as well as the European Union systems (Formez, 2011).

THE PRINCIPLES OF OPENNESS

While initially openness, as an element of qualification of the e-government processes, seemed to elude any definition framework or any concrete references in terms of contents and paths to activate, more recently it seems to be attributable to more codifying factors. It finds proper application in the principles of transparency, public participation, and collaboration (Von Hippe, 2005; Chesbrough, 2006; Tapscott et al., 2008; Di Donato, 2010; Lathrorp & Ruma, 2010; Belisario et al., 2011; Lee & Kwa, 2011).

The principle of transparency consists in the spreading of the information regarding the activities of the public administrations. To distribute public data in an open format free from restrictions, both from the point of view of the access and that of integration and reuse, represents the basic prerequisite in order to develop a real collaboration process between institutions and community, regarding the choices of the government, so that the available data can be elaborated in a new form (Formez, 2011). Transparency commits the administrations to adopt provisions that allow the rapid diffusion of the information in forms that are easy to find, on-line, and usable, that is in open formats. It makes so that the administration solicit feedback from users, to be able to primarily spread information deemed useful by the users (Hood, 2007; Fioretti, 2010; Darbishire, 2011).

Resolution Civit n°105/2010 introduces and regulates the principle of transparency intended as total accessibility *(…) of the information concerning every aspect of the organization* (article 11, par. 1). Total accessibility entails the usability, for the community, of all the public information, according to the paradigm of the freedom of information of the open government originated in the States.

The principle of participation supports the importance of the involvement of all citizens in the decision-making processes. According to this principle, the citizens must be able to give their contribution to the choices of the public administrations, making available information and collective competences. Therefore, public administrations are urged to involve the citizens in the definition of modalities that increase and improve the opportunity to participate (Fung, 2006; Pollitt, 2006; Storlazzi, 2006; Bonabeau, 2009; James, 2010; Lee et al., 2011). This aspect stimulates and eases the citizens toward a continuous control over the operations and the decision-making processes of the institutional subjects (Formez, 2011). Through strategies of openness of the data, the citizens are no longer the passive consumers of information provided by the administrations. They obtain the opportunity to reuse and integrate the data made available to them, up to developing services and applications to the advantage of the entire users' community, which go side by side with those created centrally by the institutions. In this way, the citizens effectively cooperate with the institutional subjects and actively participate in the actions of government (Formez, 2011).

The principle of cooperation affirms that the public administrations must use innovative tools and methods finalized to the improvement of the collaboration, both between the different levels of the public administrations, and between public administrations, non-profit organizations, enterprises, and private citizen. In this respect, the attention is focused on the concept of co-production, which entails a provision of services characterized by a high level of involvement of the user. To review the efficacy and the efficiency of the public administrations in terms of co-production, implies that the users, being them the waivers of knowledge and competence, are directly involved in the provision of services, and that the quality of the public service is monitored during the entire process, rather than being measured only at the end (Agranoff & Mc Guire, 2004; Cooper et al., 2006; McAfee, 2009; Mele & Mussari, 2009; Emerson et al., Johnston et al., 2010).

In the European framework, the principles of transparency, of participation and collaboration are present in the e-government plan. The Ministers of the European Union responsible for the e-government strategies have received the openness guidelines. These guidelines are a) the development of user-centric services that favour the interaction between citizens and public administrations; b) the involvement of the civil society in the initiatives; c) the increase of the availability of the Public Sector Information (PSI) to incentive the reuse; d) the enhancement of transparency in the administrative processes; e) the promotion of active participation (Reddick, 2005).

FROM E-GOVERNMENT TO E-DEMOCRACY

The growing recourse of the public administration to information technologies to favour the participation of the citizens, and their effective influence on the public decisions has brought to the development of a research field called Democratic e-governance (Anttiroiko, 2007).

In such framework, it is important to distinguish three key concepts that are related and that allow to highlight the different modalities of employment of the ITs within the public administration: 1) e-government; 2) e-governance; 3) e-democracy (Anttiroiko, 2007).

The first term, e-government, refers to all those political-administrative operations conducted by the public administrations with recourse to IT. The activities within this dimension can be recapped as follows (Heeks, 1999):

- E-administration, which consists in the improvement of the processes conducted by the public administration through a reduction of the costs and an improvement of the performance;
- e-citizens, that refers to all those activities created by the public administration to favour the consultation with the citizen;
- e-services, which recalls for the improvement in the provision of the services to the citizens with recourse to online systems;
- e-society, that deals with all the public administration activities that are conducted outside the entity and that are meant to create links with the entire community.

In other words, the objective of the e-government is to grant the citizen a higher accessibility to the services to the public administration and a better response to their needs.

The concept of e-governance, instead, concerns the development, through IT, of many types of relations with the stakeholders meant to favour the realization of the typical public administration functions, such as, the provision of the services or the conduction of public policies. The objective, in this case, is to favour the relations between public administration and stakeholders. Finally, the term e-democracy refers to the democratic structures and the deliberative democracy process in which the ITs are employed.

There are three different types of theories in the area of e-democracy; the main difference is given by the fact that the e-democracy theories put at the centre of their arguments the support offered from the Information Technologies and how these favour the process of democratization of the decisions (Floreddu et al., 2011). The first is the so-called representative democracy, that emphasises the recourse to participation tools such as the e-voting (Lourenço & Costa, 2006) in the elections, and the employment, in general, of the new media in the political and election processes. Another theory is that of participative democracy (Macintosh, 2004), strictly linked to the concept of deliberative democracy that emphasizes

the recourse to tool apt to favour the participation of the citizens through the recourse to Information technologies. In this setting, we refer, in particular, to tools such as the electronic consultation of the citizens (e-consultation), the online juries of citizens (e-citizens' juries), the online petitions (e-petition) and so on. The last one is the so-called direct democracy (Becker, 1981), which represents the most radical form of democracy and emphasizes the recourse to the online referenda (e-referenda).

The three theories enunciated are strictly interrelated and present overlapping areas. It is, in fact, quite difficult to trace their boundaries. Each one of them, for some aspect, may be included in one of the other two categories.

Only an integration of the three theories can provide valid tools to evaluate this concept adequately.

DIGITAL REPORTING

In the era of digital transformation - where the web and social networks have profoundly changed the methods of communication and relationship with the various stakeholders - reporting systems are also evolving towards innovative forms capable of overcoming traditional document forms and fully grasping the potential of new technologies, not only in terms of final reporting yield, but also in terms of the accountability process and the relative level of participation (Gruppo Bilancio Sociale, 2017) and inclusion of stakeholders.

Digital reporting makes transparency and accountability operations more reliable and timely, less bureaucratic, more usable, and smart, producing significant benefits on the internal and external dimension. The realization is an internal analysis path that allows to elaborate and share the vision, objectives, expected effects and a multidimensional measurement and verification system of the activities carried out, the resources allocated, the results and changes at the different levels of responsibility obtained. Accountability is transparent, verifiable and understandable communication even to non-experts of the sense and social, environmental and economic value produced, aimed at activating continuous, informed and aware participation.

Digital reporting requires a process of progressive embedding of this practice in the organizational culture and in strategic and ordinary management, involving the different levels of responsibility. To this end, it is essential to start with a good training on the subject that motivates the participation of interns and that allows to relaunch and give new course to sustainability policies and reporting practices. In particular, by strengthening a solid "data culture" that supports the timely and ongoing updating of qualitative and quantitative information relating to social, environmental, and economic performance. Only in this way is it possible to have data and indicators collected periodically - with different frequency according to the type - to ensure the periodic and continuous updating of the portal.

In summary, the main internal benefits deriving from digital reporting are:

- Greater environmental and economic efficiency and sustainability;
- qualitative and quantitative information that is always updated and significant, collected in progress on the three dimensions that allow the board and management levels to verify the achievement of the defined objectives, be aware of the results achieved and possibly correct the course in time;
- availability of measurement systems based on stable, shared, reliable and homogeneous indicators over time that allow to feed historical series useful for understanding the trends of performance results in the various strategic areas of the organization;

- integration of reporting processes with internal information and management systems, allowing to significantly reduce the internal effort for data collection, processing, and communication;
- greater awareness of the different levels of internal responsibility and of the data owners in terms of overseeing the processes and systems for detecting and monitoring qualitative and quantitative information;
- habit of communicating and letting people know not only the results of their actions but the changes produced by consolidating an organizational culture oriented towards transparency, responsibility, and sustainability.

On the external communication front, the benefits produced by digital reporting are many, starting with the main one, namely the actual improvement of the quality of the relationship with the various stakeholders and the exponential increase in the number of subjects reached by the web channel.

The web channel therefore represents a formidable resource for enhancing both internal and external communication methods and tools, offering complete and usable content on multiple aspects of the organization that can be conveyed through social channels and can be spent on various occasions such as conferences, fairs, meetings in the territory or with specific stakeholders. Reciprocally, this strengthens and disseminates the knowledge of sustainability communication and the visibility of the organization and its results.

In detail, the main benefits for the outside:

- Use of a web reporting tool that is consistent with the principles of sustainability, increasing the credibility and effectiveness of the reporting operation;
- greater transparency and accessibility by a wider audience of internal and external stakeholders;
- actuality of information and timeliness of communication, passing from an ex post logic on an annual basis to an ongoing update capable of producing, in the era of information in real time, an increase in the significance of data and information;
- greater communication effectiveness and usability of the contents thanks to the different communication methods that can be used on the digital channel (texts, highlights, graphics, infographics, photos, videos, chats, forums) and which increase the interest of stakeholders, improving the user experience;
- possibility of profiling the contents by themes and targets and personalizing the levels of detail, increasing the ability to respond to the specific information needs of the various stakeholders;
- inclusiveness and interactivity, through the integration of spaces dedicated to involvement and dialogue with stakeholders, which make it possible to detect expectations and needs and to collect feedback based on clear and complete information, reducing the risk of self-referentiality in reporting and allowing an evaluation more informed and aware performance by stakeholders.

CONCLUSION

The scenario in which the public administration operates, and more in general today is society, has become extremely dynamic and variable. The technologic evolution follows an exponential process in which the digital revolution is one of the more recent steps, by now considered an industrially obligated standard. This process follows such a fast and vast growth that, while our grandparents and their parents shared in

a substantially similar way, with few significant exceptions (such as the advent of television, flights, cars and so on and so forth), the parents of today's children are experiencing some technologic evolutions that come to life and then disappear within a generation, as it has been for videotapes and compact discs, too. Within a few years, there come new possibilities, now scenarios that cannot even be imagine ten years earlier. Subjects such as network cooperation in real time, cloud archiving, global sharing of data and calculation resources , use of artificial intelligence in the scientific and commercial field or simply as an informative help to the citizens, new possibilities of employment of augmented reality for the improvement of safety in the industrial operational realities, document and process management systems, such as those granted by the block chain technology, and many other aspects, are becoming remarkable paradigms, that we are not sure will not be overcome in a few years by even more surprising innovations.

This transformation must be intended not only as technological innovation, but also as real and pervasive simplification, ease and acceleration of the processes necessary to the optima management of the public affairs and of the relation of the citizens with them, backing the efficiency and the efficacy of the support that the available technology can give, but aiming also to substantially review the present operational modalities and, most of all, the responsibilities and competences that are needed in order to deeply revive the activities of the State and of the local entities, so that they are adequate to the evolving scenario.

Today, digital innovation is not a choice, but it is part of our professional and private lives, whether we like it or not and this is the concept we need to start from.

We can affirm that today, the civility of a Country can be measured even by the degree of digitalization reached.

In this evolving context, digital transformation meets accountability, at a time when more and more public organizations are realizing that, given the increasing centrality of sustainability and new regulatory obligations, it is useful to overcome the bureaucratic or "showcase" in favour of an approach that produces a benefit corresponding to the internal effort and costs necessary to develop the reporting processes.

In this logic, digital reporting represents an important tool for an enlarged and participatory governance. It allows, in fact, to share an examination of reality on the context and needs, communicate the objectives of change, monitoring the state of implementation and the results obtained over time thanks to the role and contribution of each subject. In this way, it represents a dynamic and accessible system for transparent and non-self-referential communication of the effects produced, even on long-term projects, increasing the awareness and co-responsibility of the various players in the system.

Accountability in the era of digital transformation can, therefore, contribute to a cultural change - both at the level of the individual organization and between the various actors of the polis - which increases awareness and co-responsibility in achieving the goals of sustainable development and the common good, in line with Goal 17 of the United Nations 2030 Agenda.

Of course, digital reporting also runs the risk of being used as a facade and pure washing tool. For this reason, it is essential to accompany the upgrade of accountability operations with a credible and structured training path, sharing of vision and strategies, involvement of the different levels of responsibility that root transparency and sustainability in the organizational culture and in management and communication practices. Only in this way can the increase in the communicative effectiveness of the reporting systems be combined with a solid methodological rigor and reliability of the information communicated

There are topics on which there is either teamwork or loss. And digital topic, in its various points of view, is one of them.

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ENDNOTE

[1] In literature *e-government* is defined as: a) the group of techniques for the employment of ICT methods and tools meant to facilitate the internal and external relations to public administration on all levels of the exercise of its government activities; b) the process of transformation of the internal and external relations of the public administration, through network, information technology and communication activities, so as to optimise the service provision, increment the participation of the citizens and of the enterprises, and to improve the ability to govern c) the process of implementation, within the public sector, of ICT technologies for the realization of an organizational, management, informative, computerized and relational system of a reticular type, reflecting the e-business model developed in the public sector. Some distinguish between the static definition (what is done) a dynamic definition (why it is done): the first one is intended as the provision of government services with the support of ICT technologies, whereas the second one corresponds with the process of transformation in the internal and external relations in the public sector to optimize the features of the service provided and the participation of the citizens. The definitions analysed so far have taken into account two scopes of application: 1) the increase of internal efficiency in public administration and the improvement of the external relations, 2) the medium-long term objectives. There are other definitions, instead, that propose a more ample vision of electronic government, such as the process that implies a complex and dynamic transformation of the whole state establishment, at any level, that exploits ICT in order to involve it in sharing information and strategies with citizens, enterprises, administrations and governments – even external ones- as well as public administration employees. Still, in its more ample sense, the electronic government may be intended as the pursuit of modernization objectives of the public administration even through a strategic employment of ICTs: a) within the single administrations (inter-administrations back office), b) in the relation between the different public administrations (inter administration back office) c) in the relations between administrations, citizens, and enterprises (*front-office*).

Section 2

Chapter 5
Business Transformation and Enterprise Architecture Projects:
Natural Language Programming (NLP)

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ABSTRACT

This chapter proposes the fundaments of artificial intelligence (AI) and is the basics of the author's framework that is specialized in transformation initiatives. The proposed natural language programming (NLP) concept is supported by the author's applied holistic mathematical model (AHMM) for AI (AHMM4AI) that is the result of research on AI, business, financial, and organizational transformations using applied mathematical models. This research is based on years of cross-functional research initiatives and on an authentic and proprietary mixed research method that is supported by an authentical version of an AI search tree, which is combined with an internal heuristics motor, which is applied to requirements NLP strategy. The proposed AHMM4AI-based NLP fundamentally functions like the human empiric decision-making process that can be compared to the behaviour-driven development methods, which are optimal for complex software engineering.

INTRODUCTION

The NLP is based on real-life cases and experiences for detecting and processing mainly heuristic algorithms for business transformation, NLP approach and enterprise architecture development projects. This AI implementation driven strategy offers a set of possible recommendations in the form of business architecture, managerial and technical propositions, coupled with the author's framework. The proposed executive recommendations are to be applied by the business transformation managers, business architects, analysts and implementation engineers to enable solutions to transform business and societal environments. A Generic AI Pattern (GAIP) strategy is a model driven development that offers a set of possible patterns to support business architecture, holistic requirements management and classification,

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managerial and technical guidance, coupled with a mapping model for the requirements and other project resources. The proposed executive, business, societal and technical recommendations are to be applied by the environment's business architects, analysts and implementation engineers to enable solutions for resolving development issues which can and be solved by a reasoning-based internal subsystem.

Keywords: Natural Languages, Web Services, Microservices, Atomic Building Blocks, Serverless Computing, Strategic and Critical Business Systems, Requirements Engineering, Business transformation projects, Enterprise architecture, Mathematical models and Risk Management, Organizational Intelligence, Critical success factors/areas, Performance Indicators, Software (re)engineering and Strategic Vision.

BACKGROUND

This chapter's background combines NLP, development strategy, Knowledge Management System for AI (KMS4AI), standard DevOps, enterprise architecture, heuristics/mathematical models, technology management, business transformation and business engineering fields; using mapping mechanisms (Ebert, Gallardo, Hernantes, & Serrano, 2016). Building an NLP structure needed for the implementation of strategic Decision Making System for AI (DMS4AI) that is today the major strategic goals for the transformed *Entity* (Petrock, 2020; Cearley, Walker, & Burke, 2016; Thomas, 2015), as shown in Figure 1. The proposed NLP is a generic and cross-business NLP concept that interacts with a reasoning methods which manage sets of Critical Success Factors (CSF) that can be used by a business transformation or enterprise architectures projects (or simply the *Project*) in domains related to development AI solutions (Uhl, & Gollenia, 2012); where in this chapter is supported by an adapted insurance case (Jonkers, Band & Quartel, 2012a). The author based his research method on intelligent neural networks and behaviour-driven development, where both methods resemble to the human brain (empirical) processing. This chapter on decision making is a continuation of many years of Research and Development Project for AI (RDP4AI) on various *Project* processes using decision systems and requirement management systems (Trad & Kalpić, 2019c, 2019d). The NLP concept is business driven and is agnostic to a specific environment, as shown in Figure 1. It is founded on a genuine research framework that in turn is based on many existing industry standards, like the Architecture Development Method for AI (ADM4AI) (The Open Group, 2011a, 2011b).

Today, enterprise and business architecture are a methodology used to develop *Projects* (Gartner, 2017), requirements, architecture, knowledge modules and its technology components using archaic implementation and DevOps environments. The Business Transformation Manager or enterprise architect (or simply a *Manager*) or an enterprise architect can integrate NLP oriented environments in the architecture of a *Project* to support the DMS4AI. The NLP is managed by the ADM4AI and DevOps procedures. The applied research methodology is based on Literature Review Process for AI (LRP4AI), a Qualitative Analysis for AI (QLA4AI) methodology and on a Proof of Concept (PoC) for the related hypotheses. In a holistic NLP approach, the *Manager*'s role is important and his or her (for simplicity, in further text – his) decisions are aided by using factors within the AHMMAI based DMS4AI (Agievich, 2014). A large set of CSFs can influence such an approach, like the: 1) control mechanisms; 2) enterprise CSFs; 3) enterprise resources mapping to requirements strategy; 4) operations skills; 5) functional requirements; 6) tests predispositions; and 7) monitoring and tracing mechanisms. A system approach and strategy are the optimal to apply the NLP approach (Daellenbach & McNickle, 2005). As shown in Figure 2, where

Figure 1. Technology trends (Petrock, 2020)

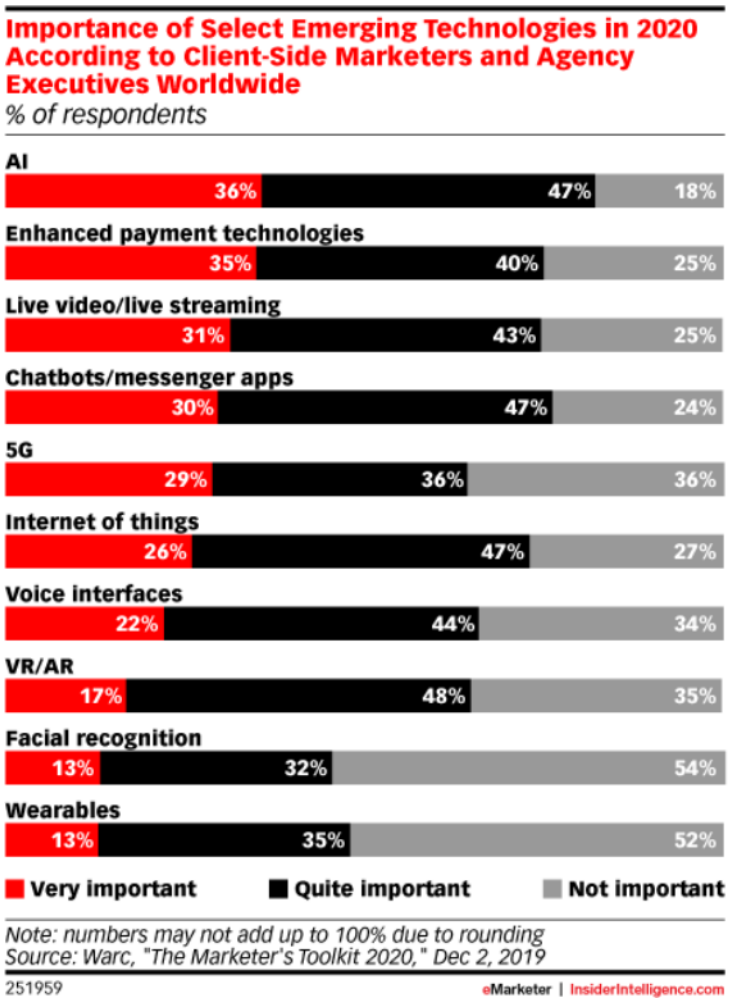


Figure 2. Application lifecycle management concept (CenturyLink, 2019)

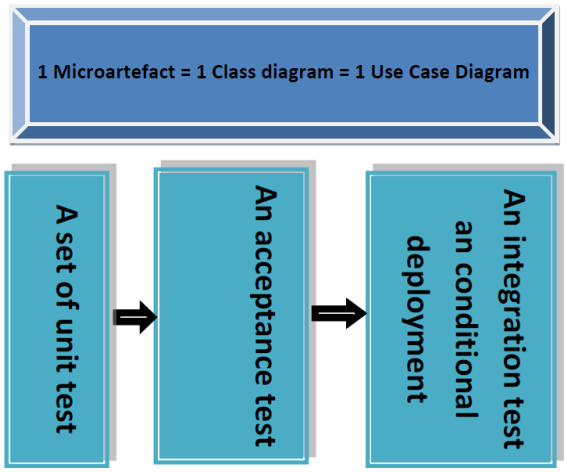
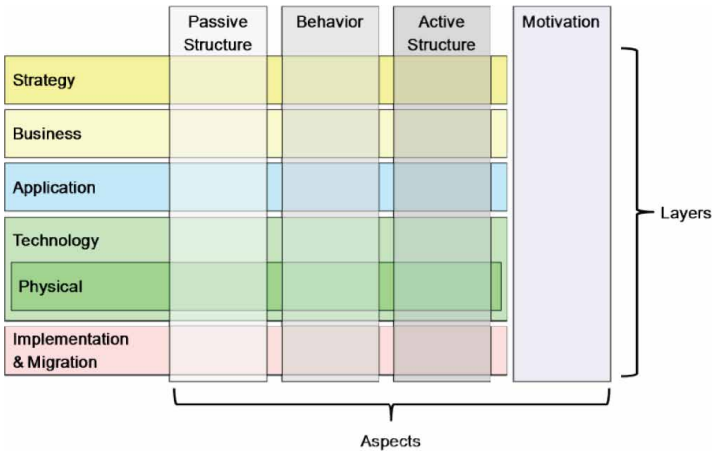


Figure 3. The development and operations interaction (Kornilova, 2017)



NLP interacts with various *Project* teams via an implemented Application Lifecycle Management for AI (ALM4AI) interfaces to manage the NLP' artefacts and resources (CenturyLink, 2019).

Synchronizing the *Project*'s AI related resources and software modules (libraries of microartefacts), can be a problematic task and the main problem can arise due to the lack of the *Entity*'s excessively archaic agility approach, where an NLP approach is built on intelligent mapping of all the *Project*'s resources. Adapting archaic agile methodologies for silos of heterogenic technologies is not sufficient and the main problem can arise due to the lack of *Entity*'s holistic approach (Cearley, Walker, & Burke, 2016) that can he supported by ALM4AI/DevOps interactions, as shown in Figure 3 (Lindgren & Münch, 2015; Gartner, 2016). NLP implementation processes are today quick and more agile insuring high performances, security, availability and reliability. This immense pressure on mapping functional requirements is the main cause that *Projects* fail or are cancelled (Kornilova, 2017); and that is this research article's main focus.

FOCUS OF THE ARTICLE

Architecture methods, like The Open Group's Architecture Framework's (TOGAF) ADM4AI, confirm the importance of NLP strategies in the development of *Projects*. Actual archaic approaches to NLP, ALM4AI and DevOps techniques for *Projects* make them complex. NLP can be used to prototype the underlying goals of a *Project,* mainly in terms of stakeholder goals. These high-level, *Project* goals, address these commercial concerns. This chapter's focus is on a concept that supports the mapping and modelling of linking AI artefacts to all the *Project's* resources. NLP's concept is based on existing standards and frameworks for goals and requirements mapping/modelling and is aligned with existing ADM4AI environments like the ArchiMate language. This chapter also illustrates how *Projects* can benefit from concept and proposes an adequate research process.

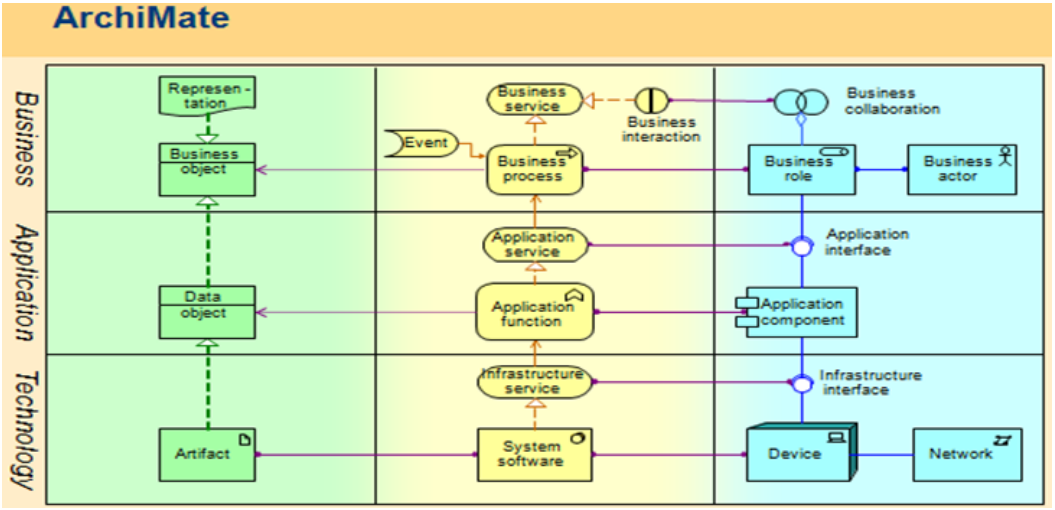
THE RESEARCH AND DEVELOPMENT PROCESS

This research's global research topic is related to *Projects* and the ultimate research question is: "Which business transformation manager characteristics and which type of support should be assured in the implementation phase of a business transformation project?". Where the kernel of this research is based on a decision-making system and CSFs (and areas).

Critical Success Areas, Factors and Decision Making Systems

A Critical Success Area (CSA) is a category (or set) of CSFs where in turn a CSF is a set of Key Performance Indicators (KPI), where a KPI maps (or corresponds) to a single requirement and/or software feature, known as a microartefact. For a given requirement or *Project* problem, the *Manager* (or enterprise architect; or even a business analyst) can identify the initial set of CSAs, CSFs and KPIs, for the DMS4AI and map them to the sets of requirements. Hence the CSFs are important for the mapping between the requirements, knowledge constructs, software modules/microartefacts, organisational items and DMS4AI (Peterson, 2011). Therefore, CSFs reflect areas that must meet the main strategic *Project* goals and predefined financial constraints. Measurements technics, which are provided by the Transformation, Research, Architecture, Development framework *(TRADf)*, are used to evaluate performance in each CSA, where CSFs can be internal or external; like: 1) NLP overall status evaluation; 2) Mapping levels of resources; 3) NLP's gap analysis; and 4) Decisions-making system calls and CSF management, as shown in Figure 4.

Figure 4. CSFs' integration in the research framework (Trad & Kalpić, 2020a)



Once the initial sets of CSFs and CSAs have been identified, then the *Project* team can use the DMS4AI to generate solutions for a given *Project* problem. The CSF-based NLP would use the DMS4AI to deliver solutions. The RDP4AI's phase 1 (represented in automated tables), which form the empirical part of the RDP4AI, checks the following CSAs:

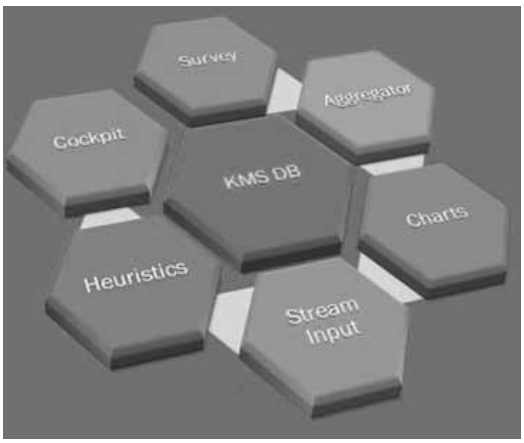
- RDP4AI, synthesized in Table 1.
- ICS, synthesized in Table 2.
- ADM4AI, synthesized in Table 3.
- The KMS, synthesized in Table 4.
- The DMS, synthesized in Table 5.
- The Applied Problem Domain (APD); which is in this research chapter the NLP, synthesized in Table 6.
- This chapter's outcome Table 7.

This chapter's tables are a jumpstart and complement for the bounded DMS4AI chapter. The proposed NLP concept, delivers a set of recommendations and solutions for an aligned and mapped *Project* architecture and is a part of this research framework, the *TRADf*.

The Proposed Framework

The *Manager* or the enterprise architect's *Project*'s related decisions, can be made in a just-in-time manner by using outputs from various enterprise experts or knowledge sources (using data sciences technics). The NLP and its ALM4AI/DevOps alignment strategies should manage the enterprise's microartefacts' libraries that are implemented by means various types of technologies and formalisms; and that should not be altered by the transformation. The proposed research framework, *TRADf*, supports various types of formalisms, as shown Figure 5. The NLP concept is complex because it has to handle: 1) the implementation of complex GAIP scenarios; 2) working with complex NLP and GAIP concepts for defining the granularity of the needed microartefacts; 3) the management of GAIP processes and various engineering activities; 4) building robust mapping and flexible mechanisms; 5) the influence of requirements links to microartefacts management on the overall *Projects* artefacts; and 6) the complex implementation of existing ALM4AI/DevOps formalisms. A global system approach for NLP integration is optimal for *Projects* (Daellenbach & McNickle, 2005). As already mentioned, in this chapter, the focus is on the NLP supports the integration of GAIP microartefacts scenarios. NLP can be applied to various types of *Projects* and other general GAIP common activities and it is a part of *TRADf's* Software engineering or

Figure 5. The NLP based implementation environment



the Implementation module (Im) and the Architecture module (Am). In this chapter the author proposes a set of NLP managerial and technical recommendations and a reusable real-world concept.

The NLP component is supported by TOGAF's ADM4AI's phases, where each atomic Building Block (aBB) circulates through its phases. *Project* aBBs contain their private set of CSFs, where these CSFs can be applied to (Peterson, 2011): 1) select the important CSFs and define their link to requirements; 2) detect the resources importance and weighting value; 3) estimate the *Project*'s status using the NLP's interface; and to eventually take a decision on the *Project*'s continuation or termination; 4) control and monitor the needed NLP interface mechanisms; 5) estimate NLP's needed skills; and 6) support the *Project's* NLP implementation (and ALM4AI/DevOps) related automation activities. The following research is also a part of the Selection management, Architecture-modelling, Control-monitoring, Decision-making, Training management, Project management, Finance management, Geopolitical management, Knowledge management and Implementation management Framework (SmAmCmDmTmPmFmGmKmImF, for simplification reasons, in further text the Transformation, Research, Architecture, Development framework, or *TRADf* will be used). The framework or the *TRADf* is composed of the following modules named after abbreviations:

- "Sm": for the selection management of the Framework.
- "Am": for the architecture and modelling strategy that can be applied by the Framework.
- "Cm" for the control and monitoring strategy that can be applied by the Framework.
- "Dm" for the decision-making strategy that can be applied by the Framework.
- "Tm" for the training management of the Framework.
- "Pm" for the project management strategy that can be applied by the Framework.
- "Fm" for the financial management's support to the Framework.
- "Gm" for the Geopolitical mind-mining in the Framework.
- "Km" for Knowledge management in the Framework.
- "Im" for Implementation management in the Framework and was introduced in this chapter.

This chapter is a part of many years research cluster that has produced a large set of articles and research framework, LRP4AIs, usable items, microartefacts/aBBs and research artefacts. In this chapter, parts of previous works are reused for the better understanding of this complex iterative research; if everything needed were only referenced it would be tedious to follow and understand. This research work can be considered as a non-conventional and pioneering one, in the field of global transformation and enterprise architecture projects. For that purpose, this phase's research sub-question is: "How does an NLP concept can support transformation projects?" The NLP is business-driven and is founded on a genuine and empirical research framework that in turn is based on heuristics, enterprise architecture and Information and Communication Systems (ICS) concepts (The Open Group, 2011a).

Empirical Engineering Research Model

This chapter is based on an empirical engineering research approach which is optimal for engineering projects (Johnson & Onwuegbuzie, 2004; Easterbrook, Singer, Storey & Damian, 2008). It applies an authentic mixed method (where mixed research is a simplistic synonym) that can be considered as a natural complement to conventional Quantitative Analysis for AI (QNA4AI) and QLA4AI research methodologies, to deliver empirical pragmatism concepts as a possible holistic approach for mixed

Table 1. Critical success factors that have the average of 9.125

Critical Success Factors	KPIs	Weightings
CSF_RDP4AI_Modelling	Complex	From 1 to 10. **09 Selected**
CSF_RDP4AI_CSF_CSA_Integration	PossibleClassification	From 1 to 10. **10 Selected**
CSF_RDP4AI_NLP4AI_References	Exists	From 1 to 10. **09 Selected**
CSF_RDP4AI_ADM4AI	Proven	From 1 to 10. **09 Selected**
CSF_RDP4AI_ICS	AdvancedStage	From 1 to 10. **09 Selected**
CSF_RDP4AI_Governance_Audit	Advanced	From 1 to 10. **09 Selected**
CSF_RDP4AI_Transformation_TRADf	Possible	From 1 to 10. **09 Selected**
CSF_RDP4AI_Mixed_Methods	Possible	From 1 to 10. **09 Selected**

valuation

methods research; in fact, both methods are compatible and the difference is the scope and depth of the research process. Empirical research validity checks if the research work is acceptable as a contribution to existing scientific (and engineering) knowledge, this chapter's author wants to convince the valuable reader(s) that this chapter's recommendations and the related PoC, or experiment, are valid and applicable. In engineering, a controlled experiment or a PoC is a design and software prototype of a testable hypothesis where one or more CSFs (or independent variables, in theoretical research) are processed to evaluate their influence on the research model's dependent variables. Controlled experiments or PoCs permit to evaluate with precision the CSFs and if they are related, whether the cause–effect relationship exists between these CSFs and CSAs. The NLP concept is AI centric and is founded on the *TRADf* that is in this chapter presented using a standard business case (The Open Group, 2011a).

RDP4AI's CSFs

Based on the LRP4AI, the most important RDP4AI's CSFs that are used are:

Module's Link to ICS

This section's deduction is that ICS' integration and engineering is central for the NLP concept in which it has its fundaments.

INFORMATION AND COMMUNICATION TECHNOLOGY'S IMPLEMENTATION

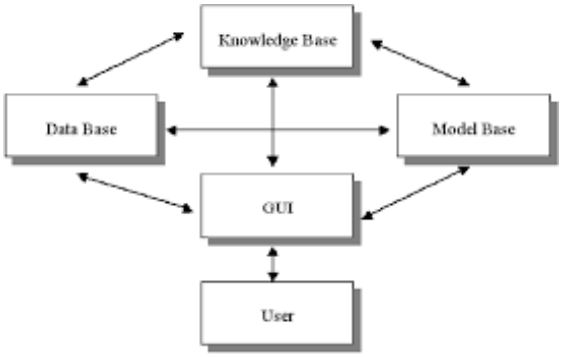
Modelling of the First Approach versus Code First

A NLP concept is a holistic structure for the *Project*'s AI based implementations and design; it also offers: 1) a set of predefined aBBs development, operations and intelligence templates to automate implementation processes; 2) describes the NLP development, operations and intelligence responsibilities and activities; 3) defines the major GAIP aBBs for the NLP processes; 4) defines a ALM4AI/DevOps engineering model and the ADM4AI interface; and 5) includes the description of the relationships/mapping between GAIP and different *Project* resources. The NLP concept is a schema that can be used to automate microartefacts implementation in various ADM4AI cycles, known also as iterations (Visual Paradigm, 2019). The NLP concept describes the mapping structure for a general aBBs mapping within the *Project* implementation phases by using the "1:1" concept; that makes the NLP concept holistic. The NLP concept is a set of idioms and activities, where an idiom is a basic automation activity that is generic and not specific to any NLP based GAIP implementation processes. An idiom describes the aspects of a microartefact and its relationships with other *Project* requirements and aBBs, where the NLP concept refers to mapping automation scripts that are used also to deploy a set of microartefact modules using agile methodologies.

Agility Concepts and Requirements Engineering

Entity's agility is achieved by combining various synchronized NLP concept, ICS technologies, GAIP and ADM4AI that promote global automation schema to be implemented in various levels and parts of the *Project*. In order to unbundle and maintain the existing enterprise business environment and glue its innovated aBBs mapping links in its ICS modules, an adapted NLP concept is needed as shown in Figure 6. Using a mixed and agile bottom-up approach, the *Manager* can design an NLP concept that can handle various types of aBB automation approaches.

Figure 6. ICS's interaction with various modules (Trad, 2018a)



Entity's development agility or ALM4AI/DevOps, is supported by the following methods and utilities:

- Agile methodologies for GAIP: in most of existing *Projects*, various types of ALM4AI/DevOps methodologies and implementation environments are used, for this chapter the ADM4AI is applied as an architecture development methodology and Microsoft's Visual Studio/.NET.
- Change management and integration: in most of *Projects* various types of change management and integration environments are aligned, for this chapter Git, Maven and Jenkins are applied as change management and integration environments (Seth & Khare, 2015).
- Integration (and other) tests: in most of *Projects* various types of integration tests are applied, for this chapter Mockito is used and is enforced with the *TRADf's* internal tests mechanisms (Shafique & Labiche, 2010). These tests can help in Rapid Application Development for AI (RAD4AI).

RAD4AI in the Context of Entity's Agility

Rapid Application Development (RAD4AI) environments have been in the computer science possession since the very beginning of programming techniques, or more precisely, since COmmon Business Oriented Language's (COBOL) birth. COBOL is still largely the most used programming language and not C/C++, Java or .NET; it is estimated that more than 80% of the world's software is in COBOL and it is still advancing, due to the following facts (Cassel, 2017):

- The Java Extended Edition (JEE) was the myth of solving all types of existing problems that resulted in the creation of thousands of classes to implement a project. This fact is confirmed by the emergence of microservices based architectures and every now and then, new approach...
- JEE pointer management, operating system independency and garbage collection myths, that resulted in huge performance problems that annihilated the JEE concept.
- SUN's JavaOS delirium, the RAD4AI's total possession of managing all ICS problems; ended in a tower of Babylon like concept.
- The hyper virtualization layers (operation system virtualization, virtual threading, Java virtual machine, web server, application server and others) that resemble the pharaohs' pyramids.
- The disillusion of hyper powerful hardware that would solve performance, input/output and disc volume problems.
- The fictive JEE RAD4AI mirage is being countered today by the new JEE Microservices that in facts would equivalent to some kind of C/C++ real-time development.
- The companies that opted for C/C++ are the ones who had the right vision and saved a lot of money and time.
- JEE environments are chaotic and need a large set of code/tools that include plethora of gadgets and plug-ins for tests and other activities.

Implementation, Tests and Tools Diversity

The JEE total gadget approach caused major problems in the GAIP industry mainly because of a large set of tools needed and for promoting the presumption that tools would solve all types of problems. So instead of simple NLP and GAIP solutions, JEE engineers prefer spending weeks in searching for and

then integrating tools or gadgets that could have been developed in a short period of time, and with poor quality and security prone. There are some examples of such tools and gadgets aimed for:

- NLP and modelling.
- NLP and aBBs.
- Unit, aggregated and integration tests.
- Continuous integration.
- Change management and ALM4AI/DevOps.
- Performance estimation.
- And many others… like performance and robustness.

Performance, Robustness, and Monitoring in the Mapping Concept

The major problem that causes the *Projects* to be stopped is the performance and robustness problems that in general in *Entities* are translated into human behavioural issues; that is the major reason for the emergence of the saviour's new illusion(s), like webservices/microservices and astonishingly, again with JEE… Which proves that humans (or *Managers*) forget fast.

Figure 7. The development and operations maturity evolution

Model's nomenclature

mcEnterprise	A micro enterprise component
mcRequirement	A micro requirement
mcArtefact	A microartefact
action (or action)	An atomic service (or neuron) execution scheme
mcIntelligenceArtefact	A set that contains: dynamic basic intelligence + governance + persistence+ traceability + data_xsd + resources
mcArtefactDecisionMaking	A microartefact_decision making entity
mcArtefactScenario	A microartefact scenario

The figure shows that AI based implementation environments are still in an infancy age and enterprises are losing a lot of energy and money on putting *Projects* together. JEE RAD4AI(s) and desire for hyper implementation comfort are confronted with serious *Project* issues like (Mohan, 2018):

- Archaic requirements and aBBs mapping concept.
- Important and blocking memory problems like: 1) out-of-memory errors in the JEE virtual machine; 2) excessive garbage collection; and 3) improper data caching.
- Unmanageable virtual threads landmines, like the thread deadlocks and gridlocks.
- Database limitations, like: 1) running out of database connections; and 2) slow database calls.

- Application / Code mammothlike issues, like: 1) JEE code-level issues; and 2) JEE Application Server bottlenecks, jams and other.
- Infrastructure deadlocks, like: 1) server performance problems that are the major *Project* killer; and 2) network latency and connectivity issues that are unmanageable.
- And many other …

These problems show that RAD4AI is still immature for large enterprise applications and hence for *Projects* (Gartner, 2016).

Service Oriented Architecture

Executive analyses on Service Oriented Architecture (SOA) show that aBBs are the optimal solution for *Projects*, because aBBs are fine-grained SOA independent, dynamic and real-time modifiable artefact bundle. An aBB interacts with other services to fulfil a functional or non-functional requirement. Such an approach is fully compatible with SOA but there are minor and unimportant differences where aBBs assume that:

- An *Entity* unbundling is based on coordinated services.
- The used aBBs' technology is agnostic and should imply that all technologies are based on interpreted coding principles.
- More architecture agility through run-time compilation and execution.
- aBBs are managed as artefacts having their lifecycle with automated deployment.
- The proposed architecture follows a strict mapping principle.

aBBs Choreography

aBBs promote granularity that is optimal for *Projects* that are based on services and are used in NLP scenarios. Defining granularity is a very complex undertaking in the implementation phase and the complexity lies in the "1:1" mapping/classification of these aBBs in ICSs with limited resources. This mapping uses complex messaging system to interact.

Messaging and Relationships

Messaging enables NLP scenarios to communicate (a)synchronously, by exchanging messages, where a message, physically has a header and a body, to support the GAIP. Physically, messages are exchanged over communication channels and there are two types of channels: 1) point-to-point; and 2) publish-subscribe.

aBBs Architecture

aBBs architecture:

- Defines a set of specifications that describe a composed model for NLP concept and systems development using SOA.

- Extends applications' interfaces to use services that are based on existing open standards like SOA.
- Offers a design model both for the composition of aBBs and for the creation of service components that includes the reuse of existing monolithic application functions within bundles.
- Is recommended for assembling *Entity's* bundles that are classified in its services'registries.

NLP concept supports frequent change initiatives and permits agility, performance improvement and scalability, but the aBB unbundling process is very complex and can cause *Project* failure. *Managers* should be experienced in this new and major paradigm shift. aBB governance focuses on the life cycle of a services' architecture from its inception through modelling, assembly, deployment, management and eventually exclusion. The emerging approach is not of a specific aBB approach as an alternative to SOA, but a manner to improve flexibility that has been undermined in the SOA approach that had become complex. aBB can provide a foundation for a holistic SOA approach for developing aBBs. NLP is built on aBBs choreography scenarios that are stored in the *Project's* architecture continuum and are the basic elements to be handled through the ADM4AI iterations; each aBB has its instance of the ADM4AI. Characteristics of the proposed aBB are:

- Has a concrete Global Unique IDentifier (GUID).
- An aBB is related to the *Project's* requirements or functionalities, where a aBB has a 1:1 relationship to a micro requirement.
- A micro requirement captures both business and technical requests.
- Contains an autonomous technology solution based on aBBs.
- An aBB directs and guides the development of the NLP choreography.
- An aBB corresponds to TOGAF's building blocks.
- Has a unique data interface that corresponds to a view.
- Unifies the implementation and usage of aBB's by using APIs; in order to adopt open standards.
- It can be an aggregation of other aBBs.
- It is a reusable template and can be easily replaceable.
- It can have many instances.
- Enables business services interoperability and integration.

Registries and Integration

Universal Description, Discovery and Integration (UDDI) services' catalogues and business processes' repositories can be integrated with environment like the operation's Configuration Management Data Base (CMDB) that enables cross ICS architecture. Such an integration Data Base (DB) links the level of business services and combine them with Business Activity Monitoring (BAM) tools. When implementing NLP based GAIP, the main problem lies in whether to give to an aBB or data model the priority. An optimal implementation would be giving them both the highest priorities and make them loosely coupled and independent from each other, which is obtained by using of Application Programming Interface (API).

aBBs Mappings to Requirements

NLP that is based on a light version of the ADM4AI is a major paradigm shift is complex to implement; therefore, *Managers* should understand transformation paradigm shift's management that can have disruptive impacts on the *Projects*. Efficiency based business advantages are based on real-time mapping requirements and aBBs. The mapping is based the following facts:

- aBB architectures supports requirements-based hierarchies.
- Requirements are supported by Behaviour Driven Development (BDD) and a light version of the Domain Driven Design (DDD).
- BDD support the NLP and Systems Thinking.
- NLP supports neural network the GAIP.

BDD and NLP are interpreted scripts that can be modified, compiled and executed in real-time; such operations can be done by business professionals with no prior computer science background. This important fact is ignored by Fowler's new micro services anti-hype that in fact is rigid and is not a Lego-like system to dismantle a monolith and to recreate a more complex one and therefore it is a flop (Cearley, Walker, Burke, 2016). That is why the author recommends an interpretable aBB based NLP concept interacts with a multitude of different *Project* resources, in a synchronized manner; using the ADM4AI to assist the *Project*'s implementation activities (The Open Group, 2011a). The NLP includes various types of mapping mechanisms that use heuristics scenarios to make the *Project*'s integration more flexible and to avoid the classical and hilarious ALM4AI/DevOps problems or even drama (Trad & Kalpić, 2017a). In Figure 8, the author presents the optimal aBBs mapping construct, where the major part of aBBs mapping are written in portable C/C++ and only the parts related to the graphical user interface are developed in JEE, .NET or any other pseudo RAD4AI environment.

Figure 8. aBB's mapping construct

AMM

mcRequirement	= KPI	(1)
CSF	= ∑KPI	(2)
CSA	= ∑CSF	(3)
Requirement	= ∑mcRequirement	(4)
(e)neuron	= action + mcIntelligenceArtefact	(5)
mcArtefact	= ∑ (e)neurons	(6)
mcEnterprise	= ∑ mcArtefact	(7)
(e)Enterprise	= ∑ mcEnterprise	(8)
mcArtefactScenario	= ∑mcArtefactDecisionMaking	(9)
IntelligenceComponent	= ∑mcArtefactScenario	(10)
OrganisationalIntelligence	= ∑IntelligenceComponent	(11)
AMM	= ADM + OrganisationalIntelligence	(12)

aBBs and Patterns

For the NLP the role of patterns and aBBs should be assisted with an efficient transformation and architecture framework like TOGAF that includes automated patterns, services and building blocks assembling concept. The *Manager's* role is crucial for the finalization of the implementation phase of the very complex *Project*, where in this phase, NLP skills are determinant to design and implement scenarios. There is a need to build a concise aBB's composite model; shortly a *holistic brick* that can be used as a pattern for a variety of *Projects*, using methods like ArchiMate or Unified Modelling Language (UML). The NLP concept is technology agnostic and where *Project* team members must be able to reuse proven aBBs that emerge from the tested ones in order to solve generic requirements. Composite aBBs promote the concept of design patterns, services building and solution blocks. TheNLP4AI uses the data architecture and modelling concept that includes the pattern on how to integrate data solution blocks which are instances of the data building blocks using the ADM4AI.

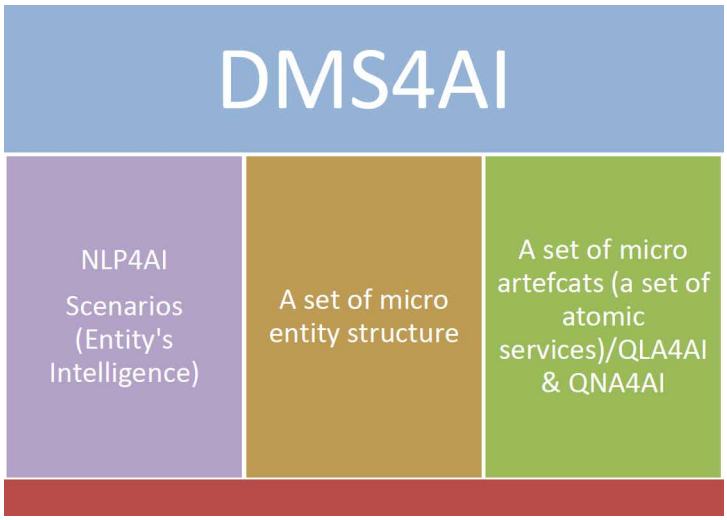
Functional Environments

The internal functional development environment supports (North, 2010) and offers a heuristics expert system for various application domains and a concept similar to NLP for hard systems thinking (North, 2010). NLP's concept uses BDD and NLP like interpreted scripts that are compiled and executed in real-time manner; such operations can be done by business professionals with no prior computer science or engineering background (Myers, Pane, & Ko, 2004; Moore, 2014). That is why the author recommends an interpretable version of NLP based NLP strategic concept.

Application Programming Interface's Management

The API methodology and modeling is based on (Patni, 2017):

Figure 9. API's management and interaction (Patni, 2017)



- Modeling the schema of an API means, creating a design document that can be shared with other members.
- A schema model is a contract between the *Entity* and the clients.
- A schema model is essentially a contract describing what the API is and how it works.
- It is like a map of an API, a user-readable description of each endpoint. Figure 9 shows the API modeling framework where APIs' specifications is.
- It consists of 5 phases in the case of an agile implementation:
  1. Domain analysis and API description.
  2. Architecture and design.
  3. Prototyping using a PoC.
  4. Building APIs for production.
  5. Publishing APIs

Project's complexity lies in managing aBBs; especially the management of their life cycle where each instance of a service exposes a remote API. In some domains a Representational State Transfer (REST) protocol can be used; knowing that the underlying SOA calls can be used as APIs in the context of an aBB.

aBB Assemblies

The proposed architecture embeds aBB's pattern in order to keep every business artefact simple and that such artefacts can be managed and implemented by any type of profile who need not necessarily be a computer science engineer. The application of structured simplicity can be achieved by the application of the "1:1" mapping rules that are based on business aBBs and business requirements alignment. The aBBs are recommended because services are rigid and not technically agnostic. aBBs are more adaptable to analysis and design services; one aBB is related to one atomic analysis and design artefact.

atomic Analysis and Design

atomic Analysis and Design is based on the adaptation of UML and DDD to the ADM4AI. A limited set of diagrams are to be used for this integration, like the class, collaboration and sequence diagrams, an aBB can be linked to a design document.

Micro Requirements

atomic Requirement, is a requirement's description in form of a DDD artefact that corresponds to functional description of a aBB that uses only one ADM4AI and can be tested by only one micro test that is known as a Test Driven Development (TDD).

atomic Tests

An atomic Test, is a test scenario or a TDD that corresponds to the testing of one aBB that uses one ADM4AI. This testing method combines: 1) BDD that is an evolution in the domains of Test Driven Development and Acceptance Test Driven Development; 2) NLP approach; and 3) DDD implementation.

The atomic Model View Controller

The atomic Model View Controller is based on the classical model view controller pattern, which is dynamically built for each aBB where the ADM4AI phase inputs the aBB, then the team develops this phase's outputs that are: 1) the update of the activity diagram with the aBBs' flow characteristics; 2) the development of the business and technical aBBs; 3) the development of the needed SOA support; 4) the class diagram; and 4) the development of the proposed concept.

Test Driven Developments

The actual standard TDD is an archaic manual approach and a concept where software developers design the test first and then do the development, where they keep to sets of code (Janzen & Saiedian, 2005); whereas the DDD or the Model first approach is based on designing the solution that starts with the modelling of *Project* requirements by using UML use case descriptions where each use case maps to a class diagram. The class diagram maps to a microartefact where the use case defines already the unit and integration tests and these tests are generated automatically (Selic, 2003). The proposed automated unit testing processes evaluate the design for a given set of requirements and verifies its status. For *Projects*, the implementation phase is very complex, and it offers a concept and strategy that delivers the *Project* microartefacts mapping status to support the development processes. Concerning the NLP concept, the question is: which type of development-driven method is optimal, TDD or DDD or any other. Even if both methods are usable, this research's proposed unit testing is more adapted for building *Project* microartefacts. *Projects* are huge projects, where the tests are auto-generated and the integration of microartefacts needs the Model first methodology that can be used with various technologies. The DDD or Model first is optimal for the NLP concept that has to be assisted by an Acceptance Test Driven Development (ATDD) methodology (Design Patterns, 2015).

Acceptance Test-Driven Development

Acceptance Test-Driven Development (ATDD) is used to make collaborate business clients, *Project* engineers, *Project* testers and software engineers and to assist their communication (Koudelia, 2011). Based on standard TDDs, the standard ATDD methodology is based on developing tests where tests represent the results of the requirement's behaviour of a set of NLP scenarios. In the standard ATDD approach, the team creates acceptance level tests, then they implement the *Project*. Later, the results are checked to improve the business system. The *TRADf* proposes an auto-generated ATDD that corresponds to acceptance testing of an aBB, similar to Kent Beck and Martin Fowler's ATDD concepts; even if they remarked that it was very difficult to implement integrated acceptance criteria using standard unit tests in various phases of the *Project*. Business users contribute to define workable acceptance tests or use behaviour-driven development techniques (Koskela, 2007).

Behaviour-Driven development

The NLP' uses *TRADf's* internal heuristics language is similar to the BDD method that includes unit, integration and acceptance tests that serve as a formalism for communication between the *Manager* (Bingham, Eisenhardt, & Furr, 2007), the end business users and the *Project*'s engineers (Soeken,

Drechsler, & Wille, 2012). The used NLP agile concept and level of tests are implemented in a pseudo-prose form that resembles to simple scripts, so that business users can understand the implemented business system's tests. The NLP' internal heuristics language (a pseudo BDD) comprises an internal resources mapping subsystem to link prose to business system's microartefacts to requirements. The NLP' internal heuristics language prose scenarios contain information to automate the linkage of the needed microartefacts' classes and the *Project*'s team-members can assist in adding code snippets to the generated microartefact instances. The NLP' internal heuristics language enables a fully-automatic unit, integration and acceptance tests that are used with the architecture iterations (Lazar, Motogna, Parv, 2010). aBBs provide mechanisms to make NLP tuneable with CSFs to evaluate the used strategies.

Requirements Engineering and Implementation Strategy

Concerning NLP the following sub concepts ca be integrated:

- Agility, and hence ALM4AI/DevOps that would limit to a components level.
- NLP in the central scope of the ADM4AI and UML derivates.
- Mapping resultant classes to entities/tables models and …
- Granularity and unbundling…
- Requirements mapping to aBBs.
- Business services mapping to aBBs.
- aBBs mapping to activities

The Unit of Work

In order to insure the definition of an optimal unit of work that will align all the *Project's* resources using a holistic "1:1" mapping concept, the author had to use a concrete basic artefact that is an object oriented class artefact, represented by a class diagram using the extensible Mark-up Language (XML) representation. Such a mapping concept is based on the class artefact, and XML insures the interoperability between all the *Project's* resources. Such a requirement mapping strategic concept is based on a naming convention and GUID that link all the *Project*'s resources that use standard patterns.

ICS's CSFs

Based on the LRP4AI, the most important ICS's CSFs that are used are:

Modules' Link to the ADM4AI and GAIP's Integration

This section's deduction is that ADM4AI and engineering is central for the NLP subsystem in which it has its fundaments.

Table 2. CSFs that have the average of 9.20

Critical Success Factors	HMM enhances: KPIs	Weightings
CSF_ICS_GUID_Implementation_Models	Proven	From 1 to 10. **10 Selected**
CSF_ICS_Standards	Proven	From 1 to 10. **10 Selected**
CSF_ICS_aBBs	Complex	From 1 to 10. **08 Selected**
CSF_ICS_Performance	Complex	From 1 to 10. **08 Selected**
CSF_ICS_DistributedCommunication	Stable	From 1 to 10. **09 Selected**
CSF_ICS_NLP4AI_Development	Proven	From 1 to 10. **10 Selected**
CSF_ICS_Security	Complex	From 1 to 10. **08 Selected**
CSF_ICS_ADM4AI_Automation	Proven	From 1 to 10. **10 Selected**
CSF_ICS_Pattern_StandardsIntegration	Possible	From 1 to 10. **09 Selected**
CSF_ICS_OperationsProcedures	Proven	From 1 to 10. **10 Selected**

valuation

ARCHITECTURE DEVELOPMENT AND GAIP INTEGRATION

Domain Driven Design

The NLP concept offers a domain centric approach that is based on the following DDD's layers (Evans, 2003): 1) the application, based on aBBs; 2) scenarios of aBBs; 3) domain and requirements; 4) the user interface; and 5) the infrastructure layer. DDD layers are based on the "1:1" concept that is supported by: 1) the *Project's* common aBBs; 2) monitoring and trace activities; 3) ICS' synchronization; 4) the reusability of legacy artefacts; and 5) managing of requirements. The "1:1" concept offers an iterative model that can map to all the designed aBBs that support:

- aBBs' components' alignment.
- The alignment of *Entity's* organizational aspects.
- The knowledge needed for the aBBs unbundling process.
- The optimal architecture for the *Project*.
- The management of synchronized dynamic organizational changes.
- The management of the organizational artefacts and their corresponding aBBs.
- Agile project management.
- DMS4AI based on neural networks.
- BDD.

Behaviour Driven Development

BDD derives from previous established techniques, like: 1) eXtreme Programming; 2) TDD; 3) Continuous Integration; 4) Acceptance Test-Driven; 5) Planning Lean principles; and 6) DDD. BDD's implementation is influenced by: 1) NLP's systems thinking; 2) the BDD/TDD relationship where the DDD model is the starting point; and 3) the BDD/TDD/DDD relationship helps to refactoring and moving of responsibilities between classes; where a class is a unit of work.

Entity Control and Governance

Entity logging servers are designed to collect and store vital business information from various *Project* aBBs. These aBBs can also provide an extended status report and ensure that the atomic services' flows should comply with the NLP concept. The logging from various types of aBBs involves issues causing that data can differ in: 1) flow's logic; 2) quality; 3) formats; and 4) reliability of interaction.

Control Objectives for Information and Related Technology Framework

The Control Objectives for Information Technology (COBIT) is a business framework for the governance and management of *Entity's* ICS, and it can be used to insure that accepted principles, practices and models are used to support the *Project*. The integration of CSFs or risks for *Projects* and the alignment with standards such as Information Technology Infrastructure Library (ITIL), International Organization for Standardization (ISO), Project Management Body of Knowledge.

Information Technology Infrastructure Library

The standardized Information Technology Infrastructure Library (ITIL) contains a well detailed description of a seven-step improvement process that provides the capabilities to: 1) measure; 2) plan; and 3) implement business services and atomic and micro services improvements with their needed assertions. This seven-step improvement process is not only used on an operational level but it also provides support for all the ADM4AI's phases. In this seven-step improvement process the *Project* team implements the needed Service Level Agreements (SLA) that can be incorporated in the operational phase. ITIL focuses on business services or application software services where the top level of the configuration tree in ITIL is the business system. The NLP decomposes the business system into aBBs that contain a set of atomic (or micro services), the governance model of ITIL can be used to govern aBBs.

Legal Aspects

Transformations forces various industries to implement legal assertion mechanisms into their *Projects* and they must incorporate legal assertions for: 1) international; 2) national; and 3) local-regional laws and rules. Besides international and national laws, there are many legal frameworks, conventions, treaties and directives to be reviewed to support the *Project*.

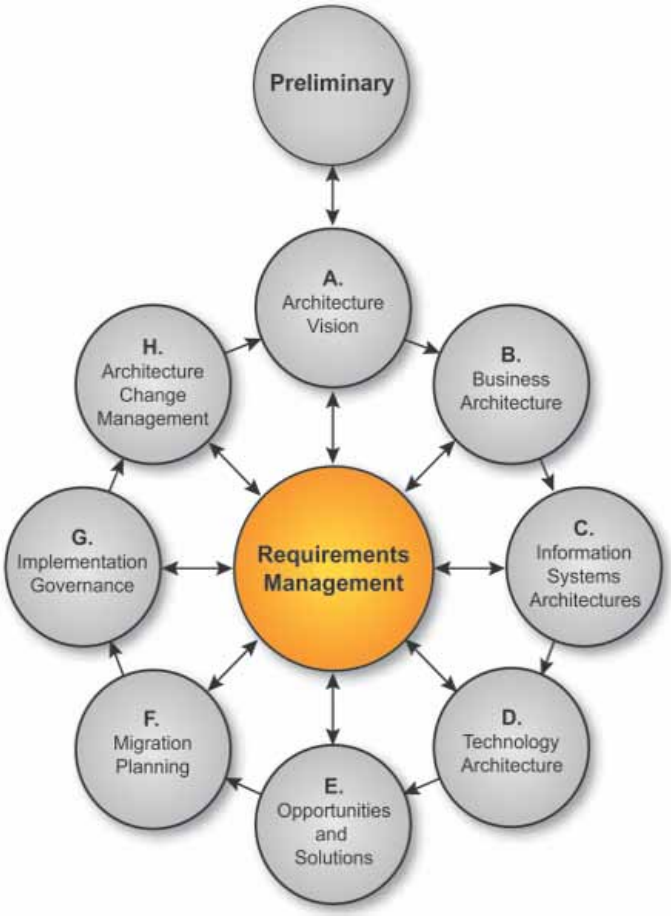
Project Management

The project management interface is used to refresh the NLP project data into the *Project's* data store; which manages just in time *Project* information, using standard formats. The roles of project management and project management office has an assistance nature.

Integration of the ADM4AI

The ADM4AI's integration with the NLP concept, enables the automation of aBBs, throughout all the ADM4AI phases and in various iterations. The ADM4AI encloses cyclic iterations; where information about all its phases' NLP activities are logged. The NLP concept is not dedicated to any specific business or technology platform. NLP's integration with the ADM4AI offers: 1) strategic just-in-time aBB management; 2) performance improvements and reliability prediction and stabilization; and 3) NLP integration with environments like the ArchiMate and UML. The ADM4AI is controlled and monitored in real-time; and it supports aBBs' mapping and interactions with various types of tests and integration-driven developments as shown in Figure 10.

Figure 10. Tests sequence

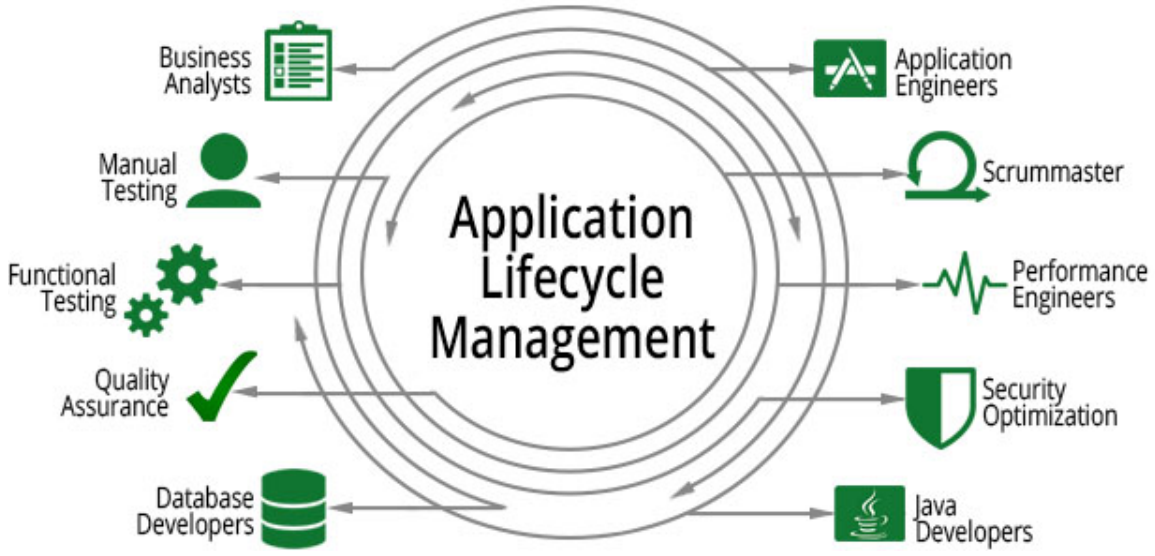


Modelling Language-ArchiMate

Modelling with ArchiMate in n GAIP has the following characteristics (Hosiaisluoma, 2021; Bebensee, & Hacks, 2019):

- The business' important behavioural and structural elements of an *Entity* can be modelled with ArchiMate, which is a comprehensive and rich notation, with a wide range of elements and relationships. ArchiMate-elements are grouped into the layers of ArchiMate Framework, as shown in Figure 11.
- Enterprise Architecture (EA) modelling is an approach to manage optimal ICS infrastructure and landscapes to coordinate GAIP based projects in an *Entity*. EA specialists apply modelling tools like ArchiMate to document the EA blueprint.
- Generated models in ArchiMate's are stored in the *Entity's* database.
- There is need to identify different information sources, from which data could be collected automatically and mapped to entities of the ArchiMate framework.
- Models can be outputted to XML files using the ArchiMate Model Exchange File Format's XML schema. Using this mapping, the output XML file can easily be converted to the ArchiMate Model Exchange File Format. Such models can be used by any EA modelling tool which supports the ArchiMate standard.
- The definitions of properties found in the schema of the output file, are mapped to instances of ArchiMate property definitions. Each host in the output file is mapped to an instance of an ArchiMate element where its network address is the GUID.

Figure 11. ArchiMate Framework (Hosiaisluoma, 2021)

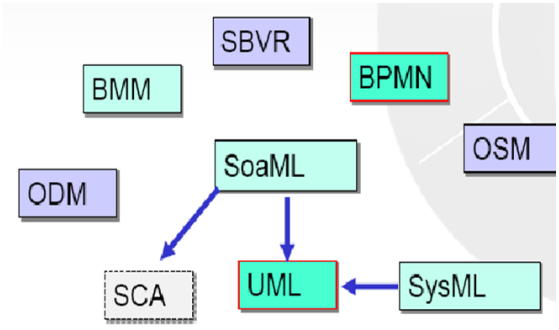


Application Cartography

The *Entities* applications can be classified as follows (Togaf-Modeling, 2020):

- Classifications can be done by using EA's capacities like, TOGAF's the Application Communication Diagram (ACD), which depicts all used models and mappings related to communication between applications and modules in the metamodel of the *Entity*. It shows application components and interfaces between various components.
- Interfaces may be associated with data entities where it is appropriate and applications may be associated with aBBs where appropriate.
- Application communication diagrams present either an application cartography of what already exists, or a logical architecture of the future situation. SOA-type architecture is encouraged.
- EA is hybrid, a mix of (non-SOA) applications, repositories and SOA based aBBs.
- SOA based EA, recommends that aBBs should be structured according to their nature and their level.
- Components are interconnected via their required and provided aBBs, which are linked by connectors. These required and provided aBBs are typed by ICS services. The service operations provided by these services transport data (parameters) are modeled in the form of *messages*.
- As shown in Figure 12, EA models are layered, where the interaction component (site) is on top, process components in the middle, and entity components on the bottom.

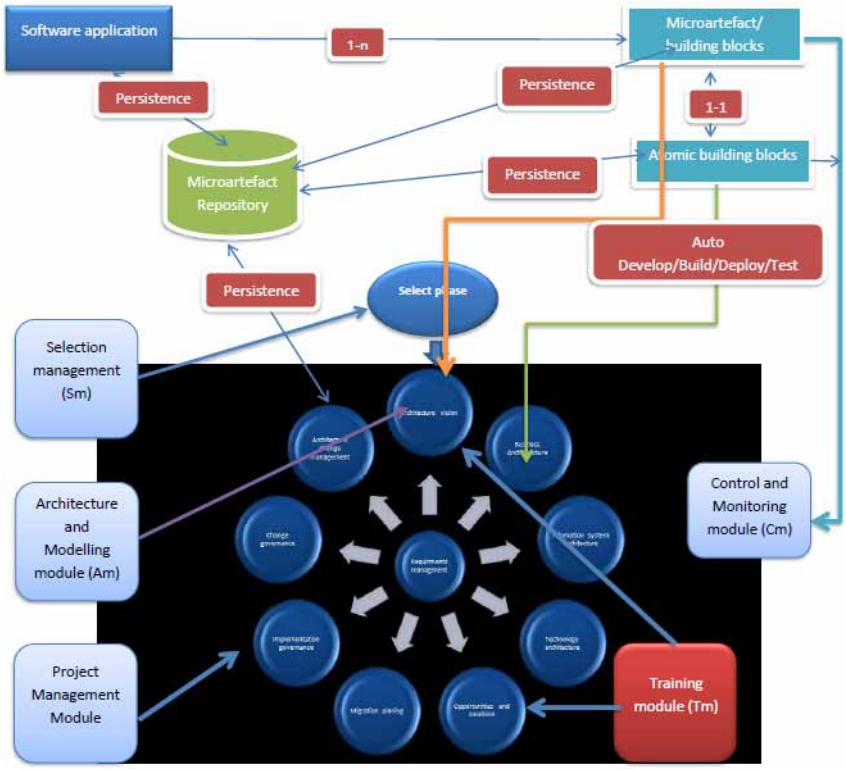
Figure 12. The architecture is layered (Togaf-Modeling, 2020)



An n-Tier Architecture

An important CSF in the *Project*'s GAIP process is the role of the n-tier model and its applied implementation and mapping strategies; where the integration of NLP concepts are the base of the interaction. NLP concepts are important for the future of any *Project* and an automated mapping strategy must be defined using a standardized methodology like ArchiMate, as shown in Figure 13 (MID, 2014). The ADM4AI improves the robustness of *Projects* by transforming their mapping design, development, integration and maintenance processes (Greefhorst, 2009).

Figure 13. ArchiMate modelling environment (Greefhorst, 2009)



The ADM4AI and the GAIP CSFs

Based on the LRP4AI, the most important ADM4AI and GAIP CSFs that are used are:

Table 3. CSFs that have an average of 9.40

Critical Success Factors	HMM enhances: KPIs	Weightings
CSF_ADM4AI_CSF_Initialization&Setup	Proven	From 1 to 10. **10 Selected**
CSF_ADM4AI_NLP4AI_IntegrationProcesses	Complex	From 1 to 10. **09 Selected**
CSF_ADM4AI_Phases_Tests	Proven	From 1 to 10. **10 Selected**
CSF_ADM4AI_Requirements	MappingAutomated	From 1 to 10. **09 Selected**
CSF_ADM4AI_ArchiMate_Integration	Possible	From 1 to 10. **09 Selected**

valuation

Module's Link to the Strategic Knowledge and Intelligence

This section's deduction is that the application of a strategic intelligence is central for the NLP concept's integration in *Projects*.

KNOWLEDGE AND INTELLIGENCE FOR AI

Data Modelling

Projects needs enterprise, solution, technical and infrastructure architectures to support a NLP's implementation that has many interrelated activities, including development, hardware, networks, business processes, technology actions that have to access data through a loosely coupled data architecture. The data architecture is a layered set of models which provide a solid foundation for strategic initiatives, based on data building blocks that can be represented with class diagrams.

The Class Diagram and Mapping Concepts

In the data architecture and modelling phase, the main data models or class diagrams, are to be defined at the initial phase and then calibrated in the requirement and business architecture phases of the ADM4AI. At the design levels, the data class diagram supports the data architecture and modelling concepts to be designed, without taking into account the *Entity's* complexities. This architecture phase enables the *Project* team to concentrate on the business aspects. The data architecture and modelling are based on the "1:1" mapping concept which helps in accessing the *Project's* data models to be built on data solution blocks.

Data Solution Blocks

The GAIP uses the data architecture and modelling concept that includes a pattern on how to integrate data solution blocks which are instances of the data building blocks, which are used with the NLP. Data solution blocks, correspond to an aBB, or more precisely, a data oriented aBB which can be accessed through an API.

Standard Engineering Patterns

Defining the unit of work for NLP using the "1:1" concept, serves as a concrete aBB that can be represented with a class diagram, where mapping supports the interoperability between all the *Project*'s microartefacts that include the internal knowledge and intelligence subsystems.

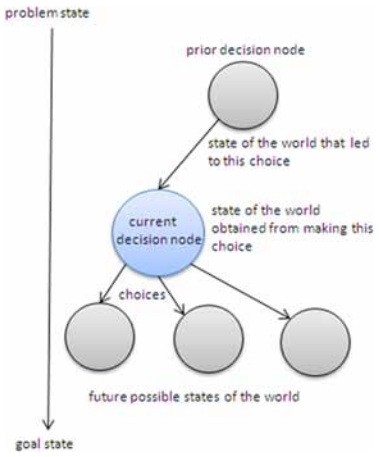
Strategic Knowledge and Intelligence Subsystems

The microartefacts knowledge and intelligence mechanisms contains the needed set of actions to enable their automatic building/linking to requirements, deployment and monitoring that insures the interoperability between all the *Project* platforms. The needed actions are described using an internal functional environment.

Knowledge Management Resources, Artefacts, and CSFs

TRADf's mapping strategy is used to relate and assemble *Project*'s microartefacts, requirements and resources. This mapping concept is used to automate the building and deployment of autonomic *Project* microartefacts' instances in all of the project's phases; and it is based on the GAIP decision model that maps all the *Project* microartefacts to CSFs (The Open Group, 2011a). The NLP concept uses the initial set of CSFs to access the KMS4AI, as shown in Figure 14.

Figure 14. The KMS4AI



The Strategic Knowledge and Intelligence Management CSFs

Based on the LRP4AI, the most important knowledge and intelligence management CSFs that are used are:

Table 4. CSFs that have an average of 9.00

Critical Success Factors	HMM enhances: KPIs	Weightings
CSF_KMS4AI_NLP4AI_Integration	Possible	From 1 to 10. **09 Selected**
CSF_KMS4AI_Item_Mapping	Complex	From 1 to 10. **08 Selected**
CSF_KMS4AI_Patterns	Possible	From 1 to 10. **09 Selected**
CSF_KMS4AI_Pattern_Integration	Possible	From 1 to 10. **09 Selected**
CSF_KMS4AI_Pattern_AccessManagement	Proven	From 1 to 10. **10 Selected**

valuation

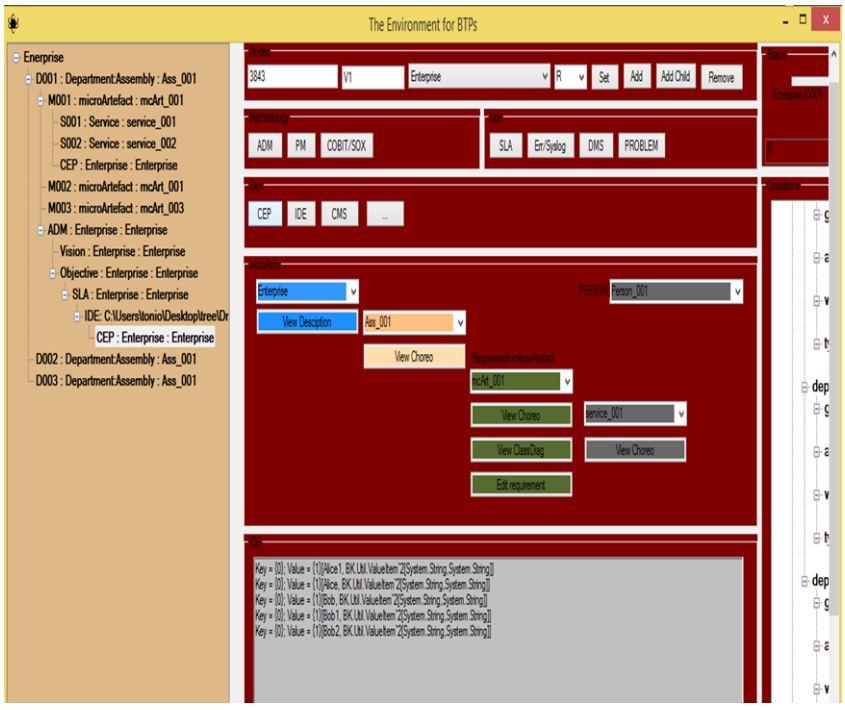
Module's Link to the DMS4AI

Due to the CSFs, this section's deduction is that decision making is central for the NLP concept and its integration in *Projects*.

THE DECISION MAKING SYSTEM FOR AI

Complex intelligent systems management refers to classical operational research, systems analysis and global systems modelling/engineering; which is supported by the NLP's concept, as shown in Figure 15. Complex systems management is an approach for building and deploying complex GAIP based systems and it replaces conventional and archaic decision systems with a set of AHMM4AI based heuristics models that automates DMS4AI. The Complex systems management can be adapted to the *Project*'s problems and requests by using the NLP concept (Daellenbach & McNickle, 2005). DMS4AI requests are processed by using *TRADf's* heuristics module, as shown in Figure 15; that in turn are based on the selected CSFs and CSFs.

Figure 15. Complex system's approach (Daellenbach & McNickle, 2005)



NLP Development and Processing

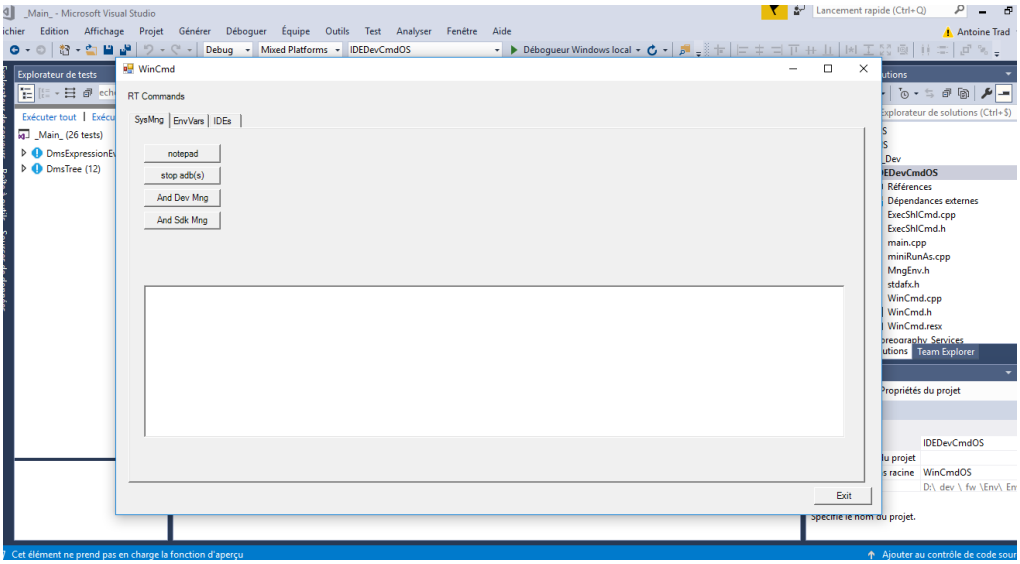
NLP deployment officer, configures the types of microartefacts to be used and mapped to *Project's* requirements; these microartefacts are orchestrated by GAIP's actions that process the deployment pro-

cesses. NLP actions map requirements to the various development and operations processes, located in ADM4AI's phases; these processes are responsible for the implementation of mechanisms needed to deliver the mapping and deployment actions. The NLP concept is implemented in all of the *Project*'s processes and the implementation of microartefacts to deliver a final business system; such a set of actions can be modelled and orchestrated by the AHMM4AI (The Open Group, 2011a; Trad & Kalpić, 2020a).

The Microartefacts' Distributed Automation Model

The NLP uses the AHMM4AI nomenclature, for its automated mapping model. The AHMM4AI is presented to the reader in a simplified form to be easily understandable on the cost of a holistic formulation of the architecture vision. The NLP concept uses the AHMM4AI that is formalized as shown in Figure 16.

Figure 16. The AHMM4AI model's nomenclature (Trad, & Kalpić, 2020a)

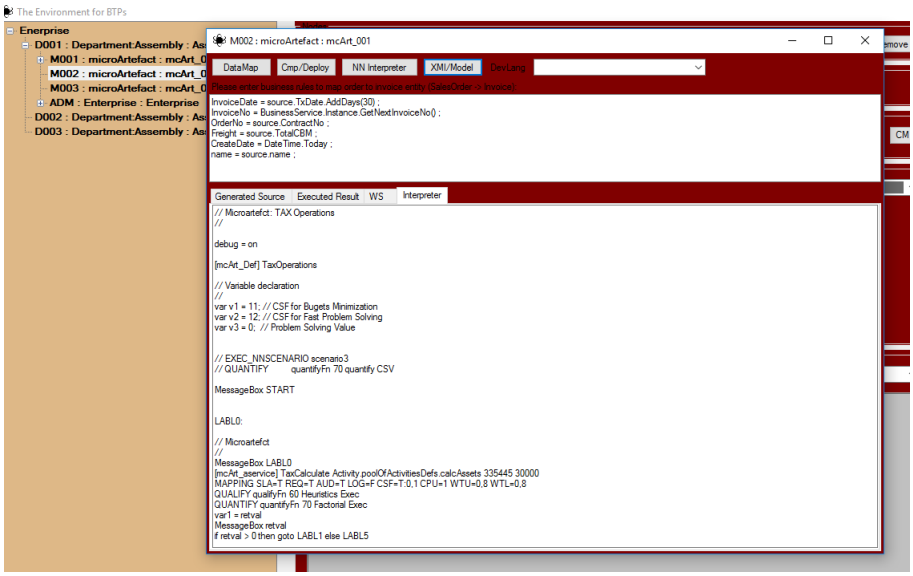


As shown in Figure 16, the symbol $\sum$ indicates the summation of all the relevant named set members, while the indices and the set cardinality have been omitted. The summation should be understood in a broader sense, more like set unions.

The Applied Enterprise Mathematical Model

The NLP concept's major requirement is that, the traditional environment has to undergo a total and successful unbundling and classification processes of its services and business processes. The AHMM4AI is an abstract model containing a pseudo mathematical language that can be used to describe, transform and implement the behaviour of any *Entity* (Goikoetxea, 2004). The AHMM4AI is a formulation of the architecture's vision using the NLP concept which interfaces the DMS4AI. The DMS4AI is a part of the *TRADf* that uses aBBs to support just-in-time decision-making. The DMS4AI, as shown in Figure 17, is based on a light version of the ADM4AI.

Figure 17. The enterprise mathematical model



The Enterprise AHMM4AI (EAHMM4AI) is the combination of an enterprise architecture and transformation methodologies.

The Applied Transformation Model

A transformation is the combination of an EA methodology like the TOGAF and the AHMM4AI that can be modelled after the following formula for the Transformational Model (TM):

TM = Enterprise Architecture + AHMM4AI (1).

(NLP):

NLP Concept = $\sum$ microArtefactsDevOpsInformation + AHMM4AI (2).

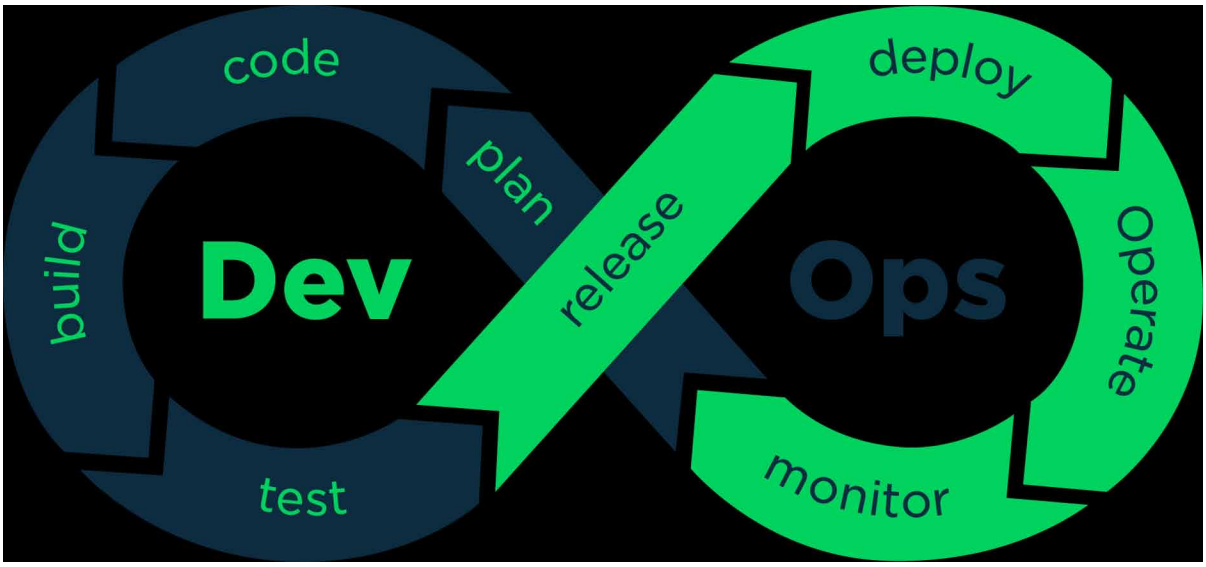
The NLP concept is based on a concurrent and synchronized *TRADf* which uses threads that can make various models run in parallel and exchange managing of building and deployment processes through a mathematical mapping choreography.

The Main Construct

Basics

Entities are both dynamic and ever changing in their business objectives and performances and there is a need for a holistic highly dynamic and non-stationary GAIP to continuously make *Project's* decisions for special situations. The evolution of the *Entity's* intelligence and its transformation capacities depend

Figure 18. The relation between the DMS4AI and NLP



on neural networks-based computation systems; such systems should be capable of handling complex problems using the DMS4AI. DMS4AI s depend on the situation with respect to space, senses, history/ experiences, real-time events and time. Most *Project* decisions are basic and trivial, needing routine intelligent actions that correspond to business functional model.

Basic Relationships and the Functional Model

Psychology and the study of intelligent behaviour focus on cognitive processing, and in particular, rational thinking. The field of AI, in ICS, mirrored this focus in its attempt to replicate intelligence. Today both psychologists and computer scientists have gained a much deeper understanding of the realities involved in making decisions, in a way to give more importance to an approach known as heuristics.

Heuristics background

A basic decision process is a sequential set of actions in progressing from a starting state to a solution state. At each state the DMS4AI offers a set of options to activate the set of actions to find solution(s). The valuation is based on the state's information that can offer a less valuable solution, good solution or a failure to reach the goal state. A decision process is a heuristic tree that has root and each stage is represented by some number of option nodes. Researchers hold that this formal model is the optimal model of the human brain. It is the model of a network of decision nodes based on simulated neurons (that correspond to (e)neurons) that learn options and produce the weightings. When the number of available options for choice becomes large enough, the process of weighing and selection would become complex. When a decision is taken (in the sense of a path through the tree), it generates an NLP action (that corresponds to an aBB) that in some sense will change the situation in the *Project*, like a new state is a concept obtained from the selection and action. There are several unanswered difficulties

with using this model. One has to consider the granularity or precision of decision-actions. The world appears to be a continuum of multi-dimensional events and not a set of sequential and discrete states. If it were encoded using discrete representations, it would be unreasonable to expect adequate precision of DMS4AIs (Mobus, & Fisher, 1999). The DMS4AI selects one solution that has a value based on CSFs. The evaluation value attached to each node in the tree is a state with complex data and functions containing many constraints.

The Heuristic Decision Tree

The DMS4AI processes the Heuristic Decision Tree (HDT), searching for the best solution or a set of NLP actions that drives to the defined objectives. The DMS4AI has routine mechanical operations to come close to the neural network. The set of possible solutions depend on the defined set of CSFs and it is not just a simple objective function that insures a correct result. The DMS4AI CSFs are deduced from the: 1) perceptual system; and 2) conceptual system that stores the explicit *Project* knowledge that has been gained through learning or experience while offering to the NLP the needed set of solutions.

The Solutions

The set of possible solutions is configured containing a specific solution that corresponds to the specific problem that had initiated by the DMS4AI. Thus, the DMS4AI tries to find possible decisions to satisfy the problem's solution and that is achieved by NLP actions. The structure of a decision is defined as: at each node in a HDT there is a set of possible future states of the world that include some state that would bring the *Manager* nearer to the goal state. Each decision is associated with an action output that changes the state of the HDT. Choosing the best option depends on having the needed information at each node that will provide an indication which node to select. *Projects* have developed GAIP mechanisms for processing HDT. Like with Damasio's recognition that promotes experiences to manage the DMS4AI, there are heuristic patterns of recognition scenarios that can be used to tag memories of solved business problems that can serve in future cases.

The Integration Process

The hyper evolution of AI forces *Entities* to implement risk management mechanisms into the DMS4AI by using business risk CSFs in aBBs. aBBs based DMS4AI contains a set of autonomous CSFs and their behavioural functions. The success of such *Projects* influences the way decision making services are managed and integrated, what consequently forces *Entities* to continuously transform. In this RDP4AI the author introduces a complex methodology for the integration of an NLP concept in order to successfully finalize the implementation phase; that should fully support the *Entity*'s strategic DMS4AI. The neural networks DMS4AI uses aBBs to promote an iterative concept for developing risks evaluation concept using risk CSFs (Chaffey, Ellis-Chadwick, Johnston, & Mayer, 2008).

DMS4AI's CSFs

Based on the LRP4AI, the most important DMS4AI CSFs that were used are:

Table 5. CSFs that have an average of 8.80

Critical Success Factors	HMM enhances: KPIs	Weightings
CSF_DMS4AI_ComplexSystemsIntegration	Possible	From 1 to 10. **09 Selected**
CSF_DMS4AI_NLP4AI_GAIP_Interfacing	Complex	From 1 to 10. **08 Selected**
CSF_DMS4AI_KMS4AI_Interfacing	Possible	From 1 to 10. **09 Selected**
CSF_DMS4AI_ NLP4AI _Processing	Proven	From 1 to 10. **10 Selected**
CSF_DMS4AI_HolisticApproach	Complex	From 1 to 10. **08 Selected**

valuation

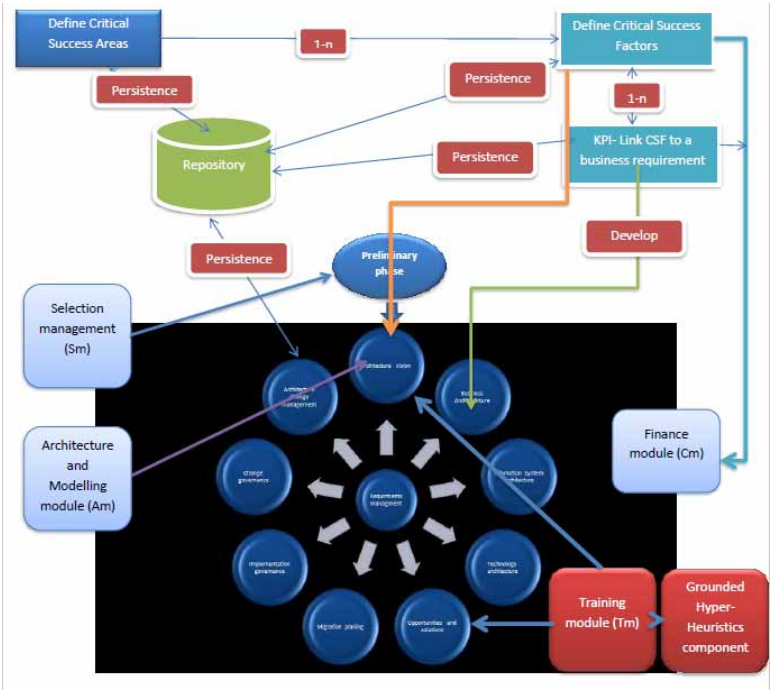
Module's Link to the NLP Concept

Due to the CSFs, this section's deduction is that the NLP concept is central for DMS4AI.

THE NLP CONCEPT

Today many implementation tools, DevOps and related concepts of development exist, and probably unfortunately, they are still very immature (Gartner, 2016). These standards related tooling and develop-

Figure 19. The ADM4AI and NLP's integration (The Open Group, 2011a)



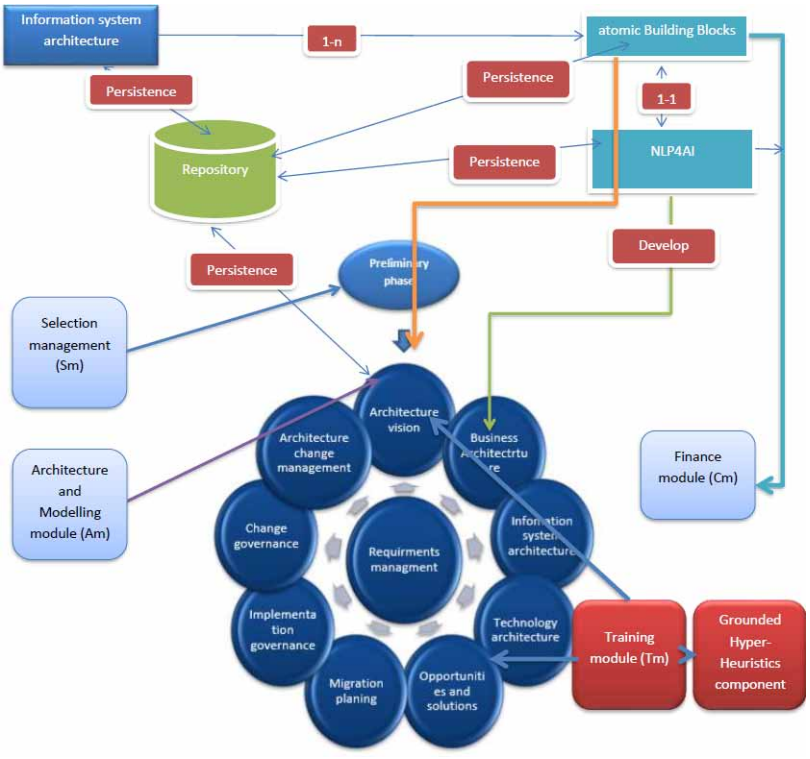
ment environments are supposed to support an iterative unbundling process of the traditional *Entities*, through the execution of an agile approach for GAIP development. Unfortunately, ALM4AI/DevOps processes are not in an advanced stage to support agile concepts that in theory may drive the *Entity* to become a part of a dynamic *Entity*. It is crucial that the *Entity* unbundles/restructures its services and maps the aBBs to all the *Project's* resources, as shown in Figure 19.

Development, Operations and Scenario/Choreography Concept

Actual NLP, mapping, development, operations, integration and tools/environments are skeletons that should enclose various automated implementation environments, loose coupled technologies and methodologies representing a holistic strategy for a unified implementation approach for the *Project*'s cyclic needs. The *TRADf* offers a high-level interpreted NLP environment to enable fast *Projects* implementation, mappings, development, operations, integration and ALM4AI/DevOps iterations and that supports its change processes. Such an NLP concept must use existing standards, and its main characteristics are:

- To deliver an in-house functional language, based on aBB that hang to the enterprise's organisational nodes' hierarchy, in order to create a fundament for a mapping structure and unbundle services.
- To use the *Entity*'s existing standard development environment(s) and code base; in fact not to alter any aspect of its GAIP.

Figure 20. Existing set of development standards (Beauvoir & Sarrodie, 2018)



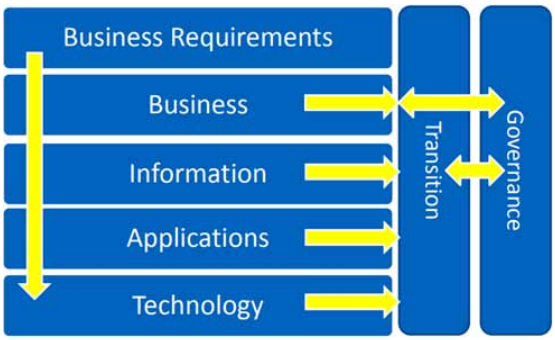
- It delivers the needed linking between requirements and aBBs; and to be used in the *Project* development.
- It offers a mechanism for the microartefacts' synchronized version management, deployment and testing.

The NLP concept is based on existing proven standards, as shown in Figure 20. Standard of EAs are based on service-SOA to support the NLP concept (Beauvoir & Sarrodie, 2018). This chapter presents a solution in the form of a PoC (or experiment) for such a concept, using existing standards and a mapping concept for a design, development, operations and maintenance.

Mapping and Design Concepts

Defining a requirement and aBB mapping and granularities for a *Projects* is a very complex task, during the implementation phase of the *Project*; added to that there is the complexity in implementing the "1:1" mapping design and classification of the discovered/unbundled *Project* microartefacts in the development of the system which have in general very limited resources and budgets; and this is where most *Projects* fail. The GAIP uses complex communication interfaces to interact with various NLP scripts. Mapping of a requirement's UML use case artefact to an NLP aBB in the form of a class diagram or communication diagram or an entity relationship model, is supported by *TRADf's* internal heuristic engine. This modelling and mapping concepts are supported by a set of the *TRADf's* microartefacts where its dispatching hub that supports the implementation of microartefacts to dynamically evaluate compound expressions, according to applied mathematical principles. GAIP uses the AHMM4AI to evaluate the *Project*'s requirements and to deliver solutions in the form of a set of applicable solutions; based on real-time linking of requirements to microartefacts (Neumann, 2002). As shown in Figure 21, the NLP concept proposes a fully automated and auto-generated mapping, building and deploying formalism, where a microartefact maps to a class diagram (or communication diagram) and has a generated GUID. The GUID identifies a specialized class that contains information for the auto-generated NLP mapping operations. This auto-generation component can be modelled by the *TRADf's* heuristics-oriented language.

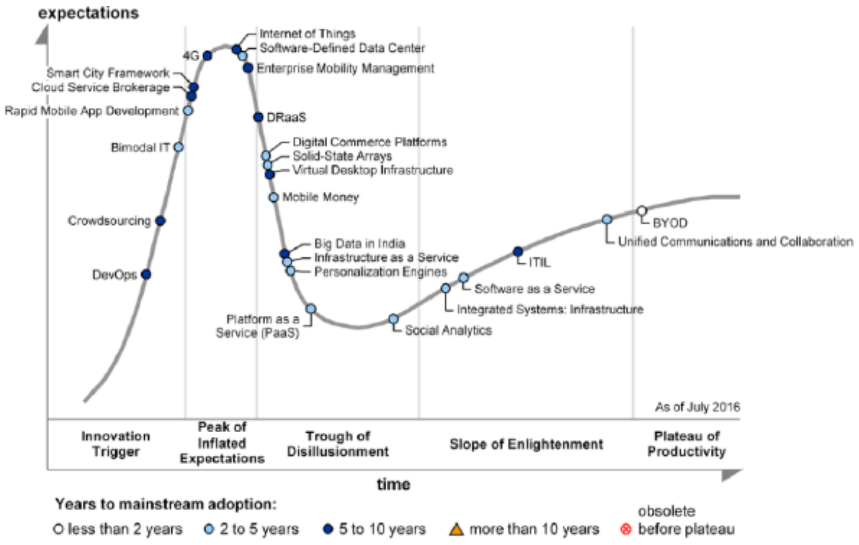
Figure 21. The proposed development and operation formalism



NLP and Microartefacts Delivery Strategy

The NLP concept contains a set of multiple coordinated automated and auto-generated just-in-time processing scripts to map requirements and aBBs (Cearley, Walker, & Burke, 2016). Mapping operations its contained intelligence is a set of NLP actions that coordinate and control various linking activities. The NLP concepts and their underlined mechanics are used to generate mapping instances and to receive and manage change requests. The NLP concept includes a rational heuristic motor to manage all the *Projects*' aBBs on-request delivery. As shown in Figure 22 the HDT is based on the DMS4AI.

Figure 22. The HDT



Major characteristics of an NLP concept are:

- Predict and offer optimal solutions with feasible performances.
- Predict and locate fallout feasible and stable solutions.
- Use different technologies and languages to support different requirements.
- All mapping, development, building and testing operations are automated to support an n-tier architecture.

NLP's Development CSFs

Based on the LRP4AI, the most important NLP CSFs that are used:

Module's Link to the Research's Implementation

This section's deduction is that the six tables permit the PoC using a concrete case.

Table 6. CSFs that have an average of 9.00

Critical Success Factors	KPIs	Weightings
CSF_NLP4AI_Mapping	Possible	From 1 to 10. **09 Selected**
CSF_NLP4AI_EA_Structure	Feasible	From 1 to 10. **09 Selected**
CSF_NLP4AI_Deployment	ManagementEnabled	From 1 to 10. **09 Selected**
CSF_NLP4AI_DMS4AI_Mapping	Feasible	From 1 to 10. **09 Selected**
CSF_NLP4AI_GAIP_Approach	Supported	From 1 to 10. **09 Selected**
CSF_NLP4AI_TRADf_Support	Proven	From 1 to 10. **10 Selected**
CSF_NLP4AI_RoleOfPatterns	Possible	From 1 to 10. **09 Selected**
CSF_NLP4AI_NeededSkills	Exisiting	From 1 to 10. **09 Selected**
CSF_NLP4AI_Maturity	Transformable	From 1 to 10. **08 Selected**
CSF_NLP4AI_Automation	Supported	From 1 to 10. **09 Selected**
CSF_NLP4AI_Tracking_Auditing	Feasible	From 1 to 10. **09 Selected**

valuation

THE RESEARCH'S IMPLEMENTATION

The PoC is implemented using the *TRADf* which was developed exclusively by the author.

The LRP4AI's Outcome

The LRP4AI (or Phase 1) outcome that supports the PoC's background, by the use of an archive of an important set of references and links that are analysed using a specific interface. After selecting the CSA/CSFs tag is linked to various NLP scenarios; which is implemented as an item, in an Excel file; where all its details are defined; this concludes Phase 1. In this DMS4AI related PoC (or Phase 2), the grounded hyper-heuristics to process solutions. The empirical part is based on the AHMM4AI's instance and the NLP mechanics', which uses the internal initial sets of CSFs' that are used in phases 1 and 2.

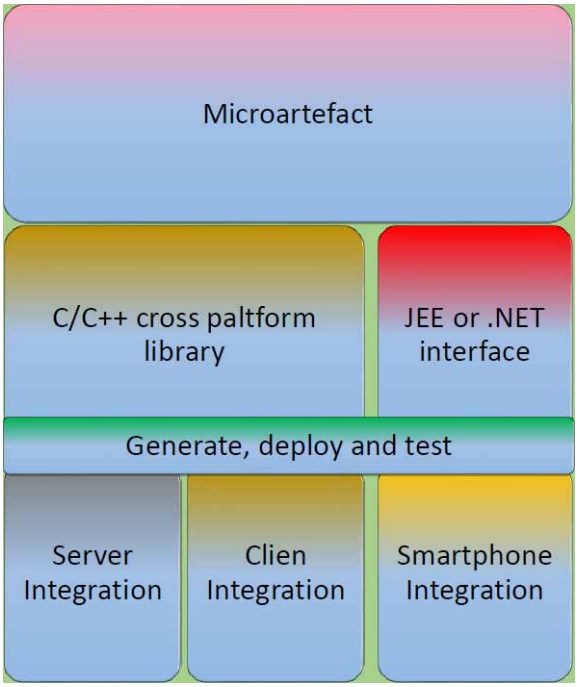
From Phase 1 to Phase 2

The *Project's* enumeration of CSAs are: 1) The RDP4AI; 2) The usage of the ADM4AI; 3) The ICS; 4) The DMS4AI; 5) The KMS4AI; and 6) The DMS4AI. Where Tables 1 to 6, where presented and evaluated in this chapter and they are this chapter's empirical part.

The PoC

The NLP concept's PoC was implemented using the research's *TRADf* that had been developed using the *TRADf's* NLP, Microsoft Visual Studio .NET, C/C++ and Java. The PoC is based on the DMS4AI and the CSFs' binding, using a specific *Project* requirement and related resources, where the NLP concept was designed using an object oriented (like UML) and enterprise architecture (like TOGAF) tools. The NLP processing model represents the mapping relationships between the requirements, aBBs, GUIDs and the CSFs.

Figure 23. The TRADf's frontend



The PoC was achieved using *TRADf* that is shown in Figure 23; were in the frontend the mapping/linking actions are activated by: 1) choosing a tree node that contains the requirement, then; 2) choosing the microartefact(s) to be linked; and 3) choosing to problem to be solved using an NLP scenario. When the setup is achieved, from the frontend the requirements development initiation interface that is shown in Figure 24, can be launched.

The NLP's concept uses a requirements knowledge (or history) database that automatically generates development and operations actions' (how to(s)); on how to make calls to DMS4AI to solve a concrete problem. Once the development setup interface is activated, the NLP interface can be launched to implement the needed microartefact scripts.

These NLP scripts that support the DMS4AI subsystem use CSFs that were demonstrated previously in this chapter's in six tables and the result of the processing of the DMS4AI, is illustrated in Table 7, shows clearly that the NLP concept is feasible.

Figure 24. The TRADf's implementation's setup interface

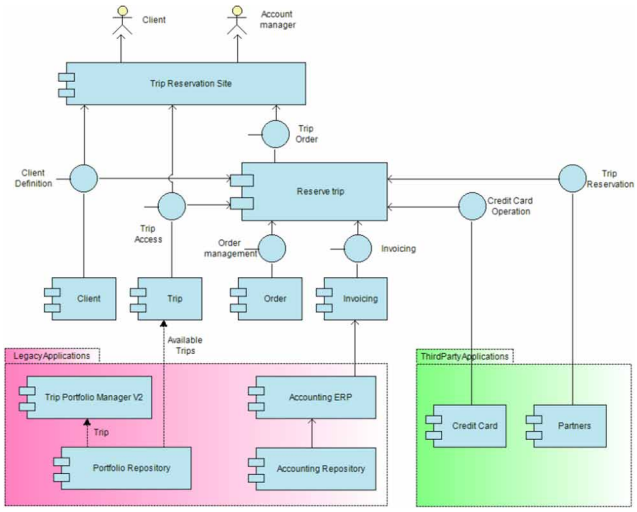


Figure 25. The NLP interface

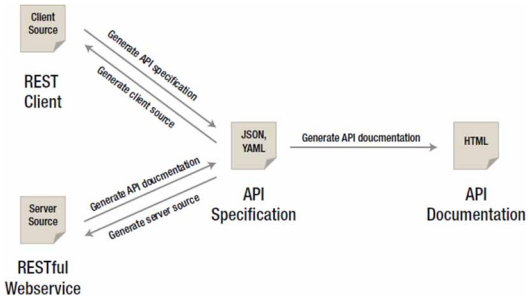


Table 7. The RDP4AI's outcome

CSA Category of CSFs/KPIs	Influences transformation management	Average Result
The RDP Integration	Complex	From 1 to 10. 9.125
The Usage of the Architecture Development Method	FullyIntegrated	From 1 to 10. 9.40
The Information and Communication Technology System	Transformable	From 1 to 10. 9.20
The Decision Making System	Implementable	From 1 to 10. 8.80
The Knowledge Management System	Implementable	From 1 to 10. 9.00
The NLP4AI Concept	Implementable	From 1 to 10. 9.00

Evaluate First Phase

The model's main constraint is that CSAs having an average result below 8.5 will be ignored. As shown in Table 7 (which average is rounded 9.10), this fact keeps the CSAs (marked in green) that helps make this work's conclusion; and no ones in red. It means that such an NLP concept's integration will succeed and that the *Project* must be done in multiple sub-projects, where the first one should try to transform the base systems, the ICS and the ADM4AI paradigm.

SOLUTION AND RECOMMENDATIONS

In this chapter, the author proposes a set of recommendations, table 7 shows that the NLP concept‘s implementation is possible. The resultant technical and managerial recommendations are:

- The NLP concept is inapplicable and mature.
- An NLP concept must be established and tried for its feasibility.
- A *Project* must build a global NLP concept to integrate in the DMS4AI.
- Enormous efforts must be applied to integrate aBBs structure, because the main problem is alignment of existing silos.
- The ADM4AI's integration with the NLP concept, enables the automation of microartefacts implementation activities.
- The *Project* must be separated in multiple transformation projects, where the first one should attempt to transform the system.

FUTURE RESEARCH DIRECTIONS

The *TRADf* future research efforts will focus on the various strategy for decision making systems and on automating the research development project.

CONCLUSION

This research phase is part of a series of publications related to *Projects*. This research is based on mixed action research model; where CSFs are offered to help *Managers* diminish the chances for failure when building *Projects*. In this chapter, the focus is on NLP, where its formalism defines a structured interrelationship of requirements, microartefacts development and other resources. NLP's development concept is an important CSF for the *Project's* evolution. The most important managerial recommendation that was generated by the previous research phases was that the business transformation manager must be an architect of adaptive business systems. The PoC was based on the CSFs' binding to a specific research resources and the internal reasoning model that represents the relationships between this research's concepts, requirements, microartefacts and CSFs. The final result clearly implies that an NLP supports transformation is possible. The author recommends performing the *Project* operations through multiple independent sub-projects; and the main recommendations are:

- The *Managers* should be supported with a set of aBB architecture concepts and tools that can be easily integrated with the defined EA principles.
- An NLP concept is needed for the definition of service contracts, implementation of aBBs and service discovery, automation of independent and scalable deployment, is needed.
- Coordinate different aBBs and react proactively in real time to events, by performing event correlation in-memory.
- EA serves as a methodology and tool to provide the link between the organisational requirements and corresponding organizational characteristics; using aBBs and the underlined atomic and micro services, in order to attain the defined business agility.
- For the NLP integration these blocks are needed: 1) the interfaces to different types of aBBs; 2) standards integration; 3) the micro architecture concept; and 4) the holistic aBB concept.
- The ADM4AI integration with the NLP concept promotes the usage of controlled aBBs. The ADM4AI and NLP are based on the "1:1" concept that helps in the integration of: 1) different aBBs; and 2) monitoring and tracing of activities.
- The NLP is built on aBBs scenarios that are stored in the *Project's* architecture continuum and are the basic elements to be handled through the ADM4AI iterations.

ACKNOWLEDGEMENT

In a work as large as this research project, technical, typographical, grammatical, or other kinds of errors are bound to be present. Ultimately, all mistakes are the author's responsibility. Nevertheless, the author encourages feedback from readers, identifying errors in addition to comments on the work in general. It was our great pleasure to prepare this work. Now our greater hopes are for readers to receive some small measure of that pleasure.

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KEY TERMS AND DEFINITIONS

ADM4AI: Architecture development method for AI.
Project: Business transformation project.

Chapter 6
New Frontiers in Payment Services:
The Payment Initiation Service in the Directive 2015/2366/EU

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ABSTRACT

The chapter will explore issues related to the Payment Initiation Service, currently subject to Directive 2015/2366/EU (Payment Services Directive II, PSD2) and, in Italy, to the Law Decree n. 11 of January 27th, 2010. It plays a relevant part in e-commerce payments establishing a software bridge between the website of the merchant and the online banking platform of the payer's account servicing payment service provider in order to initiate internet payments on the basis of a credit transfer. The transaction involves many actors, including some new entrants into the payment service market, such as third-party providers (TTPs). The chapter will deal with the nature of relations between payment service users and payment initiation service providers as well as those between the latter and account servicing payment service providers. It will also address criteria to allocate liability when a transaction initiated through a PISP was unauthorized, non-executed, or wrongfully or lately executed.

INTRODUCTION

Although it might be difficult to imagine a society without coins and paper money – especially in in the poorest areas of the world - a revolution in payment technology has been taking place over the past twenty years.

The use of cash has been in steady decline ever since the introduction of debit and credit cards in the 1980s and 1990s and, from that moment on, payment solutions based on technology have made money transfer faster and more efficient (Helgadottir D., 2020, pp. 199-224). With the advent of internet banking, new services have emerged, such as internet-payments and mobile-payments; not only are people

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now able to manage their bank account with a computer or a mobile phone, but they can also carry out payment transactions.

At the same time, we are witnessing a continual growth in the number of payment service companies around the world; both new companies and big companies originally specializing in different markets (e.g. Apple, Google etc.) are now offering new payment services, new ways of sending, receiving and storing money (Lo B., 2017, p. 112). In this regard, Mark Carney, Governor of the Bank of England and Chair of the Financial Stability Board, stated, in his speech during Deutsche Bundesbank G20 conference on "Digitising finance, financial inclusion and financial literacy", Wiesbaden, 27th January 2017, that: "This possibility is being driven by new entrants — payment service providers, aggregators and robo advisors, peer-to-peer lenders, and innovative trading platforms - and it is being influenced by incumbents who are adopting new technologies in an effort to reinforce the economies of scale and scope of their business models" (the speech is available at https://www.bankofengland.co.uk/speech/2017/the-promise-of-fintech-something-new-under-the-sun.).

The speed of this phenomenon is preventing legislators from installing an exhaustive legal framework and, as a consequence, new companies tackling the payment market have to deal with highly fragmented regulation. Carney also added: "Despite these advances, finance continues to be arranged around a series of hubs like brokers, clearing houses and exchanges; whereas in other domains, people are increasingly forming connections directly, instantaneously and openly, revolutionising how they communicate, work, and live" (Carney M., p. 3).

The EBA report on the impact of Fintech on Payment Institutions' and e-money institutions' business models states that these phenomena: "appear to potentially add value to institutions' business in a number of ways, such as: allowing customers to have an aggregate view of their account services data; allowing the use of alternative payment channels in e-commerce; enhancing KYC procedures, and customer eligibility and credit assessments; providing opportunities to share services across borders; being useful in consolidating legacy services into technology-based innovative products".

As regards the European Union, the legal basis for regulations and directives dealing with payment services are laid down in Articles 49 (Right of Establishment), 56 (Services) and 63 (Capital and Payments) of TFEU. Art. 49 TFEU prohibits any restrictions on freedom of establishment on the part of nationals of a Member State in the territory of another Member State, while art. 56 of TFEU prohibits all restrictions on freedom to provide services within the EU to all nationals of Member States who are established in a Member State, as well as to persons for whom the services are intended.

Then, art. 63 of TFEU prohibits any restriction on the movement of capital or payments between Member States and between Member States and third countries.

In this context, the European legislator enacted, in 2007, the first Payment Service Directive (Directive 2007/64/EC, PSD) in order to establish, at Community level, the first modern and coherent legal framework for payment services.

In 2015, the Second Payment Services Directive (Directive 2015/2366/EU, PSD2) replaced the PSD with the intention of providing full harmonisation of the legal framework for non-cash payments in the internal market.

Relevant areas of the payments market - in particular Internet and mobile payments – had remained not fully covered by the first PSD, due to technical innovations and the rapid increase in the number of electronic and mobile payments. Consequently, the PSD2 has tried to take into account all notable innovations in payment services and to better reflect the current European payment services market.

As a result, new services emerging in the area of Internet payments and traditional payment service providers are now under a common legal framework, regarding registration, licensing, and supervision by the competent authorities. Paragraph no. 33 of the PSD2 Preamble suggests, in fact, that the Directive should aim to ensure continuity in the market, enabling existing and new service providers, regardless of the business model applied by them, to offer their services with a clear and harmonised regulatory framework. And it also states that: "Pending the application of those rules, without prejudice to the need to ensure the security of payment transactions and customer protection against demonstrable risk of fraud, Member States, the Commission, the European Central Bank (ECB) and the European Supervisory Authority (European Banking Authority), established by Regulation (EU) No 1093/2010 of the European Parliament and of the Council, should guarantee fair competition in that market avoiding unjustifiable discrimination against any existing player on the market. Any payment service provider, including the account servicing payment service provider of the payment service user, should be able to offer payment initiation services".

At the same time, new rules have been laid down, with the intent to improve the efficiency of the payments market as a whole, increase transparency and enhance customer protection (for example, PSD2 introduces the Strong Customer Authentication). Additionally, the rapid development of technology in payment services raises a series of legal issues, such as customer data protection, security and liability, as well as competition issues (see Paragraph n. 29 of the PSD2 Preamble).

These needs are taken into account in the actual Preamble to the PSD2: "in recent years, the security risks relating to electronic payments have increased. This is due to the growing technical complexity of electronic payments, the continuously growing volumes of electronic payments worldwide and emerging types of payment services. Safe and secure payment services constitute a vital condition for a well-functioning payment services market. Users of payment services should therefore be adequately protected against such risks. Payment services are essential for the functioning of vital economic and social activities" (see Paragraph n. 7 of the PSD2 Preamble).

This Chapter will explore issues related to a new payment service, the Payment Initiation Service, which is subject to the PSD2 and, in Italy, to the Law Decree n. 11 of January 27th, 2010. The analysis will examine its key points, through the study of the nature of relations between payment service users and payment initiation service providers, as well as those between the latter and account servicing payment service providers.

Moreover, it will analyze rights and obligations of all parties in payment transaction. Lastly, it will assess criteria for assigning liability when a transaction initiated through a payment initiation service provider is unauthorized, non-executed, wrongfully or tardily executed.

THE PAYMENT INITIATION SERVICE

A specific definition of the Payment Initiation Service is set out in Article 4, no. 15, of the PSD2: 'payment initiation service' means a service to initiate a payment order at the request of the payment service user with regard to a payment account held by another payment service provider (called Account Servicing Payment Service Provider - ASPSP).

The Payment Initiation Service plays a relevant role in e-commerce payments; it establishes a software bridge between the website of the merchant and the online banking platform of the payer's account servicing payment service provider in order to initiate internet payments on the basis of a credit transfer

(see Paragraph no. 27 of the PSD2 Preamble). In other words, through this electronic intermediation, individuals can initiate payments online, via non-traditional devices (such as credit or debit card, bank transfer etc.), for example, through mobile applications.

Through the legal definition set out in Art. 4 of PSD2, it may be noted that the Payment Initiation Service is somewhere between a traditional payment service and an innovative one (La Sala V., 2020, 3): On a consumer's request, a new actor is entitled to access the consumer's bank account, requesting the payer's ASPSP to withdraw funds, in the amount determined by the payer, and then transfer them to the payee's account. The initiation service is, therefore, a preventive phase of the payment itself, which remains, as a matter of fact, unchanged and is executed by the ASPSP (that is generally a bank).

Moreover, there are some features that the payment initiation service and any other electronic payment have in common (as possibly suggested by the legislator's choice to include the payment initiation service among traditional payment orders): intermediation and distance. On the one hand, a new at-distance relation is added to the payment transaction – the relation between payers and payment initiation service providers (Helgadottir D., 2020, 199-224, the Author has noted that: "The biggest distinction between traditional banking and online banking is based on physical existence and the provision of face-to-face customer service"); and, on the other hand, the payment transaction is enriched with a new phase that speeds up the action.

Despite the operation's apparent complexity, "payment initiation services enable the payment initiation service provider to provide comfort to a payee that the payment has been initiated in order to provide an incentive to the payee to release the goods or to deliver the service without undue delay. Such services offer a low-cost solution for both merchants and consumers and provide consumers with a possibility to shop online even if they do not possess payment cards" (see Paragraph no. 29 of the PSD2 Preamble).

The transaction also becomes more accessible; the payer only needs simple information, such as mail address (*e.g.* Paypal) or phone number (*e.g.* Satispay) of the payee, to request the payment initiation service provider to finalize the payment.

THIRD PARTY PROVIDERS: THE PAYMENT INITIATION SERVICE PROVIDER

Art. 1 of the PSD2 enumerate six categories of payment service provider:

1. Credit institutions ("as defined in point (1) of Article 4(1) of Regulation (EU) No 575/2013 of the European Parliament and of the Council - "Credit institution means an undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account");
2. Electronic money institutions ("within the meaning of point (1) of Article 2 of Directive 2009/110/EC"- "Electronic money institution means a legal person that has been granted authorisation under Title II to issue electronic money");
3. post office gyro institutions which are entitled under national law to provide payment services;
4. the ECB and national central banks when not acting in their capacity as monetary authority or other public authorities;
5. Member States or their regional or local authorities when not acting in their capacity as public authorities;

Title II of the PSD2 is devoted to payment institution regulatory aspects, such as licensing and capital requirements.

As indicated, the PSD2 adds new payment services, such as the payment initiation service. As we have seen, the transaction through payment initiation service involves many actors, including new entrants into the payment service market, called Third Party Providers (TTPs), because they are third with respect to the payer and the ASPSP. New Third Party Providers introduced by the PSD2 are the Account Information Service Provider (AISP) and the Payment Initiation Service Provider (PISP).

The first one provides the payment service user with aggregated online information on one or more payment accounts, held with one or more other payment service providers and accessed via online interfaces of the ASPSP (see Paragraph no. 26 of the PSD2 Preamble). Payment service users are thus able to have an overall view of their own financial situation immediately and at any given moment.

Those services have been covered by PSD2 in order to provide consumers with adequate protection for their payments and account data, as well as legal certainty about the status of account information service providers. Paragraph no. 28 of the PSD2 Preamble states: "those services provide the payment service user with aggregated online information on one or more payment accounts held with one or more other payment service providers and accessed via online interfaces of the account servicing payment service provider. The payment service user is thus able to have an overall view of its financial situation immediately at any given moment. Those services should also be covered by this Directive in order to provide consumers with adequate protection for their payment and account data as well as legal certainty about the status of account information service providers".

The PISP initiates a payment order at the request of a payee, through access to the payee's account held at another payment service provider.

Both of these two new entrants are partially different form traditional payment service institutions. Payment Institutions are listed in Article 18(1) and they are defined as technical service providers. First of all, they do not enter, at any time, into possession of the funds to be transferred; secondly, they cannot, for any reason, modify the amount, the payee or any other feature of the transaction (see Art. 66 of PSD2).

Thus, the PSD2 confirms that third party providers are a payment transaction intermediary and they need to follow the payee's instructions with regard to the payee and the payment amount. Moreover, like any other payment operator, PISPs are required to use the payer's money for the sole purpose of the payment transaction (see the Consolidated Law on Banking, specifically Art. 114-*duodecies,* par.1, law decree, 1st September 1993, no. 385, (*Testo Unico Bancario* – T.U.B.), but, since they never enter into possession of the funds, there is no burden on them to keep the funds separate from their assets (see Art. 114-*duodecies,* par. 2, TUB).

The obligation to keep the client's funds separate from the company's funds is a safeguarding obligation and it represents one of the most important duties of Italian banking law, because it guarantees the payee that his/her money is secure.

Thus, the Bank of Italy (that is the Italian banking authority which is entitled to ensure monetary and financial stability in Italy), which promotes the smooth functioning of the Italian payments system, in accordance with EBA's Guidelines (EBA/GL/2017/08: The Guidelines on the criteria regarding how to stipulate the minimum monetary amount of professional indemnity insurance or other comparable guarantees, under Article 5(4) of Directive (EU) 2015/2366), ensures that the Third Party Providers are covered by an insurance policy for any damage and loss (see Art. 5, par. 2 states that PISPs and AISPs are required to "hold a professional indemnity insurance, covering the territories in which they offer services, or some other comparable guarantee against liability") on the part of the payer. Insurance

cover is necessary in order to obtain the authorization to operate in the internal payment market (see art. 114-septies, par. 1, TUB that requires that any payment institution must apply for authorization to be registered in the Bank of Italy's Register. The Bank of Italy inspects the conditions and authorizes the company only when all of these are met).

OPERATIONAL AND SECURITY RISKS AND AUTHENTICATION.

The PSD2 is full of references to consumer security, especially when dealing with new payment providers, such as the Third Party Providers. As noted in Paragraph 7 of the PSD2 preamble, the security risks relating to electronic payments have increased; this is usually because new services allow data transmission that identifies and potentially registers not only payment transactions but also the consumer's confidential data (De Stasio V., 2020, p. 27). Therefore, due to the increase in costumer security risks, Chapter 5 of Section III of the PSD2 is devoted to operational and security risks and authentication. Also the Regulatory Technical Standards on Strong Customer Authentication and common and secure communication under Article 98 of Directive 2015/2366 (RTS), states that: "The measures that protect the confidentiality and integrity of personalised security credentials, as well as authentication devices and software, should limit the risks relating to fraud through unauhtorised use of payment instruments and unauthorised access to payment accounts. To this end it is necessary to introduce requirements on the secure creation and delivery of the personalised security credentials and their association with the payment service user, and to provide conditions for the renewal and deactivation of the credentials".

Reg. 389/2018/EU is also devoted to supplementing Directive (EU) 2015/2366 with regard to regulatory technical standards (RTS) for strong customer authentication and common and secure open standards of communication.

Paragraph 10 of the Reg. 389/2018/EU Preamble suggests that - in accordance with Articles 65, 66 and 67 Directive (EU) 2015/2366 - PISPs, payment service providers issuing card-based payment instruments and AISPs must seek and obtain only the necessary and essential information from the ASPSP for the provision of a given payment service.

Furthermore, the consent of the payment service user is required. Such consent can be given individually for each request for information or for each payment to be initiated or, for AISPs, as a mandate for designated payment accounts and associated payment transactions as established in the contractual agreement with the payment service user.

All Member States, following the EBA's Guidelines on security aspects of payment services, are expected to ensure that payment service providers supply adequate security measures to protect the confidentiality and integrity of payment service users' personalised security credentials. Moreover, they are expected to ensure that payment service providers apply strong customer authentication, where the payer:

1. accesses his/her payment account online;
2. initiates an electronic payment transaction;
3. carries out any action through a remote channel which may imply a risk of payment fraud or other violations (see art. 97 of PSD2).

Under art. 97 of PSD2, in the case of electronic remote payment transactions, payment service providers apply strong customer authentication that includes elements which rigidly link the transaction to a specific amount and a specific payee.

Strong Authentication means an authentication based on the use of two or more elements categorised as knowledge (something only the user knows), possession (something only the user possesses) and inherence (something the user is); these are independent. Thus, the breach of one of these does not compromise the reliability of the others, and it is designed in such a way as to protect the confidentiality of the authentication data (see art. 4 of PSD2 and art. 1, par. 1, let. . q-*bis*, law decree 11/2010).

Moreover, at least one of the elements should be non-reusable and non-replicable (except for inherence), and not capable of being surreptitiously stolen via the internet.

The EU legislator also suggests that the strong authentication procedure should be designed by Member States in such a way as to protect the confidentiality of the authentication data. The EU legislator asks Member States to ensure that payment service providers have adequate security measures in place, to protect the confidentiality and integrity of payment service users' personalised security credentials. Moreover, they must ensure that, for electronic remote payment transactions, payment service providers apply strong customer authentication that includes elements which link the transaction to a specific amount and a specific payee (see also Eba's Final Guidelines on security of internet payments: EBA/GL/2014/12, 19th December, 2014).

To keep the information confidential, payment services providers must ensure that when they communicate personalised security credentials and authentication codes, these are not readable, directly or indirectly, by any staff at any time. They are also asked to ensure that, when exchanging data over the internet, they apply secure encryption between the communicating parties throughout the respective communication session in order to safeguard the confidentiality and the integrity of the data, using strong and widely recognised encryption techniques.

Moreover, under art. 35 of Reg. 389/2018/EU, AISP, PISP and payment service providers issuing card-based payment instruments with the ASPSP must contain unambiguous references to each of the following items: a) the payment service user or users and the corresponding communication session in order to distinguish several requests from the same payment service user or users; b) for payment initiation services, the uniquely identified payment transaction initiated; c) for confirmation on the availability of funds, the uniquely identified request related to the amount necessary for the execution of the card-based payment transaction. In addition, Art. 35 assigns the payment service providers a duty to ensure that where they communicate personalised security credentials and authentication codes, these are not readable, directly or indirectly, by any staff at any time. In the case of loss of confidentiality of personalised security credentials under their sphere of competence, those providers must inform without undue delay the user of the payment services associated with them and the issuer of the personalised security credentials.

AISP, PISP and payment service providers issuing card-based payment instruments are also required to keep the access sessions (offered by account servicing payment service providers) as short as possible and to actively terminate any such session as soon as the requested action has been completed.

When maintaining parallel network sessions with the ASPSP, AISPs and PISPs are asked to ensure that those sessions are securely linked to relevant sessions established with the payment service users in order to prevent the possibility that any message or information communicated between them could be misrouted.

Although these measures listed above guarantee the user's security, they sometimes make the payment transaction onerous. Thus, to increase procedure speed, the security level should be proportional to the risk in the specific payment service.

Under Paragraph no. 96 of the PSD2 Preamble, in fact, security measures are expected to be compatible with the level of risk involved in the payment service. Paragraph 96 of the PSD2 Preamble sets out the obligation as follow: "In order to allow the development of user-friendly and accessible means of payment for low-risk payments, such as low value contactless payments at the point of sale, whether or not they are based on mobile phone, the exemptions to the application of security requirements should be specified in regulatory technical standards. Safe use of personalised security credentials is needed to limit the risks relating to phishing and other fraudulent activities. In that respect, the user should be able to rely on the adoption of measures that protect the confidentiality and integrity of personalised security credentials. Those measures typically include encryption systems based on personal devices of the payer, including card readers or mobile phones, or provided to the payer by its account servicing payment service provider via a different channel, such as by SMS or email. The measures, typically including encryption systems, which may result in authentication codes such as one-time passwords, are able to enhance the security of payment transactions. The use of such authentication codes by payment service users should be considered to be compatible with their obligations in relation to payment instruments and personalised security credentials also when payment initiation service providers or account information service providers are involved".

Accordingly, EBA's Guidelines of the security of internet payment suggest Payment Services Providers should consider adopting alternative customer authentication measures for outgoing payments to trusted beneficiaries included in previously established white lists for these customers, or transactions between two accounts of the same customer held at by the same Payment service provider; transfers within the same PSP justified by a transaction risk analysis, or low-value payments, as referred to in the PSD2.

Also Art. 17 of Reg. 389/2018, that extends the exemption to Secure corporate payment processes and protocols, states that Payment service providers are allowed not to apply strong customer authentication, with regard to legal persons initiating electronic payment transactions through the use of dedicated payment processes or protocols that are only made available to payers who are not consumers, where the competent authorities are satisfied that those processes or protocols guarantee at least equivalent levels of security to those provided for by Directive (EU) 2015/2366.

However, when making use of the exemptions, payment service providers have to record and monitor the following data for each instrument of payment, with a breakdown of remote and non-remote payment transactions, on a quarterly basis (90 days) at least (see Art. 17 of Regulatory Technical Standards on Strong Customer Authentication and common and secure communication under Article 98 of Directive 2015/2366 (PSD2):

1. the total value of unauthorised payment transactions in accordance with Article 64(2) of Directive (EU) 2015/2366, the total value of all payment transactions and the resulting fraud rate, including a breakdown of payment transactions initiated through strong customer authentication and under the exemptions;
2. the average transaction value, including a breakdown of payment transactions initiated through strong customer authentication and under the exemptions;
3. the number of payment transactions where any of the exemptions was applied and their percentage with regard to the total number of payment transactions.

RIGHTS AND OBLIGATION OF THE PAYMENT INITIATION SERVICE USER

The Payment transaction discipline is based on the diligence and fairness of all subjects involved. Pursuing efficiency, security and regular functioning of the payment market means relying upon the diligent conduct of the payer, the payee and the payment service provider (see the public consultation held by the Bank of Italy, on 24th September 2010).

Paragraph 74 of the PSD2 Preamble states that in the case of payment initiation services, rights and obligations of payment service users and of payment service providers involved should be appropriate to the service provided. An example of the payer's diligence is set out in Paragraph 70 of the PSD2 Preamble. In order to reduce the risks and consequences of unauthorised or incorrectly executed payment transactions, the payment service user is asked to inform the payment service provider, as soon as possible, about any contestations concerning allegedly unauthorised or incorrectly executed payment transactions, when the payment service provider has fulfilled its information obligations under PSD2. If the notification deadline is met by the payment service user, the payment service user should be able to pursue those claims subject to national limitation periods.

More specifically, the allocation of liability between the ASPSP and the PISP involved in the transaction, compels them to take responsibility for the respective parts of the transaction that are under their control.

Thus, diligence is demanded of both the user and the third party provider, although the former is usually treated as the weaker contracting party.

For these reasons, the Bank of Italy has introduced a recommendation upon transparency of banking and financial services (*Trasparenza delle operazioni e dei servizi bancari e finanziari. Correttezza delle relazioni tra intermediari e client*), with the aim of adapting the national framework to the new European regulatory framework (Porta F., 2019, 21-46). The recommendation of the Bank of Italy provides for pre-contractual and contractual information requirements (sec. VI, § 4), a disclosure requirement to users (sec. VI, § 6), and a mechanism for handling complaints (sec. XI, § 3).

As far as payment users are concerned, they have the right of access to the payment initiation service. It is also stated that "in order to ensure fair competition between payment service providers, a participant in a designated payment system subject to the conditions of Directive 98/26/EC (PSD) which provides services in relation to such a system to an authorised or registered payment service provider should also, when requested to do so, grant access to such services in an objective, proportionate and non-discriminatory manner to any other authorised or registered payment service provider. Payment service providers that are granted such access should not, however be considered to be participants as defined in Directive 98/26/EC, and hence should not benefit from the protection granted under that Directive" (see Paragraph n. 51 of the PSD2 Preamble).

Under art. 66 of PSD2, all Member States are asked to ensure that a payer has the right to make use of a payment initiation service provider to obtain payment services. It also adds that this right is not recognized when the user's account is not accessible online. Art. 66, par. 1, PSD2: "The right to make use of a payment initiation service provider shall not apply where the payment account is not accessible online". Also see Paragraph n. 68 of the PSD2 Preamble that states: "whether the payment transaction takes place in an internet environment (the merchant's website), or in retail premises, the account servicing payment service provider should be obliged to provide the confirmation requested by the issuer only where accounts held by the account servicing payment service providers are electronically accessible for that confirmation at least online".

On the contrary, when the user' account is accessible online, he/she can share credentials and passwords with the payment service provider – even in the case of a third party provider - without being held liable in the event of errors in the transaction.

On the other hand, the payment service users are required to adopt diligent and fair behavior, using the payment service in accordance with European laws and contract conditions, which must be objective, proportionate and non-discriminatory (see art. 7, law decree 11/2010).

Moreover, users have a duty to deliver prompt notification, in the case of unlawful use of the payment instrument; the user, when realizing the misuse, has to immediately notify the payment service provider about the loss, the theft or the inappropriate use of the payment instrument (with regard to the user's duty to notify, see the Italian Supreme Court decision of the 5th July 2019, n. 18045, on the website www.dejure.it that states that the duty to notify arises when the user actually knows about the misuse or should have known through due diligence).

Diligence is also required in maintaining the security of the user's credentials. Paragraph n. 88 of PSD2 Preamble requires the payment service provider to specify unambiguously the information required to execute a payment order correctly. Moreover, in order to avoid fragmentation and jeopardise the setting-up of integrated payment systems in the Union, Member States are not allowed to require a particular identifier to be used for payment transactions. However, that should not prevent them from "requiring the payment service provider of the payer to act with due diligence and to verify, where technically possible and without requiring manual intervention, the coherence of the unique identifier, and, where the unique identifier is found to be incoherent, to refuse the payment order and inform the payer thereof". The liability of the payment service provider should be limited to the correct execution of the payment transaction in accordance with the payment order of the payment service user. If the funds involved in a payment transaction reach the wrong recipient due to an incorrect unique identifier provided by the payer, the payment service providers of the payer and the payee should not be liable, but should be obliged to cooperate in making reasonable efforts to recover the funds, also by communicating relevant information.

Under art. 7 of law decree 11/2010, when customers are using a payment instrument, they are expected to take all measures necessary to ensure and maintain a high level of security for their access credentials. The user's due diligence is also identified in relation to credit cards: the holder of a credit card must guard the credit card number and its password (see Court of Appeal, Milan, 16th November 1993, in *Banca Borsa Tit. Cred.*, 1995, 321 ss.). Therefore, they are asked to choose strong passwords and to change them frequently, or to set up security systems that make the payment instrument hard to discover for third parties.

Paragraph 68 of the PSD2 recognizes same rights and obligation to Payment service providers issuing card-based payment instruments, regardless of whether or not they are the ASPSP of the payer, in particular in terms of responsibility (e.g. authentication) and liability vis-à-vis the different actors in the payment chain. Moreover, since the payment service provider's request and the confirmation on the availability of the funds can be made through existing secure communication channels, technical procedures and infrastructure for communication between PISPs or AISPs and ASPSPs, while respecting the necessary security measures, there should be no additional costs for payment service providers or cardholders.

THE RELATIONSHIP BETWEEN THE THIRD PARTY PROVIDER AND THE PAYMENT SERVICE USER

From a different point of view, analyzing the payment transaction in its entirety, it is possible to single out two different phases. The first part of the transaction comprises the receipt of the payment order from the payer to the PISP; the second part concerns the ASPSP, i.e. the third party provider, instructing the payment service provider which holds the payer's funds, to carry out the transaction.

As regards the first part of the transaction, the main relationship is between the third party provider and the payer and it exists independently of the one between the payer and the payee, although it is on the latter that the entire payment transaction is based.

The third party provider becomes the payer's agent and is authorized to express the user's consent for the money transfer that is to be executed subsequently through the ASPSP. In this regard, Art. 64, par. 1, of the PSD2 states that "Member States shall ensure that a payment transaction is considered to be authorised only if the payer has given consent to execute the payment transaction"). The third party provider and the payment service user conclude an agreement that authorizes the former to manifest the latter's consent.

Consent to execute a payment transaction or a series of payment transactions is given in the form agreed between the payer and the payment service provider and it may also be given via the payee or the payment initiation service provider.

Thus, the ASPSP is not required to verify in advance the existence of the user's actual consent. In fact, the use of the user's credentials is sufficient to prove that the consent to the operation was effectively expressed. However, since consent may be withdrawn by the payer at any time, when this happens the ASPSP has a duty to promptly deny the PISP access to the client's account and, in any case, once it has received the withdrawal's notification (see art. 6-*bis* of the law decree 11/2010).

International academics qualify the relationship between the third party provider and the payer in terms of Principal-Agent relationship. The content of the agency contract may vary depending on the payment service selected and on what the principal and the agent agree.

For most purposes, the relationship of the parties to money transfer orders are governed by the law of agency (Ellinger E.P., Lomnicka E., Hare C., 2011, 248-268). Although some scholars find the law of agency unsuitable for innovative and technological payment transactions, it can be applied to any payment transaction. A payment transaction, is in fact, based on the customer's mandate (Hapgoof M., 2007, 406), which leads to the agent's obligation to operate diligently and follow the terms of the contract.

Moreover, using a common legal framework, as the law of agency, may be helpful to apply universal principles to any payment transaction and to stipulate obligations for the parties of the contract.

Finally, it is interesting to note that the Bank of Italy provides for minimum content of the payment contract (see Disposizioni di vigilanza per gli istituti di pagamento e gli istituti di moneta elettronica: https://www.bancaditalia.it/compiti/vigilanza/normativa/archivio-norme/disposizioni/disp-ip-20120620/Provvedimento_del_23_luglio_2019.pdf), including:

1. Characteristics and components of the service offered to the client, including the terms and form of client's consent and its withdrawal;
2. Characteristics of any client's account to which the payment service provider has access and any restriction on imports;
3. Procedures and methods of communication between the provider and the client.

THIRD PARTY PROVIDERS AND ACCOUNT SERVICING PAYMENT SERVICE PROVIDERS

As far as the second part of the transaction is concerned, it involves the Third Party Provider and the Account servicing payment service provider (ASPSP). Their relationship is based on transparency and cooperation, although the European legislator has nonetheless expressed the need to regulate the conduct of both the PISP and the ASPSP.

In Paragraph 93 of the PSD2 Preamble, the EU Commission has set the goal of laying out a clear legal framework which itemizes the conditions under which third party providers can grant their services with the consent of the account holder. And this without being required by the ASPSP to use a particular business model, whether based on direct or indirect access, for the provision of those types of services. Moreover, Paragraph 21 of the PSD2 Preamble requires for a technologically neutral definition of payment service, in order to develop new types of payment services, while ensuring equivalent operating conditions for both existing and new payment service providers.

The PISP and the AISP, on the one hand, and the ASPSP, on the other, are asked to observe necessary data protection and security requirements established by the PSD2 or included in the regulatory technical standards that need to be adaptable to the different technological solutions that In order to ensure secure communication between relevant actors in the context of those services, the European Parliament has asked the European Banking Authority to specify the requirements of common and open standards of communication to be implemented by all ASPSP which may allow…allow for the provision of online payment services. This means that the EU was asking for open standards that could ensure the interoperability of different technological communication solutions. Those common standards also ensure that ASPSPs are always aware of being reachable by a PISP or an AISP and not by the client himself: Art. 27 (a) of EBA's Technical Standards on Strong Customer Authentication and common and secure communication (EBA/RTS/2017/02) requires, in fact, AISPs, PISPs to identify themselves to the ASPSP.

In its Guidelines and Technical standards, the EBA also recognizes that it is important to balance out the technical method of access (and business-model neutrality) with the security measures under PSD2.

The EBA's standards ensure that PISPs and AISPs communicate with the ASPSP and with the customers involved in a secure manner. Art. 27 (a) (b) of EBA/RTS/2017/02 states that "account information service providers can communicate securely to request and receive information on one or more designated payment accounts and associated payment transactions" and that "payment initiation service providers can communicate securely to initiate a payment order from the payer's payment account and receive information on the initiation and the execution of payment transactions".

In developing these requirements, EBA has paid particular attention to the fact that the standards to be applied are to allow for the use of all common types of device (computers, tablets and mobile phones) for carrying out different payment services.

Equality and non-discrimination are the guiding principles in all relationships between payment providers. Paragraph 32 of the PSD2 Preamble elaborates on the modes of access by an PISP to the payer's payment account (held by the ASPSP) as follows: "Payment initiation services are based on direct or indirect access for the PISP to the payer's account. An ASPSP which provides a mechanism for indirect access should also allow direct access for the PISPs".

The direct access mode is known as screen-scraping and it allows the PISP to use the customer's account login and to access the customer's account, as the customer would do through the ASPSP's

website. On the other hand, the indirect access mode consents PISP account access through a dedicated application interface.

Under Paragraph 20 of the Reg. 2018/389, each ASPSP with payment accounts that are accessible online should offer at least one access interface enabling secure communication with AISP, PISP and payment service providers issuing card-based payment instruments. The interface should enable payment service providers to identify themselves to the ASPSP. It should also allow AISP and PISP to rely on the authentication procedures provided by the ASPSP to the payment service user.

However, to ensure technology and business-model neutrality, the ASPSP is free to decide whether to offer an interface that is dedicated to communication with AISPs, PISPs and payment service providers issuing card-based payment instruments, or to allow, for that communication, the use of the interface for identification and communication with the ASPSPs' payment service users.

Moreover, art. 36.1 of Reg. 389/2018/EU requires a ASPSP to comply with the following requirements:

1. It must provide account information service providers with the same information from designated payment accounts and associated payment transactions made available to the payment service user when directly requesting access to the account information, provided that this information does not include sensitive payment data;
2. immediately after receipt of the payment order, it must provide payment initiation service providers with the same information on the initiation and execution of the payment transaction provided or made available to the payment service user when the transaction is initiated directly by the latter;
3. it must, upon request, immediately provide payment service providers with a confirmation in a simple 'yes' or 'no' format, whether the amount necessary for the execution of a payment transaction is available in the payment account of the payer.

Limitations to this obligation to cooperate are provided for in Art. 68 of PSD2. An ASPSP may deny an AISP or a PISP access to a payment account for objectively justified and duly evidenced reasons relating to unauthorised or fraudulent access to the payment account by that AISP or that PISP, including the unauthorised or fraudulent initiation of a payment transaction. In such cases, the ASPSP informs the payer that access to the payment account is denied and provides reasons for the denial. Wherever possible, this information is given to the payer before access is denied and, at the latest, immediately thereafter, unless providing such information would compromise objectively justified security reasons or is prohibited by other relevant European Union or national laws.

Moreover, ASPSPs are asked by EBA to adopt the so-called Application Program Interface (API) in order to provide the same levels of availability, performance and support for the dedicated interface and make the interface available to payment service users for directly accessing their payment account online. However, ASPSPs stressed that the two interfaces are not comparable and for this reason EBA has clarified that it was aware that different ASPSPs offer different availability, performance and support for their PSU-facing interfaces. Thus, universal standard requirements applicable to all dedicated platforms cannot be developed (for a critical opinion see Oliinyk I., Echikson W., 2018, 1-15).

Under art. 33 of Reg. 2018/389, ASPSPs are asked to include, in the design of the dedicated interface, a strategy and plans for contingency measures in the event that the interface does not perform in compliance with art. 32, that there is unforeseen unavailability of the interface or that there is a systems breakdown (unplanned unavailability or a systems breakdown is presumed to have arisen when five consecutive requests for access to information for the provision of payment initiation services or ac-

count information services are not replied to within 30 seconds). These contingency measures include communication plans to inform payment service providers, by making use of the dedicated interface, of measures to restore the system and a description of the immediately available alternative options payment service providers may have during this time.

Moreover, both the ASPSP and the payment service providers are required to report problems with dedicated interfaces to their respective competent national authorities without delay.

As part of a contingency mechanism, payment service providers are allowed to make use of the interfaces made available to the payment service users for authentication and communication with their ASPSP, until the dedicated interface is restored to the level of availability and performance provided for in Art. 32.

The ASPSPs are also asked to define key performance indicators (KPIs) and service level targets (such as problem resolution, out of hours support, contingency, etc.) for their dedicated interfaces, which are at least as stringent as those defined for the payment service user interfaces. In addition, the EBA Guidelines on the Conditions to Benefit from an Exemption from the Fall-Back Mechanism (EBA/GL/2018/07), postulate that if the ASPSPs offer more than one client interface, then the KPIs and the service level targets for the API should be aligned to the best KPIs and service level targets across all payment service user facing interfaces that are offered.

It may finally be interesting to observe that PISPs do not necessarily enter into a contractual relationship with ASPSPs. Paragraph 30 of the PSD2 Preamble states as follow: "The personalised security credentials used for secure customer authentication by the payment service user or by the payment initiation service provider are usually those issued by the account servicing payment service providers. Payment initiation service providers do not necessarily enter into a contractual relationship with the account servicing payment service providers and, regardless of the business model used by the payment initiation service providers, the account servicing payment service providers should make it possible for payment initiation service providers to rely on the authentication procedures provided by the account servicing payments service providers to initiate a specific payment on behalf of the payer".

Regardless of the business model used by the PISP, the ASPSP is required to make it possible for PISPs to rely on the authentication procedures provided by the ASPSP to initiate a specific payment on behalf of the payer.

PAYMENT SERVICE PROVIDERS' LIABILITY FOR NON-EXECUTION, DEFECTIVE OR LATE EXECUTION OF PAYMENT TRANSACTIONS

In conclusion, it is important to analyze the liability regime that applies when a payment transaction is non-executed or wrongfully executed, especially because of the considerable number of subjects involved in a payment operation through a PISP.

In doing so, it is worth recalling that the aim of the EU law on payment services is to discipline the conduct of both payment service providers and payers, so that the money transaction can be accurately executed (De Stasio, 2020, 34).

Firstly, the payee is liable for his/her PSP, in the correct transmission of the payment order to the PSP of the payer, in accordance with Article 83(3) of PSD2 (see Art. 89 of the PSD2), i.e. "within the time limits agreed between the payee and the PSP, enabling settlement, as far as direct debit is concerned, on the agreed due date" (see Art. 83 of the PSD2).

However, more generally, Paragraph no. 72 of the PSD2 Preamble presents rights and obligations of the payment service users and the payment service providers involved, which should be appropriate to the service provided. It also adds that the allocation of liability between the payment service provider servicing the account and the payment initiation service provider involved in the transaction, should compel them to take responsibility for the respective parts of the transaction that are under their control. Under Paragraph 88 of the PSD2 Preamble, the liability of the payment service provider should be limited to the correct execution of the payment transaction in accordance with the payment order of the payment service user. In particular, if the money transfer reaches the wrong recipient due to an incorrect unique identifier provided by the payer, the payment service providers of the payer and the payee should not be held liable, but should be obliged to cooperate in making reasonable efforts to recover the funds, also by communicating relevant information.

Nevertheless, even when the money transfer is executed through a third party provider, the first service provider that bears the obligation to refund the payer in the case of non-executed, defective or late executed payment, is the ASPSP. Art. 90 of the PSD2 requires, in fact, the ASPSP to "refund to the payer the amount of the non- executed or defective payment transaction and, where applicable, restore the debited payment account to the state in which it would have been had the defective payment transaction not taken place".

According to some scholars (Santoro V., 2020, 35), this ruling finds its rationale in the fact that the ASPSP holds the payer's funds, while third party providers – that never hold the payer's money - are required to refund only when they have executed the transaction with negligence. Moreover, imposing liability firstly to the ASPS allows the EU legislator to relieve the payer of the onus of proving which payment service provider was effectively responsible for the defective transaction.

When the transaction involves a PISP, it has the onus of proving that the payment order was received by the payer's ASPSP, in accordance with Article 78 of the PSD2 and that within its sphere of competence, the payment transaction was authenticated, accurately recorded and not affected by a technical breakdown or other deficiency linked to the non-execution, defective or late execution of the transaction (see Art. 90 (1) of the PSD2).

In any case, the PISP is asked to immediately compensate the ASPSP following its request for losses incurred or sums paid as a result of the refund to the payer, if this PISP is the one liable for the non-execution, defective or late execution of the payment transaction.

Two final Articles of Section 3 of the PSD2 "Liability" provide for a right to recourse and relieve the payment service provider from any responsibility, in the case of abnormal and unforeseeable circumstances. Under art. 92, where the liability of a payment service provider under Articles 73 and 89 is attributable to another payment service provider or to an intermediary, that payment service provider or intermediary must compensate the first payment service provider for any losses incurred or sums paid under Articles 73 and 89. Under Art. 93, no liability arises in cases of abnormal and unforeseeable circumstances beyond the control of the party pleading for the application of those circumstances, the consequences of which would have been unavoidable despite all efforts to the contrary, or where a payment service provider is bound by other legal obligations covered by Union or national law.

CONCLUSION

Studying payment initiation services and relations among all the payment service operators involved in the transaction allows to realize how profound are the chances in the payment market. Next to payment services traditionally provided by banks as intermediaries, new technically innovative services have emerged now served by new entrants, including third party providers, such as payment initiation service providers (PISP) and account information service providers (AISP). Although many of these new services might seem innovative versions of traditional payment services, their originality and innovativeness go beyond the previous payments market boundaries. Thus, constant efforts of authorities and the law to modify the current rules are required.

The latest studies, in particular those of the European Banking Authority, show a continual trend to adapt the current law on payment services to meet the constantly changing needs of the market.

Conversely, new services may determine new risks for users and customers. As follows, authorities try to avoid customer's exposure to abuse and fraud: balancing between opposite needs is always required. On one hand, technological developments need to be encouraged; but, on the other hand consumers need to be protected from the abusive entrance of new unauthorized and unregulated operators. The safety and efficiency of the payment system is essential for a stable and well-functioning financial system and contributes to confidence in the currency.

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Chapter 7
Are Bitcoins the New Payment Tools Suitable for Extinguishing a Pecuniary Obligation?

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ABSTRACT

This chapter aims to examine the issue of cryptocurrencies and to develop in particular a reflection on the possibility of counting bitcoins, which represent the best known and most widespread of the existing cryptocurrencies, among the payment instruments suitable to extinguish a pecuniary obligation, recognizing in them the function of means of payment typical of currency. The reflection moves from the crucial question of whether bitcoins are currency, reconstructing first of all the meaning of currency and its function. The research aims to conduct a cross-sectional analysis of the bitcoin system through an argumentation that highlights its potentialities and limitations.

THE DEFINITION OF CURRENCY AND ITS FUNCTION

This research explores the topic of crypto currencies and, particularly, this is a consideration on the possibility to include Bitcoin, which represent the most known and widespread existing crypto currency, amongst the payment tools that are suitable to the purpose of extinguishing a pecuniary obligation, recognizing their function of payment means that is typical of currency.

The consideration may not move away from the crucial question: can Bitcoin be considered actual money? (Pernice, 2018). Therefore, before expressing an answer to such question, it is appropriate to recall what we actually intend by "money".

Both the national and the European law do not provide a definition for money (Ascarelli, 1959; Inzitari, 2011; Chessa, 2016; Galiani, 1751). The guidelines on payment services refer to them as transfers of "funds", which we do not find a legal definition of in the body of the Law that, in fact, is limited to a list: banknotes, coins, scriptural money, and electronicmoney. Recalling the financial-economic nature of the definition of money, we find its three

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typical functions: "unit of account", "means of payment", and "store of value". The first of the three is definitely the one with the most crucial role, the one of "unit of measurement" (ideal unit) of all the other values.

The concept of "currency" always refers to the function of the unit of account. The financial order, indeed, requires to being measured and the functionality of the unit of measurement is given by its uniformity. The possibility to evaluate the convenience of a purchase or of a payment or of a sale depends on the expression of it in the operator's unit of measurement. From the uniformity of the criteria and of the measurement, there arises the general acceptance of the payment tools that incorporate the unit of account.

However, the functional definition of currency leaves room, from a legal pointof view, for the community and statist theories. According to the statist formulation, currency is the means of payment that the State recognizes as suitable to the purpose of extinguishing pecuniary obligations: essentially, it is what is provided for by art. 1277 c.c.: "pecuniary debt is extinguished with legal tender of the State at the time of payment and for its book value".

The second formulation, instead, the community one, considers as currency anything that functions as a means of exchange (Knapp, 1923).For sure, at least in this moment in history, the statist theory is in force. The suitability of the currency to extinguish pecuniary obligations is the most important statutory trait in the function of the currency within the performance theory. Beginning from the Seventies and up to recent times there has been a lot of discussion regarding the suitability of scriptural money, that is, the monetary mass represented by bank deposits, to be considered legal currency, equal to the one issued by the State (token coins) or by the central bank (banknotes).

The employment of bills of exchange and paper chequesto regulate pecuniary obligations has highlighted the essential problem that the owner of the title is exposed to: the insolvency risk coming from the debtor. On the contrary, the delivery of token coins or banknotes, being it a transfer of objects, whether metallic or paper ones, which incorporate a value that does not need any other enforceable behavior to be used, is, in the traditional formulation, the right behavior in order to fulfill the pecuniary obligation. This happens because the strength of the State allows it to impose, on its territory, the acceptance of its currency (that is, of the means of payment authorized by it, and expressed in the official unit of account of the State) as a means to extinguish pecuniary obligations, even when expressed in units of account of foreign States, that is legal tender in the territory subject to sovereignty (art. 1278 c.c.).

The material support that characterizes token coins and banknotes of the central bank compared to the bank deposit entry has, for a long time, induced to limit the consideration of the currency, in a legal sense, to how physical its consistency as a movable good, susceptible of material delivery,was. Bank deposits, or the active balances on payment accounts, albeit adequate to act as a support to monetary units that are spendable in payment operations, have been seen, in the traditional view (Campobasso, 1979), as a form of credit upon delivery of monetary units, the material support of which is a movable good issued by the State or by the Central Bank: but the sum of money made of banknotes and coins is only a fraction of the currency issued. Only in the theoretical exercises of the supporters of the "full" currency (that is, a scriptural currency that can be issued only by the Central Bank, without any banking multiplier), it is possible to envisage a system in which all the units of account of the scriptural monetary mass correspond to the same number of "issues" of the Central Bank (Bacchetta, 2018).

On the other hand, the most recent regulations of positive law are meant to reduce operations with cash more and more. The anti-money laundering provisions, the legal obligations regarding certain

services exclusively conducted with scriptural money, impose the need to reconsider cash payment as the norm and all the operations with scriptural money as an exception.

Therefore, compared to forty years ago, and in a perspective in which cash can be totally substituted by scriptural or electronic currency, continuing to exclude scriptural currency from the notion of legal currency appears as an unrealistic perspective (SciarroneAlibrandi, 2008). Any available credit denominated in the unit of account that is legal tender in the Italian State, which sees the "debtor" as a supervised subject, such as the bank, or a supervised subject such as a payment or electronic currency institution (art. 114-sexies TUB), committed to employ such availability through payment operations disciplined as a payment service, has to be, nowadays, considered as legal tender in the State, suitable for being used through payment orders of the account holders, in order to pay for their debts that have as an object sums of money as per art. 1277 c.c (Venuti, 2018).

But the electronic currency is not to be mistaken for virtual currency (Guerrieri, 2015).

THE VIRTUAL CURRENCY PHENOMENON AND THE IMPOSSIBILITY TO CLASSIFY IT AS "CURRENCY"

Virtual currency is defined in d.lgs.n. 231/2007, art. 1 par. 2 lett. q (as amended by art. 1 d.lgs. n. 90/2017) as «digital representation of value, not issued by a central bank or by a public authority, not necessarily linked to a legal tender, used as means of exchange for the purchase of goods and services and transferred, archived and negotiated electronically». Electronic currency is defined by art. 1, par 2, lett.h) ter TUBas «monetary value electronically or magnetically memorized, represented by a credit toward the issuer that is provided in order to conduct payment operations, and that is accepted by individuals and corporations that are not the issuer »: in this case, there is reference to a credit toward banks or specialized supervised subjects, such as issuers of electronic currency (IMEL), and the value electronically memorized is, indeed, a "monetary" value, that is, a value expressed in legal tender.

In the case of digital value representation that constitute "virtual currency", there is no reference to the concept of "money", but only to a "value" fit to be used as "means of exchange", and the issuing of this value from a bankor a public subject is expressly excluded. The characteristics of the virtual currency are, therefore, "immateriality", given by the "digital representation", and the absence of the "monetary" character, which is linked to the issuing of this value from a central bank or public authority (Bech&Garatt, 2017).

The law allows the issuing of "virtual currency" and it regulates some of its aspects under the profile of the anti-money laundering discipline, as it has happened with Lgs. D. n. 90/2017. Under a tax law profile (Giudice, 2018), the tax treatment is equivalent, regarding the acquisition of different types of income, to the ownership of foreign currency, and, according to the taxation on services provided to subjects that operate with crypto currencies, the Court of Justice of the European Union has excluded that the exchange of virtual currencies with legal currencies may be a VAT taxable activity (Trenta, 2016). However, this does not suffice in generally attributing a monetary character to virtual currencies as they are defined by the tax law, having to consider such orientations as limited to the consideration of the tax profiles of the subject matter.

We also need to confirm that, according to the financial theory, any good or entity that is acquirable and that carries a degree of usefulness constitutes a good in an economic sense, that is, "a value". In the

case of virtual currency, the value is given, according to the legislative formulation considered earlier, by the "employment as a tool for the exchange of goods and services", provided that one of the parties is open to receive virtual currency in exchange for goods or services. Despite there are several projects for the employment of virtual currency as a tool for the representation of legal tender units of account, it is important to confirm that, presently, virtual currencies do not seem to fulfill, in any country, the function of "unit of account", since, there is no Country in which the income statements of the enterprises are drawn up using a unit of account that is different from the State's (Amato &Fantacci, 2016). Nothing forbids the obligation to deliver a certain quantity of "virtual currency", just as there can be an obligation to deliver oil barrels and wheat sacks, for which specific stock markets exist.

The undeniable circumstance that virtual currencies have a market value does not allow them to be classified as "money"(Pernice, 2016). The services related to the employment of such virtual currencies, which are not available to everyone because of the need for a technologic infrastructure and for specific knowledge, deserve to be regulated through the application of protection rules for the clients of such services. The feature of absolute immateriality that virtual currencies assume is certainly relevant in terms of the missing possibility to acquire a material possession, in the same way as it is preached for the financial tools that are object of dematerialization.

In the last two thousand years, the evolution of the economic systems and the innovation of the technological tools have modified, in time, the relationship of the people with money and with all the payment tools, but the essential concepts of book value of the currency and of payment function remain the same. The representation techniques of the currency have changed, but we keep recognizing, in the representation of the unit of account, in the function of the payment tool and in the store of value, the elements of reference that keep identifying the currency itself.

A currency exists only when it is able to conveniently fulfill all of the three above mentioned functions: it is not enough for it to fulfill the exchange function or the function of store of value. It is necessary that it represents the unit of account, which is the measurement of all the other values, for a community that recognizes itself in such unit of measurement and that has the strength to impose the redeeming payment through the representations, whether material or memorized, in which the unit of account is incorporated.

THE STRUCTURAL FEATURES OF BITCOINS AND THE ATTEMPT TO INCLUDE THEM AMONGST THE PAYMENT TOOLS

In light of the discussion conducted, Bitcoins, as well as other virtual currencies, are not money (Yermack, 2013; Howden, 2015), according to a statist formulation which is definitely in force in this time in history.

We could try and affirm that Bitcoins are money by adhering to the community theory according to which money is anything that functions as an exchange intermediary.

According to the economic theory, any acquirable good or entity vested with some sort of usefulness constitutes a good in an economic sense, that is, a value.

Bitcoins are goods, if we refer to the definition given by art. 810 c.c. according to which all the things that can become object of rights are considered as goods, assuming that the concept of goods is not necessarily coessential to the prerequisite of materiality. But the question is whether or not Bitcoins can generally be accepted as the counterbalance of an exchange(Passaretta, 2017).It is true that Bitcoin transactions are growing, but the number of these transactions is still too low compared to that of exchanges regulated in Euros or Dollars or in other legal currencies. Bitcoins have no government

recognition (both in Italy and elsewhere) and because of this they cannot act as units of account. Their conventional acceptance as regulators of exchange is still too contained to rise to the role of payment tool, at least a generally recognized one. Furthermore, the strong variations in Bitcoinsimpede their qualification as money, and they do not allow the function of value preservation, that currency must hold to be considered as such.

Therefore, Bitcoins are not money, but they may be adopted as object of exchange or for investment purposes. Not being money, Bitcoins are not legal tender in the Republic of Italy, or in any other Country. What derives from this is that Bitcoins may not be the object of a pecuniary obligation, since, as provided by art. 1277 c.c. pecuniary obligations are only considered those that are possible to be paid "with legal tender of the State at the time of payment". Also, the regulation provided for pecuniary obligations will not be applied to the obligation having Bitcoins as object.

Creditors do not have the obligation to accept them as payment and it does not matter if they have accepted them in the past, because if they have not contractually expressed their consent, they will be able, from time to time, to freely grant it or refuse it. Also, it is not possible to rely on art. 1278 c.c. which, expressing itself about exchange with currency that is not legal tender in the State, it pacifically implies foreign currency, that is, the one that is legal tender in another State: it is a circumstance in which the currency taken into consideration is, anyway, legal tender, that is, it has a regulatory recognition, albeit from a State that is not the Republic of Italy, that allows the denomination of a pecuniary obligation and the fulfillment of such obligation through an exchange with the legal tender in Italy, or, as provided by art. 1279 c.c., through the same foreign currency. Bitcoins, instead, at the moment may not be anchored to an official parameter, or, anyway, through a parameter that is supervised by some sort of public authority.

Ultimately, Bitcoins are a derivative of the principle of contractual autonomy as per art. 1322 c.c., to be read, nowadays, within the scope of art. 41 of the Constitution. Bitcoins, then, are an asset, accepted as a payment for an exchange, which, in time, my increase or decrease in value, just as any other asset.It is to be underlined, though, that, compared to other assets, Bitcoins lack their own specific usefulness, both in their physicality and in the possibility to acquire it.

Concretely, then, the value and, more generally, the usefulness of Bitcoins is entirely represented by the possibility to turn them into legal currency, against which they might be defined as alternative; however, at the same time, Bitcoins suffer the legal and monetary uncertainties of such conversion.

The inconveniences and the risks linked to Bitcoins are easily perceivable: they are not issued by a central bank or by any otherpublic authority, but they are issued in part by human belongs and in part by sophisticated software.

There is no nominalistic principle for them and they mostly lack a regulation, at least a binding one; consequently, they lack protection, which is a circumstance that is made worse by the anonymity that permeates the platform, which records their existence and exchanges.No one has the authority to stabilize their courses and, from this, derive the variations of the exchange value we mentioned earlier, and that generate uncertainties when it comes to converting them.The anonymity that characterizes Bitcoins exposes the risk to facilitate, through them, money laundering activities. Bitcoins could be, then, connected to the genus of financial products, as per art. 1, par. 1 lett. u) of theTUF, that is, they would be placed amongst the other forms of financial investment.Indeed, we can observe that, because they are not proper money, the purchase of Bitcoins, which requires the employment of a certain amount of legal tender, it is necessarily linked to the possibility, in the future, to receive a certain amount of legal tender with an inverse operation, and, therefore, to receive a financial service.

The operation is quite aleatory, because it could either entail a remuneration or a loss: that is, the capital returned could be higher or lower than the one that has been initially used for the purchase of Bitcoins. It can reveal the elements that are typical of financial products: the employment of capital (that is, of legal tender); the assumption of a risk; the intention to draw an economic usefulness from spending them. Bitcoins are, therefore, exposed to the same risk as any financial product, that is, that the period will not remunerate the capital employed, plus their own risks, such as, that it is not possible to physically own them and use them; the possibility that a State law will limit, forbid, or influence the conversion in legal tender; the loss risk is also linked to possible frauds and to the termination of the activity of the exchange platforms; the operation, once conducted, is irreversible; the variation of the exchange course of the conversion are totally uncontrollable and uncontrolled. Therefore, accepting Bitcoins as a form or payment for a service, or making them the object of an investment is uncertain and dangerous.

CONCLUSION

We can conclude that Bitcoins are a mere market creation and, at least for now, they are subject exclusively to the rules of the market. Presently, the bitcoin market lacks any regulation, even only a conventional one: there are no clear rules or severe sanctions and there isalso no authority that can dictate rules and impose sanctions.

In the present bitcoin market there is no one responsible for providing savers and investors with information that are necessary to the purpose of them understanding what they are buying and what operation they are conducting. This, on one side, can give the impression that one is able to act free of the presence of cumbersome operators (such as the banks), but, at the same time, it exposes users to the huge risks that the lack of adequacy of the information inevitably causes in today's society and within the scope of financial markets. It is also important to notice that, should one want to take advantage of the help of financial mediators, the risk is to not obtain it, because the mediator does not operate in parallel currencies (considering that the National and supranational bank authorities explicitly discourage mediators from doing so), or else, the risk is to be assisted by a mediator that, in this framework, is completely clear of any behavioral requirements to which he would be otherwise obligated and, therefore, would be easily induced in the temptation to commit some form of abuse against the client that are so frequently observed, unfortunately, even where there are obligations or sanctions. In conclusion, in light of the discussion conducted, after excluding that bitcoins can form the object of a pecuniary obligation, for the reasons explained above, the proposal that can be shared appears to be that of considering them as "financial products", which could lessen, albeit partially, the reported inconveniences.

The acquisition or employment of bitcoins, indeed, would obligate those who insert themselves in the process of creating or exchanging them to observe the protection rules in force for financial or investment services and, since, in the case of the bitcoins, the financial mediation is substituted by the technical one, the actions of the many operators that intervene in this sector could maybe find a discipline, by analogy and thanks to a considerable exegetical effort, in the behavioral rules provided for financial mediators, at least when the above mentioned actions are reconstructed and precisely attributable.

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Chapter 8
Smart Contract:
Towards a New Contract Law?

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ABSTRACT

A smart contract is a technology that allows the creation of a negotiation process capable of running independently, without human intervention. This chapter intends to frame the figure of the "smart contract" from a legal point of view. It shows that the smart contract is an advanced tool in the context of a contractual relationship. The possibility of making a smart contract "the contract" in a legal meaning opens up scenarios which have hitherto been unexplored for contract law. It is still difficult to determine to what extent current rules are adequate to govern this phenomenon. The chapter will therefore conclude with a review of the strengths and weaknesses of the smart contract technology and with some suggestions for a future smart contract law.

INTRODUCTION

Smart contract is a technology that, by the distributed ledger technology (DLT) blockchain in particular, allows to create a negotiation process capable of running without human intervention upon the occurrence of data assumptions, as predetermined by the programmer-developer according to the classic algorithm "if-then" and–if made up of external facts–ascertainable through input from the so-called "oracles" (Benatti, 2019; Di Sabato, 2017; Karamanlioğlu, 2018).

Wittingly, Sirena (2019) sustained that smart contracts are neither "contract" nor "smart."

Indeed, the noun "contract" cannot be traced back to the classic legal concept of "a promise or agreement recognized by the law" (Chen-Whishart, 2018, p. 71) or, in more structured terms, of "an exchange relationship created by oral or written agreement between two or more persons, containing at least one promise, and recognized in law as enforceable" (Blum, 2007, p. 2). It is rather to be understood as a slogan. A smart contract is a "computer protocol," that is a software that independently governs certain

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events that affect the relationship between two or more parties, on the basis of instructions inserted by them (Karamanlioğlu, 2018; Mik, 2017; Raskin, 2017). However, under certain conditions, a contract can be a smart contract as well, although only in the sense, by metonymy, of a means of exteriorization of an agreement (Capaccioli, 2016; Cuccuru, 2017; Parola et al., 2018).

The smart contract is not even smart, since today, in any case, a computer protocol operates in accordance with the instructions it receives and does not have the ability to "self-determine" or adapt. The smart contract cannot autonomously suspend its execution, unless there is a specific instruction (Karamanlioğlu, 2018).

Given these premises, this chapter aims to outline the smart contract from a legal point of view, also as to the historical and current regulatory context. The author's analysis will show that the smart contract is a technologically advanced and versatile tool, which the parties of a contractual relationship can use for different purposes: 1) As a mere vehicle for the exchange of negotiating statements, as a certified e-mail is; 2) as a means of implementation of the contract the parties concluded in a "traditional" form; 3) as the source of the contractual constraint itself, thus making the smart contract "the contract." The last possibility opens up scenarios which have hitherto been unexplored for contract law. Contract law is called to face the challenge (firstly, in cultural terms) of a technology that promises to disintermediate commercial relations, to eliminate the risk of default and to free the parties from the slavery of mutual trust. At this initial stage of adoption of the smart contract in the trade practice, it is still difficult to determine to what extent current contract rules are adequate to govern this phenomenon. The chapter will therefore conclude with a review of the strengths and weaknesses of the smart contract technology and with some suggestions for a future smart contract law.

DESCRIBING A SMART CONTRACT

First of all, it is necessary to explain why the smart contract is not a contract in its traditional sense.

In the Italian legal system, the contract is defined as an agreement by which the parties regulate a patrimonial legal relationship (Article 1321 of the Italian Civil Code). The contracts are defined as "typical" and as "atypical" by law; they are drafted by the parties to perform interests which are worthy of protection (Article 1322 of the Italian Civil Code).

By a smart contract, the parties do not create a brand new contract, different from the above-mentioned kinds, but they apply a new technology to traditional contracts.

The four phases of the development of a smart contract are as follows: 1) Processing of the content by parties (or at lease by one of them); 2) transcription in the blockchain; 3) execution; 4) exhaustion of its effectiveness (Sillabel & Waltl, 2017).

The first phase is the coding of the instructions for the operation of the smart contract.

The smart contract is characterized not by "what" it contains, but by "how" the content is processed, and precisely for the use of computer language instead of human language. This is a very delicate phase, considering that, on the one hand, the smart contract is written using a computer language which is largely unknown even to many legal professionals, and that, on the other hand, this is the first and only time in which changes or corrections to the content can be made, as, after the transcription on the blockchain, it cannot be amended.

The second phase is divided into multiple steps of high technical complexity– that the author does not deem as necessary for the purpose of this analysis. Importantly, the smart contract is added permanently

and unchangeably to the blockchain, accompanied by a time stamp that uniquely identifies the (date and time of the) transaction, but not its parties. The difference from all other (known) forms of electronic bargaining is clear: The computer is only the tool through which a traditional contractual relationship is concluded or executed; vice versa, the use of the blockchain is able to move the contract into a dimension which neutralizes human interference.

However, total disintermediation seems a slogan rather than a reality. In other words, stating that blockchain transactions are not disintermediated, but "differently intermediated" seems preferable.

The third phase (i.e., execution) concerns the effectiveness of the smart contract (i.e., the activation of the software) when the circumstance that the editor indicated as a prerequisite for execution occurs. From the legal point of view, the mechanism recalls the the condition or term, but the algorithm "if ... then ..." seems to lend itself to a much more extensive use than the normal perimeter of the condition or term attached to a traditional contract. However, the data of the automaticity of the operation introduce a rigidity that plays at the expense of the appeal for the smart contract and that could limit (at least, for now) the perimeter of use only to the simplest and most unstructured categories of transactions. Moreover, if it is true that the automaticity of execution eliminates, for the creditor, the cost inherent in the risk of default, at the same time it deprives the debtor of both the opportunity to exercise the remedies provided in case of default or modification of the original balance of the sinallagma, namely the right to obtain a judicial review of the performance due, and the opportunity to resort to the so-called "Efficient non-fulfillment", whenever is Pareto-efficient not to fulfill the obligation and compensate the damage.

The fourth phase of a smart contract can be summarized by the noun "stability" and by its functional consequences: Untraceability (it can no longer be deleted and removed from the chain, remaining there forever, unless it is equipped with a kill function to disintegrate and eliminate it); unchangeability (there is no way to intervene ex post to change its content); unstoppability (it cannot be blocked or canceled), even if all parties of the transaction agree.

In a nutshell, a smart contract is a tool for the practice of negotiation. The parties can use the smart contract exclusively or together with other negotiation methods (both in person and remotely) for the conclusion (with simultaneous or deferred exchange of proposal or acceptance, by signature in the presence or transmitted) or the execution (direct or through intermediaries) of a contract. Thus, the smart contract turns out to be an extremely sophisticated and powerful tool, although with some criticality and rigidity.

Hence, the question is to what extent a smart contract can actually be used in the unfolding of a contractual relationship.

USING SMART CONTRACT FOR THE CONCLUSION OF A TRADITIONAL CONTRACT

It is well known that a contract can also be concluded "at a distance." It is also well known that the smart contract can be used as a mere vehicle of communication among parties during the negotiations and to express the consent to the final draft of the "traditional" contract.

However, the smart contract is not designed to be a trivial communication tool, but rather a sophisticated mechanism for the implementation of negotiated agreements. Any use for different purposes only makes it unnecessarily expensive and makes complex a process for which the smart contract is not designed.

The Purely "Executive" Smart Version of a Traditional Contract

The execution of a contract represents the natural course of use of a smart contract (Benatti, 2019).

First, it is important to establish whether it is possible to use the smart contract to execute any type of contract. The answer should be–apparently–negative: Contracts that have instantaneous execution with simultaneous exhaustion of mutual performance are to be excluded, unless any additional obligations occur (e.g., the amount retained in escrow in a share purchase agreement). Likewise, a smart contract may not be used to perform services to produce or to deliver material goods or to achieve deferred translation effects. Instead, it will be allowed to use it whenever the service is for payment of sums or transfer of dematerialized goods (e.g., the smart contract that liquidates a sum in case of delay of a means of public transport or one that blocks the functioning of a machine or a vehicle or program in the absence of payment) (Karamanlioğlu, 2018; Kaulartz & Heckmann, 2016; Raskin, 2017).

The second legal issue is language, since it will be necessary to "translate" the parties' obligations in the traditional contract into computer language, with the risk of errors or misunderstandings for which the "editor" will be responsible. Moreover, the author believes that the translation into computer language of the contract concluded in the traditional way constitutes a peculiar hypothesis of repetition of the contract in a different form, which is necessary for its implementation.

The third theme concerns the function "if ... then ...." If the parties condition the effectiveness of the contract to an event or a date, it is probably correct to qualify the function "if... then..." as a condition (Article 1353 ff. of the Italian Civil Code) or term, subjecting it to its legal discipline. If, instead, the contract is already effective and the event only represents a prerequisite for the performance of the other party (e.g., the buyer will pay the price only after delivery by the seller), it certainly does not fall within the scope of the condition because the event does not affect the effects (but the obligations arising from the contract) and because, depending on the will of one of the parties, the condition would probably be invalid due to Article 1355 of the Italian Civil Code. In this case, the smart contract resembles an exception of contractual nonperformance pursuant to Article 1460 of the Italian Civil Code ex ante. In other words, the purchasing party, who could well refuse to fulfill after having ascertained the nondelivery of the goods, using the smart contract shows this intention in advance by "instructing" the software not to perform (not to transfer money) if there is no confirmation, (by an oracle) of the other party's performance.

Finally, a last critical profile is represented by the referability of the smart contract to the parties of the contract. Being a computer protocol, the problem is addressed in the blockchain environment, by using signature mechanisms such as asymmetric double key encryption. This feature allows to uniquely associate a transaction to a subject. In this regard, however, the Agency for a "Digital Italy" has not issued the guidelines that should contain–given the content of the aforementioned Article 8-*ter* Decree 135/2018–the specifications of the parties' computer identification process yet.

The New Frontier: The "Constitutive" Smart Contract

As the author mentioned above, the smart contract is not a (new) type of contract, but rather a tool that parties can use as a vehicle to express their human will.

A sheet of paper, a computer document, and, in general, any material or immaterial support, under certain conditions, can become the means by which the existence of a contract is manifested, namely its "external appearance." Indeed, by metonymy, even in the legislative language, the medium becomes itself its content, and therefore the sheet, the document or their support are themselves the contract.

Undoubtedly, in some cases, such an "external appearance" is required for the validity of the contract (the so-called written form *ad substantiam* as per Article 1351 of the Italian Civil Code and the ad hoc provisions requiring it), while generally, by virtue of the "freedom of form" principle, it can only serve to prove its existence in court (written form *ad probationem*).

Nothing seems to prevent the author from considering even the smart contract as a vehicle for the exteriorization of a contract, and, therefore, again by metonymy, as the contract that parties stipulate (Cuccuru, 2017; Di Sabato, 2017; Kõlvart et al., 2016; Panisi, 2017; Savelyev, 2017; Werbach & Cornell, 2017).

Scholars have divergent opinions on this conclusion, but the reasons supporting the denial seem rather inconsistent. The argument is based on the unchangeable, untraceable, and unstoppable nature of the smart contract (i.e., its "stability") from which "the consequence–frankly excessive–that smart contracts could be beyond any possible control by the nation states and their legal jurisdiction" (Parola et al., 2018, p. 685). Undoubtedly, this is a realistic scenario, where the challenge for scholars, practitioners, and systems should be to strike a balance between freedom and private autonomy, on the one hand, and state authority, on the other hand.

However, this entails several additional issues, and implies the whole spectrum of the contract discipline is declined in a "smart" way.

COMPUTER LANGUAGE AND CONTRACT CONTENT: THE PROBLEM OF AUTOMATIC INSERTION OF CLAUSES

The first issue concerns the adequacy of computer to the challenge of drafting an entire contract. It must not be forgotten that the smart contract is a software composed of a code that expresses functions or states. These functions or states are instructions to make the system "react;" moreover, to date, these instructions are based on a very limited catalog of options. *Nulla questio*, if it is a matter of writing the code containing the transactions that parties undertake to make when objective conditions occur, which will be expressed with simple "if... then..." algorithms. It is already an insurmountable obstacle, however, if the instruction introduces a value clause such as "pay x to X if Y does not fulfill with serious fault" (mentioning the judgment on the degree of fault) that is not likely to be "appreciated" and then executed by the software, if not using an intermediary. The intermediary would allow to assess the subjective state of Y and could be an oracle or an independent third party adopting a multisig scheme according to which the activation of an instruction requires the consent of two parties.

Further, a traditional contract includes clauses that make the obligations of the parties explicit. It is usually also composed of numerous other elements (e.g., statements of science, definitions, clauses of style, expressions of opinion, premises, and attachments), which all contribute to form the overall content of the document. The computer language is not structured to express those other elements although they are relevant in terms of hermeneutics as per Articles 1363, 1364 and 1365 of the Italian Civil Code). It will not be surprising, therefore, that even in the presence of more complex operations, smart contracts may have a minimal skeleton, as long as sufficient to integrate the minimum elements required by law (i.e., identification of the parties, determination or determinability of the object, and reason).

There is also another possible way that could neutralize the language problem, but at the expense of the purity of the smart contract: Inserting in its text special portions of the contract that do not consist of instructions. The product of this operation would be a hybrid, partly smart contract and partly

something probably qualifiable as a computer document ("electronic document containing the computer representation of acts, facts or legally relevant data:" Article 1, paragraph 1, letter p, of the Italian Digital Administration Code) or electronic document ("any content stored in electronic form, in particular sound, visual or audiovisual text or recording:" Article 3, n. 35, of the EIDAS regulation). "Purists" may not like it, but the author deems it as a solution capable of enhancing the potential of the smart contract and fill the gaps that may hinder its concrete use.

It is worth mentioning the problem of automatic integration of the contract (Articles 1339 and 1340 of the Italian Civil Code). In the author's view, the argument of the unchangeability of the code in the blockchain is not contrary to the operation of the predefined provisions. Indeed, it is necessary to consider parties complaining about some breach or defect, a situation that is bound to be addressed and resolved outside the smart contract, possibly giving rise to claims for damages (Parola et al., 2018). However, this is beside the serious problem of the consequences of the, even partial, invalidity of a smart contract. This issue does not fall within the focus of this chapter,

THE LIMITS OF USE OF A "PURE" SMART CONTRACT: THE FORM

In the hypothesis under examination, there is no preexisting traditional contract, but the smart contract itself is the source of the negotiation constraint. This makes it impossible to use the smart contract to access any contract that requires a solemn form (i.e., public deed or notarized private writing). Instead, it seems reasonable to believe–pending the guidelines of Article 8-ter of the Decree 135/2018–that the digital signing of the smart contract on the blockchain satisfies the request of the written form in accordance with Articles 20 and 21 of the Italian Digital Administration Code. After accepting this perspective, the statements contained in the smart contract can be considered as originating from the parties who signed it pursuant to Article 2702 of the Italian Civil Code (Parola et al., 2018).

NEGOTIATIONS, PROPOSAL, ACCEPTANCE, AND MUTUAL CONSENT

It is reasonable to assume that the conclusion of a contract in a smart form can be achieved in various ways, among which: The acceptance of a proposal unilaterally drafted by the counterparty in computer language, possibly on the basis of general conditions already existing in analogical or digital form; the start of negotiations in the real world that leads to the drafting, jointly between the parties or their agents, the lines of code and text that make up the agreement; the signing of a preliminary contract or other preparatory agreement. Instead, the author would exclude that the smart contract can be configured per *facta concludentia* (i.e., in the absence of a proposal) because the assumption of the absence of a formalized agreement is ontologically incompatible with the requirement of drafting the computer protocol, a typical element of the smart contract. Instead, it would seem conceivable to intend the smart contract as concluded, pursuant to Article 1327 of the Italian Civil Code, in the absence of acceptance.

A common topic among all forms of conclusion of the agreement is the existence of the willingness of the parties to accept a certain negotiation regulation, which presupposes understanding. Nevertheless, if it happens that a party does not have any perception of the meaning of the contract being concluded, it is possible to ask for its cancellation by mistake, pursuant to Article 1427 ff. of the Italian Civil Code.

Without lingering on the sophisticated taxonomies of the different types of error, it seems sufficient to point out that the smart contract brings to the fore two hypotheses of error that, in traditional contracts, occur less frequently. On the one hand, the lack of understanding of the content of the contract (which may be essential under paragraphs 1 and 2 of Article 1429 of the Italian Civil Code) for ignorance or lack of knowledge of the language (computer) used in the drafting of the smart contract: it is clear that an agreement cannot be considered formed if one of the parties does not understand its meaning. On the other hand, the divergence between the will and its exteriorization in the lines of code and text (i.e., in the declaration) or in the inaccurate transmission of the same by the possible intermediary in charge of drafting it and importing it into the blockchain: here Article 1433 of the Italian Civil Code may perhaps be deemed as useful.

Dwelling on the general themes of the conclusion of the contract, the author does not find any obstacle to believe that negotiations to stipulate a smart contract must be conducted in compliance with the principles of fairness and good faith, all relevant legal protections in view of the gap in technological culture between the parties. In addition, they may be interrupted, possibly giving rise to a precontractual liability pursuant to Article 1337 of the Italian Civil Code.

THE CONCLUSION OF A SMART CONTRACT

The contract is concluded when the proponent becomes aware of the counterparty's acceptance (Article 1326 of the Italian Civil Code).From that moment on, the contract acquires "force of law," namely it becomes binding between the parties (Article 1372 of the Italian Civil Code). This dynamics could also be easily transposed to the mechanism of the smart contract, if it were not for the fact that Article 8-ter of Legislative Decree 135/2018 makes the binding nature of the smart contract depend not on the conclusion, but on the "execution" (in the technical sense of the validation of the software on the blockchain, in the author's prudent opinion), and considers the agreement on the effects as an event prior to that in which the smart contract binds the parties.

If this interpretation is accepted, the result would perhaps be a *tertium genus* of contract formation that would add to the mechanism of consensuality (i.e., contract that ends with the meeting of consents) and reality (i.e., contract that ends with the *traditio* of the thing): The contract that ends as a result of widespread validation by the nodes of the blockchain.

PARTIES AND POWER TO ENTER IN A SMART CONTRACT

While in the real world a party in legally identified when its generality is specified, with reference to computer documents pursuant to Article 2702 of the Italian Civil Code that is achieved through a qualified electronic signature or through an identification, in accordance with the requirements set by the Agency for Digital Italy. Whereas the possibility of affixing such a signature presupposes a prior process of identity verification, at the moment the guidelines for managing computer identification (Article 8-*ter*) have not been issued, yet. Thus, it is not easy to predict the perimeter within which, for the purposes of equivalence of the smart contract to a written document, a person can be considered as identified.

It seems useful, however, to remember that in contract law the identification of the parties is not an essential requirement. In addition, many operations of daily life are not affected (e.g., shopping in a

supermarket), and it is not a problem if a contract is concluded between two parties using a pseudonym (Capaccioli, 2016), as long as it is not a matter of using a false name. In other words, it is desirable not to introduce constraints that are unsuitable for a highly deformalized environment such as the blockchain.

Of course, this does not affect the application of the provisions relating to natural capacity and the consequences of the conclusion of a contract by a minor or incapacitated person.

THE "MIXED" CONTRACT, BETWEEN TRADITIONAL AND SMART

It is reasonable to imagine that, at least initially, smart contracts will be used in tandem with traditional ones, to automate certain portions of the broader negotiation rules of the operation carried out, or as a negotiating segment of serial relationships governed by general conditions. The presence of general terms and conditions represents one of the most effective solutions, since it allows the parties to have a complete negotiation regulation in traditional format (which does not seem to be easily achieved with the smart contract alone), and correlatively to disintermediate and automate the individual operations.

A major problem concerns the fulfilment of the double subscription requirement provided for by Articles 1341 and 1342 of the Italian Civil Code. This is more a matter for technicians, rather than legal scholars; however, it seems that two alternatives can be suggested. The first option consists in inserting in the smart contract a condition consisting of the signing–which would take place in the real world–of vexatious clauses, the fulfilment of which would be "communicated" to the smart contract using an oracle. The second–which would have the advantage of resolving the entire "on-chain" issue–assumes that the unitary smart contract would be split into two, that the party would have to sign in sequence. The first contract would contain only the unfair clauses requiring double signing, while the second contract–one for which activation conditions would obviously be the signing of the first contract–would contain all the clauses of the contract regulations. In the author's opinion, both hypotheses allow to consider the double signature requirement to be respected, since the law does not require the "specific approval in writing" to take place in the body of the same document containing all the other clauses. Moreover, the drafting of an autonomous document containing only the vexatious clauses unifies the double signature procedure and the most recent and rigorous positions of the jurisprudence of merit.

IS THERE MUTUAL DISAGREEMENT IN THE SMART CONTRACT UNIVERSE? THE SPACES FOR *IUS POENITENDI*

Since it is unthinkable that the parties cannot, even if they agree, dissolve a smart contract, it is necessary to rephrase the question and ask how this can be handled. It seems that a first plausible answer, at this stage, is that the mutual disagreement must be concretized in the preparation of a new equal but opposite smart contract, that is, to neutralize the legal effects produced by the first. The author does not hide the fact that this option may appear unsatisfactory, resulting not in the disappearance of the no longer desired contract, but, on the contrary, in the paradoxical permanence in life of two distinct relationships that inefficiently continue to run and "cancelling" each other's effects.

The alternative–which would require its inclusion *ab origine* in the smart contract–could be to use a so-called kill code that can only be activated jointly by the parties to the contract. The same solution could also lend itself to solving the problem of how to assign the unilateral right of withdrawal under

and in accordance with Article 1373 of the Italian Civil Code. In this case, it would be necessary to allow the activation of the kill function also by the initiative of a single party.

THE SMART CONTRACT WITH OBLIGATIONS OF THE PROPONENT ONLY

The dynamics of the formation of the contract pursuant to Article 1333 of the Italian Civil Code could lead to some critical issues with respect to the smart contract mechanism, both for the unilateral nature of the obligations assumed and for the importance of the silence of the other party as a source of the negotiating relationship. In the perspective discussed here, it does not matter that silence is intended as such or as a tacit manifestation of acceptance. In any case, a smart contract requires an activity of adhesion of the party through the signature.

THE APPLICABILITY OF PRELIMINARY CONTRACT TO SMART CONTRACTS

seethe author sees no reason to prohibit parties from accessing a smart contract. Someone could perhaps raise doubts in relation to the remedies in case of nonfulfillment, and in particular to the practicability of the action referred to in Article 2932 of the Italian Civil Code. However, looking carefully at this, the fact that parties concluded a certain contract in smart mode does not prevent the recourse to judges, which is aimed at obtaining not the conclusion of the contract, but rather at producing its effect.

THE SMART CONTRACT IN FAVOR OF A PERSON TO BE APPOINTED OR OF A THIRD PARTY

The use of the smart contract does not seem precluded to enter into a contract in favor of a third party: Policyholder and promoter will insert appropriate lines of code that direct the services to be implemented to the other recipient, who can join the stipulation by signing the contract in smart format. Some doubts arise in relation, on the one hand, to the compatibility with the smart contract of the rule of the immediate purchase of the right to service by the third party; on the other hand, to the way in which the right to revocation or modification of the obligation by the policyholder is configured.

Instead, considering the subsequent designation of the contracting party compatible with the smart contract protocol (Articles 1401 ss. of the Italian Civil Code) seems more complicated, unless the mechanism for the election of the third party is deemed as an input from an oracle agent under the control of the policyholder. In order to make the contractual relationship valid, the nominee must simultaneously accept the appointment by affixing his/her signature electronically; can he/she, alternatively, issue a power of attorney as Article 1402 of the Italian Civil Code allows? It does not seem possible, considering that the power of attorney must take the same form as the contract (Article 1403 of the Italian Civil Code), and, as the author stated previously, it seems preferable to exclude that it can be conferred in a smart format.

SMART CONTRACT AND ARBITRATION CLAUSE: IS DIALOGUE BETWEEN THEM POSSIBLE?

It seems that the issue of the possibility of devolving the disputes arising from a smart contract to arbitration deserves more attention.

Indeed, since this is a negotiating relationship, therefore normally a source of available rights, the related disputes are arbitrable pursuant to Article 806 of the Italian Code of Civil Procedure. The parties may either stipulate a compromise at lawsuit (Article 807 of the Italian Code of Civil Procedure) or agree an arbitration clause, inserting it in the smart contract or in a traditional document (paper or computer), since it is also allowed it results from a "separate act," as long as it functionally refers to disputes arising from that negotiating relationship.

An interesting perspective concerns the possibility that the parties opt for arbitration to be celebrated entirely "on-chain." Even on this ground, multiple issues arise in terms of compatibility with the procedural discipline of commercial arbitration. In-depth feasibility studies are underway within some working groups aimed at exploiting the potential of blockchain technology and start management services (a kind of "arbitration chamber") of disputes on this telematics infrastructure, and it is reasonable to expect concrete developments in the near future.

LOOKING FOR A TRADE OFF BETWEEN EFFICIENCY AND JUSTICE: THE SPECIAL SMART CONTRACT LAW

In the author's view, a good synthesis cannot ignore a schematic reconstruction of the strengths and weaknesses of smart contracts that emerged during the analysis in this study.

Among the weaknesses, multiple elements of rigidity of the blockchain can be included: The natural inadequacy of the platform, due to its architecture (Mik, 2017), to manage complex negotiation operations; the impossibility of corrective actions or modification of codes once the smart contract is validated on the chain; the minimization of space for negotiation strategies; the inability of computer systems to conceive uncertainty and manage value parameters (e.g., good faith, correctness, and measure of guilt) (Cuccuru, 2017). However, for the sake of completeness, it should be noted that some people believe that the overcoming of the uncertainty variable would be a merit, considering that the market does not tolerate it, as the practice of preparing increasingly detailed negotiating regulations has demonstrated (Di Sabato, 2017), not to mention the current obsession with the calculability of any risk. The author does not intend to hide that the argument arouses some anxiety, as the distrust towards the human being that emerges (while computers do not act under uncertainty) represents a serious derivation from principles that should continue to be a constant guide. The order contains in itself all the instruments to govern uncertainty and risk. The use of general clauses that would be impossible in a smart contract is proving to be, on the contrary, increasingly widespread by the legislator as an outlet in all situations where the use of flexible standards reacts better than fixed rules.

Continuing the review, it is easy to assign positive value to the ability of the smart contract to eliminate (almost entirely) the risk of default and the related transaction costs that the creditor is otherwise forced to bear. Still, disintermediation is not complete because of the presence of third-party oracles that may be corrupted or make mistakes and the need, at least to date, to be assisted by specialists to overcome the semantic barrier of computer language.

Again, transactions are secure and instantaneous, but the confidentiality of the existence of the contract and its content is lost, even if not to the point of revealing the identity of the parties. The process of verification, among other things, poses tricky technical problems.

Finally, the crux of judicial protection remains: The use of *permissionless* chains (i.e., with no supervisory authority, completely decentralized and open) perhaps satisfies at most someone's longing for freedom from the oppression of authority, but more realistically prevents anyone from being able to intervene in the execution of transactions included in the blocks.

The list might be endless, but the picture seems sufficiently rich in ideas.

The author is convinced that a serious policy of incentivizing smart negotiating technologies requires extensive work to develop a new contract law whose compass must be aimed at finding a balance between the efficiency of blockchain technology and the respect for the minimum prerogatives of the system, also (and above all) to ensure an adequate level of parties' protection, especially if they are in a weak position.

Honestly, the author does not believe in the self-regulating power of the market and in the capacity of the technological system to ensure substantial justice. At the same time, it must not be forgotten that the DLT model was born as a reaction to the power of the central authorities, as a manifesto of a new (crypto-)anarchy (Capaccioli, 2016). The national systems, even with all the limits they suffer from in the face of globalized phenomena, must continue to be the polar star and regulators of social and economic relations, even as an advanced garrison of government of the technological revolution. In this context, the main merit of the blockchain (i.e., the absolute stability of validated transactions) risks–if not adequately guarded by corrective mechanisms–to also be its main Achilles' heel: To what extent is a rational economic operator willing to abdicate instruments to protect its position in the name of speed, efficiency and stability of a transaction? To what extent is a sovereign order willing to tolerate mechanisms that completely escape any control and coercive or sanctioning power, where the only supreme law is the computer code?

Without any further delay, the author thinks that the search for a balance between the two abovementioned needs is the most profitable way to take advantage of technological progress in an orderly manner.

This objective can be achieved through a process of normative elaboration that, in the author's opinion, could be structured on several levels: (i) Identification, with elastic but sufficiently punctual definitions, of the technical coordinates of this telematics infrastructure, as has already been done through the perfectible Article 8-ter, which defined technologies based on distributed registers and smart contracts; (ii) characterization of DLT platforms in order to be legitimized to offer IT services for the validation of transactions or operations using blockchain technology or by qualified third parties (e.g., the judges); (iii) definition of the perimeter within which individual economic transactions or entities are granted with the protection of the system, if they are carried out on DLT platforms; (iv) regulation of the judicial systems (public or private, such as arbitration) to which the parties can turn in case of disputes, ensuring speed of decision, specialization of the judge, and especially effective enforceability of the ruling in the smart environment.

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KEY TERMS AND DEFINITIONS

Arbitration: A form of alternative dispute resolution (ADR) by which a dispute is decided by one or more persons which renders the arbitration award that is binding as a judicial decision.

Blockchain: A technology that allows to manage transactions between two or more parties in a virtual environment which ensures that the transaction is unalterable and not revocable.

Distributed Ledger Technology: A technological infrastructure that allows simultaneous access, validation, and record updating in an immutable manner across a network where multiple entities are connected and confirm the transaction.

Mixed Contract: A contract partially in form of traditional contract, partially in form of smart contract.

Oracle: An external factor (human or natural) affecting the execution of a smart contract.

Smart Contract: A technology that, using the distributed ledger technology (DLT) blockchain, allows to create a negotiation process capable of running independently without human intervention, upon data assumptions.

Traditional Contract: An agreement between two or more parties by which they create, modify or delete a legal and binding commitment.

Chapter 9
Blockchain and Smart Contracts: New Perspectives on Copyright Protection in the Digital Single Market

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ABSTRACT

New technologies making use of blockchains and smart contracts have been considered an efficient and innovative way to achieve the goal of effective copyright protection in the digital market. It is impossible to deny, however, that these innovative technologies raise serious questions about their compatibility with international, European, and national legislative frameworks, at least if we compare them with the original and most widely-used blockchain model (i.e., the so-called permissionless blockchain). Indeed, permissionless blockchains create a "law-free zone" resistant to any subsequent modification and judicial intervention. In this general context, this chapter aims to analyse the pros and cons of using blockchains and smart contracts in the context of copyright. It will also attempt to investigate possible legislative solutions at the national and supranational levels aimed at encouraging the use of these innovative technologies to the extent they are compatible with the existing regulatory framework.

INTRODUCTION

A constant variable in the history of copyright is its need to adapt to technological challenges, and copyright has always responded with great flexibility and expansive capability.

Technological innovation in recent years, especially in digital reproduction techniques and the development of the Internet, has severely tested the very survival of authorship exclusivity, which – albeit as a result of heated debates (Lessig, 2004) – has nevertheless been reaffirmed and probably also strengthened. It is a widespread and acceptable opinion that, since the end of the 1990s, the approach of the legislator – at the international, European and national level – has been directed towards a powerful reaffirmation of the proprietary paradigm of copyright and related rights in the digital environment, as evidenced in particular by the two WIPO Treaties of 20 December 1996 (WIPO Copyright Treaty–WCT

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and WIPO Performances and Phonograms Treaty–WPPT), as well as in the European context by Directive 2001/29/EC of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society (Pila & Torremans, 2019; Musso, 2018).

After years of using the Internet and digital reproduction techniques, it is almost superfluous to enumerate the possible critical issues related to the protection of copyright and related rights on intellectual works in the digital market: intellectual creations, once they are placed on the network, are potentially the subject of endless perfect and identical reproductions, and moreover, subject to a global dissemination that is difficult to stop.

Thus, the main demands of rights holders in view of the potential circulation of their works on the Internet could be summarised as follows: (a) prevention of illegal uploading of the work, if it has already been disseminated off line; (b) protection against duplication and/or alteration and/or further dissemination, if the creation has already been distributed on line; (c) reduction of transaction costs related to the stipulation of licences with users and/or providers of online services; (d) monitoring of the exploitation of the licensed work for the purposes of quantifying any royalties, as well as any other forms of fair compensation provided for by law.

In this perspective, it is significant that at the legislative level, the answer to the need to protect copyright in the light of new technologies has also been found in technological tools, according to the well-known maxim that if the problem is the machine, the machine itself will provide the solution (Clark, 1996; Lundblad, 2002).

This has come about especially through the recognition of the full legitimacy of "technological measures" and "electronic rights-management information" (Articles 6 and 7, Directive 2001/29/EC). However, despite the presence of very stringent and even anticipatory protection legislation, these technological tools – often jointly identified under the name of DRM (Digital Rights Management) systems – have not been fully successful in providing effective protection to rights holders, often due to their high costs, implementation difficulties, rapid obsolescence and related ease of circumvention by users and malicious hackers (Finck & Moscon, 2019; Savelyev, 2018; Tresise et al., 2018).

Finally, the birth and increasing adoption of the innovative technology known as blockchain, especially in combination with the use of smart contracts, has raised a chorus of voices welcoming it as an efficient way of protecting copyright on the Internet: the relative ease of use, the generally low costs, the total disintermediation and, above all, the substantial unassailability by unauthorised parties make the blockchain – in its main applications – capable of overcoming the main critical aspects of protecting copyright holders and the online use of their intellectual works (for a general overview, see Tan, 2020).

Although we are aware of the challenges posed to legal scholars by the high level of technicality of the subject matter, in the following paragraphs we will attempt to highlight the potential consequences, both positive and negative, deriving from this revolutionary mode of circulation of intellectual works.

More specifically, we will try to analyze how the main technical characteristics of blockchains and smart contracts - as summarized under par. 2 - could represent a challenge for the current European legal framework on copyright, in a contractual and non-contractual perspective. From the first point of view, for example, the non-modifiability of the contractual provisions contained in the blockchain could constitute a problem in light of the recent Directive 2019/790, since the latter requires Member States to adopt provisions that guarantee that licences can be adapted, in order to ensure fair remuneration to the right holders during the contractual relationship. From the copyright liability/infringement perspective, the difficulty of implementing measures to inhibit and/or remove illegal content from a blockchain is immediately evident: therefore, the removal procedures that ISPs would have to implement, autonomously

or at the request of a judicial or administrative authority, pursuant to and for the purposes of Articles 12-14 of Directive 2000/31/EC could appear technically unfeasible (for both aspects see par. 3.1).

And the above mentioned problems are more evident due to the self-execution of smart contracts and the anonymity - or rather pseudonymity - of their parties (see paragraphs 3.2 and 3.3).

Moreover, we will not fail to highlight the concerns – already put forward by several interpreters in more general terms in relation to the possible abuse of TPMs (Technological Protection Measures) – about raising insurmountable technological barriers that conflict with the free flow of ideas and collective cultural progress (see par. 3.5).

Within this framework, some final considerations will be devoted to the formulation of some proposals that could encourage the use of certain blockchain and smart contract models that are more compatible with the current regulatory framework. In general, we will come to the conclusion that currently the fully compliant blockchain model should be the "permissioned one", or at most some variation of hybrid models (more in detail see par. 4.1).

From a *de iure condendo* perspective, we believe that appropriate legislative interventions should favor the implementation of blockchains which, although permissionless, would at least consent the "identifiability" of the contractual parties, favouring the use of qualified or advanced signatures, or in any case provide forms of user identification for access to the technology as a prerequisite for the attribution of validity, efficacy or at least evidentiary value to the IT document (see par. 4.2).

Finally, it should be considered that this article does not take into consideration the specific legal issues related to the recent NFTs (Non-Fungible Tokens) market, which represents the most recent and currently most remunerated application of the blockchain model connected to the world of digital artistic works. In this context, the emergence of NFTs is raising many of the same questions about copyright law that will be described below, accompanied by specific issues not expressly considered in this paper (Bodò et al., 2021; Trautman, 2021; Steiner, 2021).

TECHNOLOGICAL BACKGROUND

Born from the evolution and combination of peer-to-peer networks and cryptographic techniques, the blockchain is essentially a computerised system of distributed ledgers (Distributed Ledger Technologies), whose characteristics are now generally known to legal scholars, at least in terms of the technical aspects with potential legal implications (De Filippi & Write, 2018).

Moreover, the exponential growth of blockchain use globally is striking: originally developed in the creation and use of a specific virtual currency (Bitcoin), it has quickly become a technological paradigm capable of combining transaction security with the absence of a central authority in charge of its control (Daley, 2020; Gambino, 2019; Moro Visconti, 2019). In short, across multiple and diverse sectors, blockchains are currently being successfully deployed to achieve an efficient combination of disintermediation and security, yet they raise significant questions about the need for its specific regulation at national and supranational levels (Noto La Diega & Stacey, 2019, p. 33; Agnikhotram & Kouroutakis, 2019; Jaccard, 2018).

Moreover, in its most recent evolution, blockchain technology constitutes the cornerstone of the implementation and use of numerous applications known as DApps, which include smart contracts, i.e. computer code incorporating instructions for the self-execution of the contractual regulations between the parties, whether contained in a separate documentation (analogue or digital) or entirely translated

into computer language within the smart contract itself, and which are of particular importance from a legal point of view (Szabo, 1994; Cuccuru, 2017; Jaccard, 2018; Maugeri, 2021; Stazi, 2019, p. 107).

Beyond the debate about the legal nature of this tool and its classification, it is wise to specify from the outset that smart contracts in the strict sense operate on blockchain technology and consequently incorporate the advantages and disadvantages typical thereof (Cuccuru, 2017, p. 107; Stazi, 2019, p. 119; Woebbeking, 2019; Maugeri, 2021, p. 28).

In greater detail, with specific reference to the protection of intellectual works in the digital environment, the technological features that could determine a profitable and efficient use by rights holders of blockchain technology and smart contracts are essentially the following:

- high level of security;
- (almost absolute) immutability of the data;
- (tendency towards) decentralisation or disintermediation;
- possible use of smart contracts;
- possible use of virtual currency.

Security and Immutability

As for the first aspect (i.e. security), in the current technological landscape, blockchains are particularly difficult for computer hackers to compromise, especially when compared to the traditional technological protection measures that have been used until now to protect intellectual works. From a technical point of view, this high level of security is essentially based on the use of asymmetric key cryptography and on the fact that a sequence of blocks is created through a continuous hashing process; in addition, transactions are replicated on each node of the network, so that the failure or the mere alteration of one of the network nodes does not lead to the loss of essential information, since it is always possible to reconstruct the correct sequence of the relevant operations.

The high security of blockchains is closely linked to the substantial immutability of the information recorded in each block: the modification of the data entered, however abstractly possible, is in fact extremely difficult, because it would require complex IT operations or the joint action of most of the mining nodes involved, which is all the more difficult the more widespread access to the mining platform is.

From a technological point of view, the possibility of an accidental hard fork in the blockchain exists, i.e. the eventuality that an existing open-source software protocol is copied, then modified or updated, which version is then distributed: if the two versions of the software are both implemented, there is the risk of having two conflicting versions of the same blockchain, with two diverging ledgers created at the time of the fork. Bitcoin's blockchain, for example, underwent an accidental hard fork in 2013 and Ethereum's blockchain had an unannounced fork in 2016, but in the end there was no loss or alteration of data.

In addition to the risk of uncontrolled forking, there is also the possibility of a "51 percent attack", which occurs when a group of mining nodes controlling at least 51 percent of the computational power of the network enters new data or alters data already recorded: the risk of attacks by 51 percent of the nodes is, however, almost non-existent given the enormous amount of computational power required to control more than half of the nodes in the network (Aiello, 2020, p. 10; Giaccaglia, p. 949).

Security and data immutability make blockchains particularly useful in solving some of the problems linked to transaction costs in the conclusion of contracts for the economic exploitation of intellectual

works: the existence of a registry containing the chain of transactions involving a given intellectual creation would allow potential assignees/licensees to easily and securely identify the owners of copyright and related rights, compensating for the current lack of efficient registration mechanisms for these works at the European and international level. Moreover, time stamps are created for each transaction, which would also allow potential disputes between different claimants to be resolved more efficiently than with the instruments currently used (Savelyev, 2018, p. 554; Noto La Diega & Stacey, 2019, p. 36; Moscon, 2020).

Of course, in order for this potential to be fully exploited, the creation of a single registry – preferably at the supranational level – or at least the guarantee of efficient interoperable systems between different blockchains would be advisable (see below).

However, it should be noted that the tendency for blockchains – and, consequently, smart contracts – to be immutable is also one of their main problems from a legal point of view.

Decentralization and Disintermediation

The characteristic decentralization of this technology derives from the absence of a central authority (public or private) in charge of controlling transactions; the validation of individual blocks that are added to the chain is delegated in fact to specific "mining" nodes through verification mechanisms that generally require a high computational effort, generally rewarded with certain quantities of virtual currency. This is the case of the so-called Proof of Work (PoW) system used in the Bitcoin blockchain.

Other systems such as Proof of Stake (PoS), Delegated Byzantine Fault Tolerance (DbFt), Proof of Elapsed Time (PoET), and Proof of Burn (PoB) share the distinctive and original feature of the Bitcoin blockchain in that there is no entity in a superior position able to identify, select, modify and possibly eliminate the other nodes of the chain (Aiello, 2020, p. 13; Stazi, 2019, p. 102).

The absence of controlling – and therefore intermediary – entities is often perceived by protection-seeking authors as positive, as it gives them the possibility to directly and safely manage information and transactions related to their works on digital platforms.

It should, however, be pointed out that the characteristics outlined so far are typical of the archetypal permissionless blockchain. Nevertheless, practice has led to the creation of other types of blockchain, in which these characteristics are absent or significantly reduced: here we refer to a permissioned blockchain characterised by the existence of an entity (of a public or private nature) in charge of controlling the platform. In these cases, there is a central authority that could be entrusted with the selection of the participants and of the contents uploaded on the blockchain, as well as with powers to modify them, thus potentially reducing the degree of security and immutability of the information contained in the blocks.

Halfway between these two types, there are various intermediate cases (so-called hybrid blockchains), whose degree of openness and disintermediation varies: in some cases, for example, access to them is made conditional on the existence of certain requirements, subject to the assessment of a plurality of subjects (so-called consortia); in others, although access is free, transactions are subject to the validation of a plurality of pre-selected nodes.

Based on what will be analysed here, permissioned blockchains – and to some extent also hybrid ones – are certainly more compatible with the world of law (copyright and others), at the cost, however, of losing all or some of those very specificities that have made such tools so successful (Savelyev, 2018, p. 550).

Smart Contracts and Cryptocurrencies

It is precisely the deployment of smart contracts that is one of the most relevant innovations linked to the new technology: the 'smart' contract, in fact, combines the capabilities of technological monitoring and DRM protection with the security and immutability typical of blockchains (Tresise et al., 2018, p. 6; Moscon, 2020). But above all as they rely on self-execution, they avoid the risks of breach of contract while protecting the rights holder from unauthorised use of the protected content.

Moreover, as a rule, payment for smart contracts is made in virtual currency, which – at least according to some observers – has proved to be particularly suitable for making so-called micro-payments for frequent limited and/or partial use of intellectual property.

In short, blockchain-based smart contracts can easily be used by copyright holders to manage the online use of their creations without the need for any intermediation by producers or other members of the cultural industry. But even in the case where authors continue to resort to entrepreneurial intermediation, licences granted to the intermediary via smart contracts can enable – thanks to the aforementioned features of the blockchain – a more efficient and continuous monitoring of the commercial exploitation of the licensed works and, therefore, a more correct quantification of royalties to the benefit of authors and artists (Savelyev, 2018, p. 552; O'Dair., 2016, p. 10).

And similar benefits could likewise arise from the regulation on blockchain platforms of the relationships between rights holders and collecting societies (Bodò et al., 2018, p. 329; Tresise et al., 2018, p. 10; O'Dair, 2016, P. 12).

These last two hypotheses, however, would presumably be realised through permissioned blockchains governed by the managing entity, thus partially distorting those characteristics of decentralisation and disintermediation that make such technologies so attractive to many users.

MAIN JURIDICAL PROBLEMS FOR COPYRIGHT PROTECTION DERIVING FROM THE USE OF BLOCKCHAINS AND SMART CONTRACTS

In the eyes of the jurist, the technological advantages briefly outlined in the previous paragraph cannot conceal the serious legal problems deriving from them and the connected risk that the law ends up abdicating its function of selection and regulation of opposing interests, totally delegating the regulation of private relationships to technology (Jaccard, 2018; Finck & Moscon, 2019, p. 83; Rothman, 2014). Someone, in this regard, has used the expression "lex mercatoria", or rather "lex cryptographia" (De Filippi & Wright, 2015; Agnikhotram & Kouroutakis, 2019), whose implications in technical-legal terms are still in the making and will likely be further amplified by the spread of the combination of blockchains and the Internet of Things (IoT), as well as more generally by the development of increasingly advanced artificial intelligence (AI) technologies.

Excluding these complex and general issues from the more modest and concrete objectives of this work, we limit ourselves to observing that the most relevant legal criticalities linked to the use of blockchains and smart contracts, in the context of transactions involving content protected by copyright and related rights, would seem to regard essentially the following:

- the inability to modify contractual provisions
- the so-called self-execution of the contract

- the anonymity of the parties, or rather their pseudonymity;
- the use of computer language;
- the potential suppression, in practice, of exceptions and free uses of intellectual works.

Non-Modifiability of the Contractual Provisions Contained in the Blockchain

As regards the first aspect, it has already been pointed out that the transactions contained in the individual blocks are substantially unchangeable, at least in the permissionless blockchain model. It is evident that such a situation makes it substantially impossible to revise, amend and/or supplement the contract, for whatever reason: a variation may be necessary, for instance, to correct initial mistakes in the contractual text, perhaps resulting from its translation into computer language, or to renegotiate the content of an agreement in order to adapt it to new circumstances.

The latter hypothesis, in particular, is significant in light of the current European legislation on copyright, since the recent Directive 2019/790 requires Member States to adopt provisions that guarantee that licences can be adapted to the actual commercial use of the protected content (including a right to revoke the assignment/licence), in order to ensure fair remuneration to the right holders during the contractual relationship (Articles 18-22).

More generally, therefore, whenever the modification of transactions on a blockchain and of the data contained therein is directly or indirectly required by law, it becomes difficult – and probably impossible – to execute, even for the judicial authority, if not perhaps by obliging the parties to implement the technological operations necessary to bring their respective juridical positions back into full compliance with the law.

Nor can it be overlooked that with specific reference to authorship protection, a problematic situation with no easy judicial resolution would be the inclusion of protected content in the blockchain by unauthorised parties, who misappropriate said content to exploit it commercially through smart contracts: blockchain technologies, in fact, are not able to solve the problem of "garbage in, garbage out", given that the authenticity of the information entered on the distributed register is not automatically guaranteed by the system when it is first entered (Bodò et al, 2018, p. 328; Bechini, 2018; Moscon, 2020, p. 142).

In such scenarios, the difficulty of implementing measures to inhibit and/or remove illegal content from a blockchain is immediately evident. Similarly, the removal procedures that ISPs would have to implement, autonomously or at the request of a judicial or administrative authority, pursuant to and for the purposes of Articles 12-14 of Directive 2000/31/EC appear technically unfeasible, except perhaps in cases where content is hosted on sites outside the blockchain (Savelyev, 2018, p. 556).

Self-Execution and Smart Contracts

The potential immutability of blockchains is amplified by the so-called self-execution of the smart contract. This execution is especially important in order to ensure remuneration for the use of the intellectual work: in the 'if/then' logic typical of the smart contract, certain contents will only be made available to users, within the limits of what is allowed by the assignment/licence, after the relative payment has been made. More generally, computer code performs certain actions upon the occurrence of specific conditions; these conditions may concern parameters internal to the network or, to the contrary, be related to the occurrence of a certain external event in the real world. In the latter case, smart contracts are programmed to take into account inputs from external sources deemed reliable (so-called oracles),

which monitor external data and communicate to the connected smart contracts the fulfilment of the relevant conditions (Bodò et al., 2018, p. 315; Cuccuru, 2017, p. 111).

It is evident how such a technological set-up – at least in the case of a permissionless blockchain – prevents recourse to all the judicial instruments designed to contrast contract pathologies (e.g. nullity, voidability) and/or possible supervening circumstances capable of compromising the parties' fulfilment (Giuliano, 2018, p. 989; Savelyev, 2018, p. 557; Woebbeking, 2019, p. 105).

After all, some of these situations could be foreseen and their consequences regulated in the electronic contract, which could also provide for the automatic recourse to arbitration bodies which, acting as mining nodes of the blockchain, could act directly on it after having made certain decisions (Parola et al., p. 687). These are, however, remedies that are left to the free will of the parties and to their ability (possibly through the use of legal and IT consultants) to fully and efficiently articulate the contractual text. Indeed, one cannot rule out the fact that this may not actually occur, also in view of the significant increase in transaction costs that the drafting of such a regulation would entail (Stazi, 2019, p. 184).

If, therefore, a smart contract does not already contain in itself the "antibodies" to deal with pathological situations and/or make the necessary adjustments to the contractual regulations, the only remedy that would seem to be abstractly conceivable is the judicial one, which, where possible, should take the form of obligations to carry out corrective operations aimed at reconciling the parties' respective interests on the IT platform; however, in the absence of a central authority in charge of managing the blockchain (i.e. in the case of a permissionless blockchain), such transactions would have to be carried out by the parties themselves, though how that would be done is not at all clear (see below).

Anonymity and Pseudonymity

One of the characteristics of a blockchain is the anonymity of the network nodes, whose identification is based on the combination of public and private keys and corresponding computer code consisting of alphanumeric strings: more correctly, it has been pointed out that this is not true anonymity, but pseudonomy, since through complex computer operations aimed at cross-referencing additional information present on the web, it would almost always be possible to trace the identity of a person who carries out a specific transaction (Cuccuru, 2017, p. 110).

It is clear however that – at least in permissionless blockchains – the contractual party of a smart contract is not in any way identified with his true personal details (e.g. name, address, tax code, company name, registered office, etc.), thus making it extremely difficult if not impossible for the counterparty to take legal action against him, as well as for any public authority to exercise its powers with respect to this undetermined subject. These difficulties are exacerbated by the aforementioned absence of a central control body on the platform (if permissionless) and the concrete impossibility for ISPs to adopt effective measures to remove and/or disable access to content entered into the blockchain.

In short, disintermediation and pseudonymity ultimately make legal protection for rights holders, as well as users of intellectual creations, extremely difficult (Bechini, 2018; Stazi, 2019, p. 143).

Computer Code

Judicial intervention is also particularly difficult from the perspective of the interpretation of the subject and content of the smart contract itself, given that the judicial authority will have to express its opinion in relation to a text that may be formulated exclusively in computer language: although the drafting of

a separate document containing the agreements of the smart contract is always desirable, it may be that such a document does not exist at all. In such cases, therefore, the judge will have no choice but to make use of the assistance of a technical consultant, whose interpretation of the contractual clauses, and consequent translation, will inevitably end up playing a decisive role in the final judgement.

Moreover, the same transposition into computer language of the provisions agreed upon between the parties will probably be entrusted to technical consultants, with a probable weakening of the lexical richness and of the related juridical nuances: in particular, it will be extremely difficult to include in the smart contract clauses with a general and flexible content aimed at regulating the correct execution of the contract (e.g. correctness and good faith), especially in light of the characteristic self-enforcement typical of smart contracts. More generally, it has been pointed out that transaction costs would only shift from the enforcement and monitoring of the obligations (as is the case in traditional agreements) to the design phase of the agreement, understood as its translation into computer code; it would thus be very likely that highly standardized and relatively simple agreements will be used, prepared by professionals, businesses and service providers who can absorb the costs of codification with a large-scale application of codified ''smart'' clauses (Cuccuru, 2017, p. 113).

Actually it is possible and quite frequent that digital transactions on the blockchain do not contain express licence terms that govern the related contractual relationship: in such a probable scenario it is even more difficult to interpret which rights on the digital work have been transferred and at what extent (see Steiner, 2021).

Copyright Exceptions and Limitations

The problems associated with the rigidity of the computer language used in smart contracts are particularly important in the context of free uses of copyrighted creations (Geiger, 2010; Okediji, 2017).

In fact, it is difficult to imagine how, within the framework of the contractual agreement, the legitimate user of the work could be guaranteed the exercise of free uses, which – since they may involve acts of reproduction or communication or otherwise making the contents available – will probably be prevented in advance by the smart contract, similarly to what generally occurs for the use of protected works.

The non-modifiability and self-execution of the 'smart' contract, moreover, do not allow due consideration to be given, either in an ex ante or an ex post perspective, to the legal concepts of indeterminate and flexible content underlying the free uses of users, such as those underlying the international principle of the three step test and/or the United States principle of fair use.

In short, the use of technology could prove to be a tool for making the protection of copyright holders and related rights more effective, but to the detriment of users and their free uses, which in turn underlie the protection of fundamental principles and freedoms, conceived in a complementary way to copyright exclusivity with the common goal of fostering the creation and dissemination of works for collective intellectual progress.

Again, this is not a new problem for copyright, at least since the spread of technological protection measures (TPMs). Moreover, as is well known, in balancing the conflicting interests at stake, the inclination of the European legislator seems to have shifted decisively in favour of online copyright exclusivity, granting broad protection to technological protection measures on one hand, and acting timidly on the harmonisation of mandatory free uses on the other (see especially Art. 5 of Directive 2001/29/EC). More specifically, for works that are released on the network, access to which is allowed on the basis of contractual clauses, the exceptions or free uses that may be recognised by individual Member

States are substantially left to private regulation, with the result that they can be effectively annulled by the application of TPMs (Mezzanotte, 2017; Ghidini, 2013; Finck & Moscon, 2019; Rothman, 2014).

However, the direction taken by the recent Directive 2019/790 is somewhat different. At least in the field of online content sharing platforms (Art. 17.7) it has made certain free uses mandatory (i.e. quotation, criticism, review, caricature, parody, pastiche), thus demonstrating a certain reversal of the trend, then confirmed by further provisions. The same directive in fact introduces other forms of free uses for text and data mining in favour of research organisations and cultural heritage institutions for scientific research purposes (Art. 3), as well as in favour of other users for the purpose of promoting the development of data analysis (although in this case it may be contractually excluded by the rights holder, see Art. 4). There is also an exception for the cross-border digital use of works and other materials exclusively for illustrative didactic purposes in educational institutions, albeit within certain limits (Art. 5), and an exception in favour of cultural heritage institutions for the reproduction of works permanently present in their collections for preservation purposes (Art. 6) (Dussolier, p. 981).

The compulsory nature of these free uses should therefore lead to the invalidity of contractual clauses – even those contained in the context of smart contracts – that prevent their use by legitimate users.

In addition to the difficulty of translating into computer language the content of certain free uses (e.g., for the purpose of caricature or teaching), there remain all the difficulties previously mentioned regarding the application of judicial review in relation to contracts whose content is difficult to understand and, in any case, cannot be modified, and which in practice illegally block the user in his potential freedom of choice. The risk, in short, is that the spread of smart contract licences ends up determining a progressive and unstoppable "closure" of knowledge and a gradual collective cultural impoverishment in the long term.

CONCLUSION

The observations made in the previous paragraphs show how the dialogue – or perhaps the conflict – between law and technology finds fertile ground in the context of transactions carried out through blockchain and smart contracts, accompanied by inexorable questions about the possibility and/or the advisability of legally regulating such pervasive and unstoppable phenomena, with respect to the evolution of which the legislator always ends up being at least one step behind. Just as it is inevitable that the legal interpreter will be faced with the hermeneutical problems arising from the attempt to apply the existing rules, and especially the general principles that can be deduced from the respective legal systems, to a technological context that is clearly tending towards self-regulation and self-enforcement.

Permissioned Blockchains and Their Legitimate and Efficient Uses

Well, starting from the (in our opinion) unquestionable premise that it is intolerable for the regulation of private relationships to be removed from the applicability of the law and the consequent judicial control, the only legally conceivable blockchain model should be a permissioned one, or at most some variation of hybrid models: only thanks to the presence of a management body could the selection and identification of the contractual parties, the modification/integration of the contents and the execution of judicial decisions be guaranteed in fact.

Admittedly, if only permissioned blockchains were allowed, the revolution promised by this technology would be greatly diminished; nevertheless, even these variants would have the merit of ensuring a high level of security and transparency of information, while allowing the use of specific applications, including smart contracts.

In this perspective, a concrete project that could be envisaged, towards which it would be worthwhile to direct the efforts of the international community, or at least of the European Union, is the implementation of a blockchain-based register – or a plurality of interconnected registers – under the aegis of an international and/or European institution, which would provide comprehensive visibility of the information concerning the complex of copyrights and related rights relating to a given work, also taking into account the subsequent transfers or licences that may apply to it.

Similar initiatives are being studied in several countries by public authorities and/or collective rights management bodies (Anderson, 2018; Bodò et al., 2018, p. 324; Daley, 2020; Moscon, 2020), but it is clear that their innovative scope grows exponentially in the hypothesis in which the aim is to create a data base as universal and complete as possible, characterised by a high level of transparency and security, capable of enabling information on intellectual works to be easily found, especially in the transnational perspective typical of online transactions.

In compliance with the Berne Convention (art. 5.2), as is well known, such a registration procedure could not be imposed by law in the member countries; national legislative systems, however, could indirectly encourage its use – e.g. by giving it a particular probative efficacy – as long as this does not lead to the surreptitious introduction of formalities constituting copyright.

The presence of such a register could also help to meet the burden of proof related to the "diligent search" required for the use of orphan works by some EU cultural institutions (Directive 2012/28/EU). In this context, some scholars have proposed the use of a blockchain to securely and transparently record the various search attempts of rights holders on allegedly orphan works, previously carried out through interconnected artificial intelligence systems, so as to fulfil the aforementioned probative obligation: it is understood, however, that such a system could be further improved through smart contracts that automatically license such works, within the limits and for the purposes allowed by law (Goldenfein et al., 2017; Tresise et al., 2018).

Finally, private and permission-based blockchains owned by authors, cultural enterprises or collecting societies could be usefully employed in the management of licences through smart contracts, in line with a practice that is already emerging in several sectors, including, as far as copyright is concerned, the music sector (Daley, 2020). Certainly, these are hypotheses that obviate the need for disintermediation on which the success of the most famous blockchains (e.g. Bitcoin, Ethereum) is based, thus partially frustrating the attempt of authors and artists to receive more appropriate remuneration; however, as mentioned above, the use of smart contracts could, in any case, facilitate the speed and certainty of royalty payments, especially if – thanks to a permission-based blockchain – an appropriate adjustment is envisaged in light of Articles 18-22 of Directive 2019/790.

And one could imagine extending to the platform manager the supervisory duties and responsibilities currently required by European legislation for the different types of Internet Service Providers (ISP): more specifically, it is plausible that Article 16 of Directive 2000/31/EC, aimed at defining the responsibilities of the hosting provider, would be directly applicable to the ISP (as well as, under certain conditions, article 17 of Directive 2019/790 /EU).

The Legitimacy of Permissionless Blockchains in the Current Legislative Framework: Some *De Iure Condendo* Proposals

The considerations made thus far photograph a reality – in part already existing, in part futuristic – that however is accompanied, and probably will continue to be accompanied, by a massive and parallel use of smart contracts on permissionless blockchains, whose main criticality, from the point of view of compatibility with the world of law, derives from the so-called automated enforcement and the consequent substantial exclusion of remedies offered by a judicial type of apparatus (Agnikhotram & Kouroutakis, 2019, p. 300).

Nevertheless, it appears highly unlikely that at a political and legislative level their spread will be hindered and their illegality confirmed because of the "law-free zone" that the use of such technologies can determine; on the contrary, the legitimacy of the archetypal form of permissionless blockchain has ended up receiving direct and indirect endorsement by supranational institutions and certain national legislatures (at a European level, see especially the European Parliament Resolution of 3 October 2018, entitled "Distributed ledger technologies and blockchains: building trust with disintermediation", and with specific reference to cryptocurrencies, Directive 2018/843/EU of 30 May 2018; for the regulatory situation in the U.S., see Stazi, 2019, p. 129).

Recent Italian legislation, too – Article 8-ter of Legislative Decree no. 135/2018 (converted into Law 12 February 2019, no. 12) – attempts to provide a legislative definition of the new technology, and analyses and describes the phenomenon in the perspective of blockchains with a high degree of disintermediation, presumably using the most widespread platforms such as Bitcoin and Ethereum as a reference parameter (see Aiello, 2020, p. 18; Giaccaglia, 2019, p. 941 ff.).

However, in the field of copyright, as well as in many other areas, the use of smart contracts applied to permissionless blockchains poses all the legal problems that have been outlined above.

Faced with the concrete impossibility of containing such a phenomenon, one could envisage general or sector-specific regulatory interventions aimed at encouraging the implementation of blockchains which, although permissionless, would at least partially limit the critical issues described above. To this end, it would be a good idea first of all to increase the "identifiability" of the contractual parties, favouring the use of qualified or advanced signatures, or in any case provide forms of user identification for access to the technology as a prerequisite for the attribution of validity, efficacy or at least evidentiary value to the IT document (Cuccuru, 2017, p. 116; Jaccard, 2018, p. 21; a different perspective is found in Verpaluu et al., 2020).

This is the direction in which the Italian legislator seems to be heading with the aforementioned Article 8-ter, pursuant to which smart contracts "meet the requirement of written form after the parties concerned have been identified electronically" (paragraph 2), through a process whose concrete definition is delegated to subsequent AGID (Italian Digital Agency) guidelines.

And it should be noted that with particular reference to contracts concerning intellectual works, the incentive value of this provision appears to be closely related to the written form *ad probationem* imposed on contracts for the sale/licensing of copyright by the Italian legal system (Art. 110 of the Copyright Act). In this perspective, also important is the attribution of the legal effects of electronic time validation to computer documents stored on DLTs, according to technical standards determined by the AGID (see art. 8-ter, paragraphs 3 and 4, Law no. 12/2019) (Faini, 2020).

Generally speaking, the possibility of being able to establish with relative certainty the identity of the contracting party and his/her personal details would undoubtedly make it easier to identify those responsible for any wrongdoing and take appropriate legal action against them.

Leaving aside the terminological question of whether such a blockchain should not rather be defined as 'hybrid' – if the prior identification of the user and/or the need for the use of a digital signature is interpreted as a 'selection' of the users in the broadest sense of the term –, such an architecture, capable of securely identifying the node owners even in the absence of a proper blockchain management body, could represent a compromise solution between the world of law and the maximum freedom and disintermediation typical of the original blockchain model. Moreover, several technological solutions would already appear available to achieve the goal of increasing independence from centralised identification mechanisms belonging to public or private certification authorities: for example, so-called "identity custodians", or self-sovereign digital identity models, i.e. DTLs in charge of providing participants with a digital identity (Bruschi, 2020; Tobin & Reed, 2017).

One could imagine, moreover, regulations providing incentives aimed at encouraging the adoption of arbitration mechanisms for dispute resolution within the blockchain itself and/or other technological tools capable of determining changes in the contractual content (or even the cancellation of the contract, if appropriate) upon the occurrence of certain events or conditions actionable by the parties (Jaccard, 2018, p. 7).

In a more general perspective, it would be desirable, even at the international level, to encourage the use of interoperable technologies, perhaps based on open source software.

The Still Unsolved Problem of Copyright Free Uses in the Digital Environment

Even with such solutions, however, with specific reference to the exploitation of works on the web, the aforementioned problems related to the effective recognition of free uses in favour of users would remain substantially unresolved, as they are increasingly difficult to guarantee in the light of the new technological framework. Even in this case, it cannot be ruled out a priori that in the future, developments in the field of artificial intelligence will succeed in implementing 'fair use by design' modes, capable of effectively combining the protectionist demands of rights holders with the needs of the community to have access to knowledge; but such a scenario still seems faraway and difficult to foresee (Elkin-Koren, 2017).

It would therefore be appropriate for the current technological framework to inaugurate a new season of debate on the appropriateness of reaffirming the protection of authors in the form of exclusive property rights: the plausible and progressive "locking up" of digital creations through blockchain and smart contracts – which does not adequately safeguard certain free uses – demands a comparative assessment of conceivable alternative ways of remuneration, direct or indirect, of rights holders for creations placed on the network (e.g. paying for free access and/or fair compensation), failing which global cultural growth is likely to decline. Of course, the implementation of these solutions would also have to be adequately assessed in the light of an appropriate differentiation between different types of creations and forms of use, but the debate – which has never been entirely settled – deserves to be revitalised in view of the risks inherent in the new technological tools for the use and negotiation of digital works.

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Chapter 10
Artificial Intelligence and Redress for Damages:
Fault, Strict Liability, Mandatory Insurance, Legal Personality, or No-Fault Schemes?

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ABSTRACT

Artificial intelligence has innumerable applications in society. Algorithms have a certain degree of autonomy in their functioning. Therefore, their "behaviour" evolves over time, and the relationship of cause and effect, as regards causation of damages, may be not linear as we believe. Results of AI activity may be unpredictable despite no flaw in design or implementation. Many proposals were made in order to adapt civil liability rules in this. The author drafts here a proposal grounded on the ideas that (1) overall benefits of artificial intelligence evolution outweigh costs deriving therefrom, so that it should be encouraged or, at least, not hindered; (2) "traditional" civil liability rules (either based on fault or strict liability) may provide a negative incentive toward such evolution, insofar as they may impose the obligation to pay redress onto producers and programmers of AI devices despite no flaw in design or implementation. He proposes, in this respect, no-fault redress schemes as an interesting and worthy regulatory strategy to this end.

INTRODUCTION

The current paradigm of civil liability laws can be understood as indirect market regulation, since the risk of incurring liability for damages provides an incentive to invest in safety ("deterrence"). It is believed, in fact, that any increase of liability to producers and suppliers of goods and services will increase investments in safety to avoid incurring liability, so that the tougher civil liability rules on producers and other professionals, the higher the overall level of safety within the system (Calabresi, 1970; Cooter & Ulen, 2008; Viscusi & Hersh, 2013).

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The idea that civil liability must have a deterrent function presupposes that the obligation to pay damages is attributed to the person whom the legal systems identifies as the addressee of such deterrence; the person, in other words, whose investment in safety is to be fostered. This paradigm has remained substantially constant over time and has developed on two main strategies for allocating the obligation to pay damages: liability for fault and strict liability.

The first and most important criterion for attributing the obligation to pay compensation for damages is that of fault, an idea which is deeply rooted in legal thinking (Comporti, 1965) and lies at the very foundation of all modern civil liability regimes (Bussani & Sebok, 2015). The aforementioned paradigmatic centrality of "deterrence" has evolved, but has remained in place, when most relevant social, political and economic changes directed legal thought toward a growing quest for solidarity in all western legal systems, regardless of their civil-law or common-law basic structure (in comparative perspective see: Taylor, 2015), which "reach similar results because they must address and resolve the same basic fact patterns" (Engle, 2009).

In fact, the quest for solidarity, greatly prompted by the factual consequences and upheavals derived after the industrial revolution, brought legislators to consider unjust that damages following certain (intrinsically risky) activities should be borne by consumers and other end-users of goods and services unless a "fault" of producers or other professionals could be proven in court. Therefore, throughout the whole XX century, legislators reallocated the cost of (some) accidents from customers and end-users to producers and other professionals, since the latter were thought to be in a better position to spread the cost of accidents and arrange for appropriate prevention policies (Calabresi, 1970; Comporti, 1965; Cooter, 1991).

This evolution was pursued through similar techniques in all western legal systems (mainly: the inversion of the burden of proof and the imposition of strict liability on producers and other professionals, the development of the precautionary principle in many fields of application *etc.*) and expanded the liability imposed on producers and other professionals to include cases in which the latter could not prove that the damage was not attributable to them, cases where there was scientific uncertainty as to the cause of the harmful effects or even cases where such cause was unknown (Faure et al., 2016; Montinaro, 2012).

The emergence of strict liability represented a mere incremental advancement of the same traditional paradigm of civil liability based on "deterrence": here "fault" has been conceptually replaced by that of strict liability simply to increase deterrence even in cases where the fault could not be assessed positively in court, with the aim of inducing producers and other professionals to further increase investments in safety (Comporti, 1965). Legislation, however, appeared to keep considering civil liability for its potential of deterrence.

The same (mere) evolution may be observed in the adoption of further loss-spreading techniques as provision of mandatory insurance for producers and professionals. In fact, also in this case the traditional paradigm based on deterrence is held and legislation limits itself to reallocate the *financial cost* or compensation onto insurance companies – that, in turn, ascribe it to their client, also by raising applicable insurance premiums.

BACKGROUND

The above mentioned paradigm, based on deterrence, may be considered nearly indisputable (Popper, 2011; Calabresi, 1970; EU Parliament, 2020. A similar approach seems to be implicit, e.g., within the

"*Principles of European Tort Law*", PETL drafted by the European Group on Tort Law, http://civil.udg.edu/php//index.php?id=129 – whose approach is somehow unavoidable, since it follows the current paradigm within European civil liability legislations in place).

As regards EU Member States' legislation (non-harmonised on the issue, with a few exceptions such as product liability under Directive 85/374/EC), domestic legislation generally provides fault-based liability, along with specific rules reversing of the burden of proof, establishing cases where strict and vicarious liability apply (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b, spec. §§ B.III.5 and B.III.4).

The situation appears to be the same as far as artificial intelligence (hereinafter also: AI) is concerned. It ought to be noted that in this chapter I will deal with programmers' and producers' liability only; any issue relating to users' liability fall outside the subject of this chapter. Within this issue, e.g., jurisdictions that already allow the experimental or regular use of highly or fully automated vehicles, either do not provide *ad hoc* liability rules (as it happens in Germany, France and UK) or do so but limit themselves to adding special mandatory insurance requirements (as in Italy and Spain) (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b, § 2).

The current debate seems to be based *only* on the traditional paradigm of civil liability, and is limited to discussing whether algorithms should be applied common fault rules (R. Abbott, 2018) or strict liability regimes (Buonanno, 2019), also pleading extension to AI of the rules on defective products (Borghetti, 2004) or on animals under the care of humans (Schaerer et al., 2009). Seldom it is proposed that application of "traditional" civil liability should be accompanied by attribution of legal personality to robots (see further, § 4).

The same approach is currently held by European Institutions. The Expert Group on Liability and New Technologies believes that future regulation may keep being designed either on (wrongdoers') fault-based liability or on (producers' and operators') strict liability, with "*no need to establish new kinds of compensation funds, funded and operated by the state or other institutions*" – with the sole exception, "*in the areas where compulsory liability insurance is introduced, a compensation fund is also in place to redress damage caused by an unidentified or uninsured technology*" (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b).

The European Parliament resolution of 20 October 2020 (EU Parliament, 2020) moves in the same direction. In its Whereas "A" it specifies that "liability" plays the role of providing "*the economic incentives for natural and legal persons to avoid causing harm or damage in the first place or price into their behaviour the risk of having to pay compensation*". Consistently, limits its scope only to set out rules for the civil liability claims "*against operators of AI-systems*" (art. 1) and provides a strict liability regime for high-risk AI-systems (art. 4) and a fault-based one for other AI-systems (art. 8).

Alternative proposals to this "traditional paradigm" (especially those showing that incentives produced on safety by civil liability rules may be not appropriate in some markets, e.g.: Viscusi, 2012, and highlighting how *ex ante* regulation prevents risks better than *ex post* civil liability e.g.: e.g.: Faure, 2015; Faure, 2014) are very rare in law literature, only in very few cases address AI specifically (Marchisio, 2021; Scherer, 2016), and appear to be substantially unheard to date.

MAIN FOCUS OF THE CHAPTER

The paradigm of civil liability based on deterrence has proven to be reliable and appropriate in several cases, in which increased liability resulted in higher investments in safer products and services. This happened, e.g., with reference to general consumer legislation enacted, among many others, through Council Directive 85/374/EEC of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products (EU Commission, 2020).

Such paradigm, however, may be ineffective/inappropriate with respect to AI (this will be specifically subject to experimentation/testing in this research), by reason of its peculiar features. In fact, AI, whose applications are very common and are present in every sector (Solaiman, 2017), is prone to the peculiar problem of having a certain degree of autonomy in its operation. Algorithms' "behaviour" evolves over time (and will do so much more in the near future), based on the information and feedback collected and processed by thousands of different shared sources ("machine learning", "deep learning", "neural networks" *etc.*). Algorithms do not only perform tasks, but also learn how to perform them over time (so-called "autonomy" of AI) (European Commission, 2019). This problem applies also to self-driving cars (Sprenger, 2020), which are particularly dealt with in my project as a study model (see below).

It can be considered quite frequent (and will be more frequent in the future) the possibility that algorithms "behave" very independently from the instructions initially provided by programmers. In this field, therefore, the relationship of cause and effect, as regards the causality of the damage, may be not linear anymore (Scherer, 2016) since the way causality works is no longer "Aristotelian" (Engle, 2009). As stated by the EU Expert Group on Liability and New Technologies, AI makes it questionable the adequacy of existing liability rules based on "anthropocentric and monocausal model of inflicting harm" (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b).

The results of the AI activity, therefore, could be unpredictable despite the absence of flaws in their design or implementation. This implies that algorithms may err in their "decision making" (Schönberger, 2019). Such a expansion of the area of "unknown", which is not capable of being predicted according to our current scientific methods (Beck, 1996), requires careful consideration of which redress regime should apply to damage caused by AI operation.

Of course, different uses in diverse contexts raise different concerns and require different rules on redress. In order to provide a clearer reference to the factual context referred to, for the scope of this chapter I define the area of interest with reference to AI algorithms characterized by a relevant degree of autonomy, execution of physical tasks and impact on human physical integrity, as it happens, e.g., with reference to self-driving cars and surgical robots (which can be taken as study models).

I claim that the said peculiar feature of AI makes application of the traditional paradigm of civil liability not useful to foster significant improvements of safety in AI and determine negative externalities, instead. The risk that business decisions may be taken depending on the liability regime in force at any given time within the relevant legal system is highlighted in literature (e.g.: Scherer, 2016).

In fact, compensation to damaged consumers and other end-users of AI requires, under the said traditional paradigm, that the obligation to pay compensation is imposed to programmers and producers of AI algorithms and devices (hereinafter also: Programmers and Producers), who are the only "someone" available to be imposed liability on (Hao, 2019). However, Programmers and Producers could not do much to forecast *unforeseeable* "behaviour" of AI algorithms, which would be influenced by innumerable variables provided by databases, big data gathering and feedback from end-users themselves, which are completely out of the reach and control of anyone.

This is why I believe that civil liability could not induce virtuous investments in safety as expected within the AI industry: in fact, no further investment, fostered by deterrence, could prevent such kind of *unforeseeable* risks. On the other hand, the application of the traditional paradigm of civil liability, especially when conceived as a strict liability regime, would expose Programmers and Producers to unpredictable and potentially unlimited claims for civil liability, with no possibility of reducing the risks by increasing investments in safety (with regard to damage following "unforeseeable" but "correct" behaviour of AI algorithms).

Therefore, it is likely that such an application would (contribute to) prevent them from entering the market or developing it, instead, thereby hampering technological progress (what is sometimes called the risk of "technology chilling": EU Independent High-Level Expert Group On Artificial Intelligence, 2019b; Viscusi & Moore, 1991), as it happened in the past, for equivalent reasons, in comparable sectors such as health care (on this comparability see: Gaine, 2003; Marchisio, 2020) with the so-called "defensive medicine" (Marchisio, 2020; OECD, 2006) which "occurs when doctors order tests, procedures, or visits, or avoid certain high-risk patients or procedures, primarily (but not necessarily solely) because of concern about malpractice liability" (U.S. Congress, Office of Technology Assessment, 1994).

One may note, of course, that "technology chilling" is not detectable in these times. Economic and business literature account for significant investments in AI (OECD, 2019) and international market races to deploy AI technology. Furthermore, AI has been used in finance for years and the application of the current civil liability regulation does not seem to have chilled that use until now.

This is true. However, recent AI applications (driverless cars, surgery applications *etc.*) show a wider and deeper exposure to risk than ever before. Other markets, e.g.: US commercial aviation industry, have shown that *ex ante* uncertainty on the allocation of the costs of accidents (coupled with the consequent fear of excessive litigation) "*may drive otherwise healthy companies outside the market*" (Leenes et al., 2017). Furthermore, a similar pattern of "chilling" *vis-à-vis* negative externalities has been observed, in the past, with regard to medical civil liability (OECD, 2006; Marchisio, 2020). A rich and valuable literature shows, in fact, that increases of medical civil liability do not produce further increments in safety (OECD, 2006, esp. 16) but, instead, often determine the adoption of "defensive" strategies ("defensive medicine") and impose very relevant negative externalities. It should be noted that the reference to civil medical liability, when it comes to tort law reform in the wake of AI, appears appropriate as the two systems show similarities in both incentives and (negative) externalities (Gaine, 2003; Marchisio, 2020).

Therefore, on the basis of available evidence and recent history, relating to different but comparable sectors, there is a well-founded fear that the application of the traditional paradigm of civil liability, based on deterrence, to AI could determine a "technology chilling" effect (whose risk and measurement will be among the objectives of the proposed research) which would impose significant negative externalities, since new technologies determine an important increase in safety and reduce the overall number and relevance of accidents (OECD, 2006).

Of course, one can hope that the problems do not arise. The idea behind this proposal is to act wiser and adapt the legislation in order to prevent such negative externalities from manifesting themselves in the first place (exactly as the European Parliament planned to act, e.g., in its resolution of 20 October 2020: EU Parliament, 2020), also in order to prevent investments in AI from moving away to non-EU countries (which would make it much more complicated to bring them back to Europe).

Issues, Controversies, and Problems

Such an outcome would be highly undesirable: available empirical evidence (Kizer & Blum, 2005; US Department of Transportation, 2017b) shows that the adoption of AI in carrying out specific activities determines a significant increase in safety and reduces the overall number and relevance of damage, injuries and deaths compared to human action, as it happens, e.g., in driving (US Department of Transportation, 2017a; US Department of Transportation, 2017b; US Department of Transportation, 2018) and health care (see, e.g.: Kizer & Blum, 2005). This means that technological innovation appears, at least with reference to specific sectors, a safer strategy than any other.

Use of AI and reliability of algorithms have the chance of increasing sharply in the next few years. The technical possibility to gather, process and manage big data, which shall evolve sharply also due to the pursue of open-access and open-data strategies by the EU, allows algorithms to operate more and more accurately, especially through machine learning and deep learning technologies. Also in this respect this process is already detectable in health care, which is on its way to robotisation (Kuznetsov & Syryamkin, 2015).

It is exactly for this reason that the European Parliament proposed "*creating a specific legal status for robots, so that at least the most sophisticated autonomous robots could be established as having the status of electronic persons with specific rights and obligations*" (EU Parliament, 2016a; Solaiman, 2017). The grounding behind this proposal was to use legal personality as a technique to impose liability to the robot alone and, therefore, isolate its obligations (including damages) from those of its Programmers and Producers. Many authors and institutions, and the same Expert Group on Liability and New Technologies (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b, § C.4), believe that such a proposal is not desirable (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b; EU Parliament, 2017; European Parliament, 2016a; Solaiman, 2017). However, the above-said proposal is much relevant within the present discussion, because it clearly shows the detected need to shift "*obligations*" away from Programmers and Producers when robots are capable of acting rather autonomously from their original design (Scherer, 2016).

If a risk of "technology chilling" is effectively in place, how could such a problem be addressed? The possibility that algorithms "behave" in a very different way from what was initially foreseen in their programming, so that they may "err" despite the absence of flaws in their design or implementation, was not foreseen when civil liability rules were designed. The only cases where liability for "unpredictable objects" is currently provided in civil law, such as liability for animals under the care of humans, relate to simple, detached and one-to-one relationships between "owner" and "damaged party" and are certainly not exportable to mass production of AI devices.

As relate to the so-called "law of the horse" controversy (Easterbrook, 1996; Lessig, 1999; Calo, 2015), my hypothesis (see also Marchisio, 2021; Marchisio, 2020) is that civil liability rooted on deterrence should not apply to "correct" functioning of AI and that future regulation should not relate to *what the algorithm actually does* but, instead, to *how the algorithm was designed* from the very beginning.

This idea is sometimes held in legal research when scholars propose that, within highly technological sectors, safety should be promoted mainly by definition of scientifically validated standards (depending, of course, on available knowledge) (Guerra, 2018). Recourse to *ex ante* definition of standards instead of *ex post* mechanisms of deterrence such as civil liability, in fact, is sometimes thought to be a more effective form of regulation within mass products (Viscusi, 1989). This direction seems worth being further developed and advanced in order to pursue a radical paradigmatic revolution within this field.

Definition of standards should be coupled, in my hypothesis, with a change of the current paradigm by taking into an higher account systemic needs. A prompt in this sense comes from the idea that redress obligations should be shifted away from Programmers and Producers when robots are capable of acting rather autonomously from their original design, which lies at the hearth of another proposal for new regulation of the matter (Scherer, 2016) and is upheld, in principle, also by the European Parliament (EU Parliament, 2016a; Solaiman, 2017).

Consequently, I believe that an appropriate new regulatory strategy should maintain redress in favour of damaged users but shift it away from Programmers and Producers (a similar proposal is made by Scherer, 2016) if an algorithm, programmed and developed in accordance with scientifically validated standards, occasionally *errs* and produces negative consequences despite no design or implementation flaws – which is the case from which the negative externalities highlighted above come from. This means that compliance with standards should constitute, in the AI environment, a sort of "adapted range of duties of care" (European Commission, 2019).

It should be noted that linking such evolution in civil liability legislation to the definition of standards is necessary in order to achieve the desired result, insofar as if a strict liability regime is in place (as proposed in the European Parliament resolution of 20 October 2020, which provides a strict liability regime for high-risk AI-systems in art. 4), Programmers and Producers could be held liable for damages even if no fault on their side is proven in court and, therefore, even if they *actually respected* pre-defined standards.

This proposal embodies the principle that intrinsically risky activities incorporate a certain percentage of risk that does *not* depend on the person performing them but on the activities themselves (Aven, 2016; Beck 1996). However, instead of allocating the consequent costs on Programmers and Producers (as "traditional" strict liability would do: Calabresi, 1970; Comporti, 1965; Cooter, 1991), it differently *spreads* the relative costs (depending on the selected model: on the whole category, on the whole sector, on taxpayers *etc.*). A model based on such a principle would better incorporate the idea that errors occur and, in some sectors, will occur regardless of the severity of the civil liability rules in force. Modernisation widened the area of "unknown" and the following risks escape from what is capable of being predicted pursuant to our current scientific methods (Beck, 1996).

Such a conclusion should lead to discarding the "blame culture", which inspires and supports the current law on civil liability, and replacing it, at least in some cases (as briefly discussed here) with a "no-blame culture", rooted in risk management (J. Reason, 1990) and scientifically validated standardisation. Lawyers and legislators should catch up with the risk management literature on this point.

The above proposed release of Programmers and Producers from redress obligations, however, *should not* lead to prevent damaged customers and end-users from getting compensation. This would be inconsistent with the "solidarity" approach that now pervades juridical systems (Taylor, 2015; Calabresi, 1970; Comporti, 1965) and would contradict the principle of "functional equivalence", according to which compensation should not be denied in a situation involving emerging digital technologies "when there would be compensation in a functionally equivalent situation involving human conduct and conventional technology" (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b). This principle may anyway tolerate that redress is somehow confined as it generally happens in "no-fault" schemes.

In this sense, I see room for relevant legislation to evolve from an issue of civil liability into one of financial management of losses. In my view, one of the most interesting alternatives available in current legal thought, which would be suitable to meet the above needs and to resolve the risk of "technology chilling", would be adoption of a "no-fault" systems, which would provide redress to damaged users by

a dedicated fund regardless of any fault by the agent being established. The idea that intrinsically risky activities incorporate a certain percentage of risk that does *not* depend on the person performing them but on the activities themselves (Aven, 2016; Beck 1996) is currently considered a valid grounding to *aggravate* (strict) liability on Programmers and Producers (Calabresi, 1970; Comporti, 1965; Cooter, 1991). Given potential ineffectiveness of deterrence in these cases, in my proposal I will attempt to discard the "blame culture" and replace it, at least with reference to AI, with a "no-blame culture", rooted in risk management (Reason, 1990).

Such a strategy is currently adopted in different jurisdictions in different areas such as medical damage (see, in general: OECD, 2006; Marchisio, 2020); adverse effects attributed to vaccination (World Health Organisation, 2009); damages coming from unknown drivers (see, e.g., the whole Chapt. 4, art. 10-11 in Directive 2009/103/EC of the European Parliament and of the Council of 16 September 2009, "*relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability*") *etc.*.

Adoption of a "no-fault" scheme instead of civil liability, moreover, could also contribute resolving other weaknesses inherent in the traditional paradigm of civil liability (OECD, 2006; Atiyah, 1997). One can mention, here, the risk of civil liability turning into a "damages lottery" due to the fact that, in some cases, the damages cannot be awarded because no one is at fault in the specific event or contrasts in case-law make the content of the single sentences unpredictable. It is also possible to report the case in which damages cannot be collected because the debtor is (in many instances: deliberately) unable to pay (Atiyah, 1997).

More Issues, Controversies, and Problems

Of course, any redress proposal alternative to civil liability will need be appropriately coordinated with the legal and economic context it is called to operate in, with respect to the most relevant features of the adopted model. As a mere example, with reference to no-fault schemes, the most relevant variables currently identified by researchers relate to the eligibility criteria for compensation; if the compensation is paid automatically upon occurrence of the event or an avoidability standard is adopted; whether or not the system prevents continuous access to the courts; how the program is funded; whether or not the compensation is imposed a financial cap; the definition of the financial entitlement (Dickson et al., 2016).

Moreover, among the first issues that will need to be headed there is an inquiry on what it takes to establish "scientifically validated" standards. These include the issues of who (public body, certified experts *etc.*) should be in charge of defining them and how (at national, supranational, international, global level) *etc.* (the issue is dealt with, with special reference to the EU, e.g. by Guerra, 2018).

Another specific issue relates to the need of certification following self-learning by *specific* AI devices. In these cases, *each* algorithm could "learn" items that are different from those learned by any other one and could consequently modify the way it operates in original and even unfamiliar ways. Here, also building on current research on this problem (Whittlestone & Clark, 2021), safety requirements should require that each AI-system capable of self-learning has a memory of who took each decision performed (human or the algorithm itself) and of all self-learning developed over time (tracking). Any evolution of the algorithm developed through self-learning should be automatically ineffective until it is expressly validated (i.e.: certified) by a dedicated normative body. Such a dedicated normative body should monitor each AI-system active on the market and examine all evolutions of each algorithm developed through self-learning and expressly decide whether to certify each evolution of algorithms

developed through self-learning or not. If certification is granted to the single AI-system, its adoption could be considered as a update to be released to *all* AI-systems if it deems it appropriate. If certification is not granted, certification should be denied and the evolution under exam should be *remotely cancelled* from the AI-system that developed it.

If a "no-fault" scheme is adopted as a valid alternative (on which issue there is no convergence: see, e.g., *contra*: Wagner, 2012), it is also necessary to study how risk management could match the reduction of incentives to invest in security deriving from the de-application of civil liability based on deterrence (Howell et al., 2002). In fact, "no-fault" schemes in health-care raise concerns as to their appropriateness to limit the risk of moral hazard, since "*the principal weakness of no-fault schemes is the difficulty of ensuring that the socially optimal amount of care is taken by potential loss-causers, as the links between their potential to cause loss and the costs of their actions are severed*" (Howell et al., 2002).

In the same case, an appropriate set of principles/rules about financial management of losses that is based on solidarity mechanisms should be developed, along with definition of principles/rules on the sources for compensating damages, taking into account the evidence coming from existing schemes and relevant literature. The possibility to adopt a table system for definition of standardized amounts of compensation could also be appropriate, in this case reporting current table systems potentially useful for reference (e.g., as regards physical injuries, those adopted in insurance law to determine compensation after medical malpractice).

Finally, alternative redress models should integrate and coordinate with the legal system, as regards, e.g.: general liability legislation, consumer law, competition law, relevant pieces of criminal law (e.g. on injuries) *etc.*.

CONCLUSION

As noted above, the intensive use of artificial intelligence in several sectors is very likely to reduce overall risks and harm compared to human action. However, it can give rise to particular risks and harms in specific cases. In this article I have examined, in particular, the risks associated with the capacity of AI algorithms to act in a rather autonomous way from their original design.

From a systemic point of view, the overall benefits of artificial intelligence outweigh the resulting costs. Therefore, technological evolution should be encouraged or, at least, not hindered.

I believe that "traditional" civil liability rules can provide a negative incentive towards such evolution, as they can impose the obligation to pay compensation on producers and programmers of AI devices despite no design or implementation flaws. In these cases, I claim that civil liability would provide no virtuous deterrence to utmost care, but would mainly discourage technological progress, instead. Therefore, AI creates new challenges with regard to civil liability, which must balance adequate compensation to victims with the need not to hinder technological innovation (EU Commission 2020).

No-fault compensation schemes could be an interesting and worthy regulatory strategy for that purpose, in order to allow an evolution of the matter from an issue of civil liability into one of financial management of losses, with respect to the cases where damage is caused by "correct" functioning of AI. In this cases, I propose that regulation should be based on the definition of scientifically validated standards (Guerra, 2018). Of course, as scientific knowledge evolves, standards should evolve correspondingly (however, the cost of unpredictable accidents should not be borne by Programmers and Manufacturers until their cause is ascertained – and, therefore, accidents become *expectable*).

Compliance with these standards should constitute, in the AI environment, a sort of "*adapted range of duties of care*" (EU Independent High-Level Expert Group On Artificial Intelligence, 2019b), which is considered a more effective form of regulation within mass products (Viscusi, 1989). Therefore, if the damage derives from an unexpected/unforeseeable "correct" functioning of AI and the algorithm/device complies with defined scientifically validated standards (i.e.: the algorithm "errs" despite no design or implementation flaws), then the "no-fault" scheme should apply, in order not to impose redress obligation to Programmers and Producers (similar proposals are found, albeit very rarely, in law literature: Marchisio, 2021; Scherer, 2016). This would contribute to remedy the negative externalities and "technology chilling" examined above.

If the algorithm/device does not comply with defined scientifically validated standards, on the other hand, "common" civil liability rules should apply. In this respect, it appears reasonable the principle laid down by the European Parliament resolution of 20 October 2020, which provides a strict liability regime for high-risk AI-systems (art. 4) and a fault-based one for other ones (art. 8).

Said in other words: with reference to the AI markets, the evolution toward a "no-fault" system should not abrogate the traditional civil liability paradigm rooted in deterrence. Instead, both of them should coexist as independent and alternative techniques of compensation (a sort of "double track" legislation on damages), in order to exploit the advantages that each of them gives, restricting their defects from their reciprocal interaction.

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Chapter 11
Old Rules for New Tools:
Traditional Liability Rules and Technological Development

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ABSTRACT

The aim of this chapter is to investigate the features and problems posed by the damages that may be caused by the surge of new technologies, such as drones, artificial intelligence, and robots, and the solution found to those problems using the traditional civil liability tools of liability for fault, strict liability, and compulsory insurance. Notwithstanding the theoretically possible different remedies that could be applied in these cases, the authors discover that the traditional tools of liability for fault, strict liability, and compulsory insurance are most probably the best suited for the compensation of the damages caused by the new technologies.

INTRODUCTION

The development of new technologies always entails the problem of the compensation of the damages that the new technologies may directly or indirectly cause to third parties or their assets. This issue may be especially problematic in times where a wave of new technologies, endowed by new features, suddenly invades the society.

Nowadays we are the spectators of one of these surges of new problematic issues concerning the compensation of damages caused by the use of new technologies. Think, for example, about drones, autonomous vehicles, big data and smart contracts. All these new technologies often pose challenges to the compensation of the damages they may cause, because of some of their features or characteristics. The seriousness of these challenges is heightened by the amplitude of the amount of the damages that may be the consequence of the use of these new technologies, such as in cases of robotic failure, or automatic vehicle street incidents.

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Scholars and legal practitioners are called to elaborate solutions to these challenges, using legal instruments appropriate to the purposes of the protection of those that may be harmed by the new technologies, but also taking into consideration the need not to interfere with the economically and socially advantageous technological developments. This task has been sometimes performed using traditional legal tools, and at other times, especially if the task was carried out by scholars, notoriously more inclined to fully use the freedom that is granted to them by their academic position, developing innovative solutions (Gunkel, 2018; Pagallo, Corrales, Fenwick, Forgó, 2018).

If we look more closely at the European system, which we know best and that which most directly concerns our field of interest, we may realize that after a period of ferment and heated debate among legal academics and practitioners, on the legal tools that should be used to better regulate the risks and the compensation of the damages arising from new technological tools, we have recently finally reached the point where most of the discussions have been finally settled. The solution found at a European level is, very simply, the application to the new cases of the traditional rules that have long been used by both national systems and European legislation: liability for fault, strict liability, reversal of the onus of proof, joint and several liability of multiple tortfeasors, compulsory insurance.

The purpose of the following sections is therefore to investigate the evolution of those prominent liability rules and their application to the new technological tools, starting from the first cases of damages caused by technological development to today and taking mainly into consideration, for reasons of limited space and opportunity, the European experience.

THE EVOLUTION OF THE COMPENSATION OF TECHNOLOGICAL DAMAGES IN THE XIXTH AND XXTH CENTURY

Legal history offers plenty of examples where the introduction of a new technology started a heated public and legal debate on what remedies should be offered to the damaged parties, if any, and who should bear the responsibility for those damages.

One of the most notorious cases is that of the construction of railways during the XIXth Century, which in many countries caused a long lasting political and legal fight between the old social class of the land owners and the rising social class of the entrepreneurs. The issue at stake was that of finding a balance between the rights and the economic interests of the land owners, who were first deprived of their lands in force of expropriations aimed at building the railways tracks and then, once the railways were built and operative, damaged by the fires caused by the sparks of the train engines, and the rights and commercial interests of the entrepreneurs, who built and ran the railways, fostering the general increase of industries and commercial activities (Martín-Casals, 2010; Kostal, 1994 Kleeberg, 2003; Gregory, 1951; Rabin, 1981; Schwartz, 1981; Schwartz, 1988-1989).

Under a legal profile, those cases faced the courts and the legislators with the thorny choice between two different possible sets of applicable rules. On one hand they may choose to apply to these cases the traditional liability for fault rule based on the negligence of the tortfeasor, which requiring the petitioners to prove the negligence of the defendant may often favour the railways owners to the detriment of the landlords. On the other hand, they may instead opt for the application of the liability for fault rule joined with the presumption of the fault of the defendant, which implies the obligation of the defendants to prove they had not acted negligently, or the use of the strict liability rule, which allows the defendants

to free themselves from the liability only when they could prove that something outside their sphere of control happened.

In the end, the second approach was largely and generally adopted by most western legal systems, not only in cases of railway damages, but also in the large number of cases of damages caused by motor vehicles, that shortly after arose, or of damages caused by industrial tools or chemical products. The underpinning ratio of this choice resides in the idea that if somebody causes a harm as the consequence of an industrial or commercial activity, the compensation of the damages arising out of that harm should be borne by who is advantaged by the same industrial or commercial activity, and not by the natural or legal person damaged by it. That idea still generally permeates most of the western legal systems, as we shall see when we deal with the problems arising out of the new technologies.

The legal and judicial development concerning the compensation of the damages caused by the railways was the first step of the establishment of two pillars of the modern rules on liability for the damages caused by technological development.

First, it was established by some courts that in cases where liability for fault applies, and the defendant was in a special relationship with the victim, and this relationship entailed some special duties of the defendant to protect the victim against the damages that actually arose (such as in the cases of workers' compensation, consumers' compensation and similar other cases where there exists a disproportion in the balance of powers between defendant and victim), the defendant's fault could be presumed.

Second, it was also held that when a person engages in a profitable activity that may cause damages to third parties, such as using vehicles, new tools and products, the legislator may enact legal provisions aimed to better protect the potential victims of those activities, enforcing strict liability rules. In both cases, in the end, the result of the application of the two different set of rules will be that the victims of the new technological tools shall be exempted from proving the existence of the negligence of the defendant.

The first system of ascertainment of the liability of the defendant for the damages caused by new tools or products was mainly used as a strategy applied by courts to overcome the difficulties that may be encountered in compensating the victims of the technological development in difficult cases, where it may often be cumbersome and costly for the victim to prove the negligence of the defendant. The second system is, on the contrary, an explicit political choice, made by the legislator, to shift the consequences of the damages occurred to the victims on the defendants, without letting them eliminate that responsibility but when they can prove that those damages were the consequence of unexpected events. A political choice motivated by the fact that those damages are the consequence of activities that are performed under the sphere of control of the defendants and the source of their profits.

In the following XXth century, another stream of tortious cases caused by technological development soon emerged, characterized by peculiar features, chiefly the fact that the damages were caused by the toxic effects on humans or other living beings of chemicals, pharmaceuticals or other products, that they affected large numbers of persons or living beings, and that it was often difficult to ascertain with a certain degree of certainty if the damages claimed were actually the consequence of the toxic products and in what measure. Because of those features, those categories of damages were called "toxic torts" or "mass damages" (Cranor, 2006).

Although courts and legislators were already well trained in examining cases of damages caused by the technological development, the unique features of these cases, especially those concerning the ascertainment of the causal link between the toxic product and the insurgence of the harm, gave rise to a completely new array of problems, to which a definitive answer has not been found to this day. In fact, only some of these damages can, for example, be classified as *"signature diseases",* or in general be

interpreted as signature harms, that is to say as marked by a close connection to a certain toxic substance. On the contrary, most of these damages may be classified as "*multifactorial*", that is to say as damages that may find their sources in many different factors, each of them sufficient to cause the harm. Harms that, moreover, may arise a long time after the exposure to or the ingestion of the toxic substance, making the ascertainment of the causal link between harm and agent even more complicated. Last but not least, it should be remembered that even scientific expertise may be of little help in these cases, as the reasoning of scientists is normally expressed in probabilistic terms, while lawyers need a yes-no answer to attain a legal solution in damages cases.

The first cases of toxic torts arose, as we all know, in the United States and in Europe in the 70s, with the notorious cases of Talidomide, a drug against the pregnant women nausea that, it was later discovered, may cause the serious deformity or death of the foetus, and which is thought to have caused around 12.000 cases of birth defects in Europe and 40.000 in the United States (Hilts, 2003). That was most probably the first occasion where the courts faced the difficulties in ascertaining the link of causation between the assumption of a drug and its noxious effects, using the traditional legal tools of reasoning. The outcomes in the different countries were dissimilar, although all of them had to face the difficulties in demonstrating that the petitioners actually used the drug and that the deformities or deaths of the foetus was the consequence of that same drug. So, if in England most of the damaged parties were not able to recover the damages, because the transaction approved by the English court between the drug producers and the victims provided that these latter had to prove that the harm suffered was caused by the drug (Goldberg, 1999, pp. 17-19)[1], in the United States the courts favoured the public opinion over the rules of civil liability for negligence, providing the duty of the petitioner to prove the liability of the defendant (Cane, 1997, p. 232), with heavy economic consequences for the manufacturer (Green, 1997, p. 89). In Germany, instead, the producer was sentenced in a criminal court to pay a large amount of money to a fund, that was aimed to compensate the victims of the drug (Koch, 2001)[2]. Shortly after the German parliament enacted a law providing for the strict liability of the manufacturers of pharmaceutical products, for the damages caused by their drugs[3].

In the following years a new stream of cases emerged, that of the damages related to the use of Diethylstilbestrol, generally shortened for DES, a drug used for a number of feminine diseases, used by probably 4-6 million women before being outlawed, when it was discovered that it could cause cancers to the daughters of the women who had used it in the first three months of pregnancy to avoid a possible abortion.

Many of the victims acted in the United States for the compensation of the damages suffered. But, contrary to the cases related to Talidomide we examined before, in these cases, while it was easy to prove that the drug was the cause of the cancers, the problem was that more than one manufacturer produced the same drugs, and it was impossible to prove which one or ones of the manufacturers produced the drugs used in each case. In those cases, the application of the traditional civil liability rules to prove the liability of the defendant would have left the victims uncompensated, and the application of the presumption of the liability of all the manufacturers, along with the joint and several liability of all of them, would have put all the burden of the compensation on a few of the manufacturers. Some of the U.S.A. courts tried to find a solution to this conundrum by elaborating a system of partial liability, generally called *market share liability*, that provided for the shared liability of all the producers of the drug, in proportion to the market share of each manufacturer (Delgado, 1982; Gifford, Pasicolan, 2006)[4].

That solution was not accepted by all the courts in the United States, as some of them explicitly refused to apply the market share liability system not only to cases of DES[5], but also to cases of vaccines[6] and

asbestos (Geistfeld, 2006)[7], stating that these rules were inconsistent with the rules concerning liability for fault, and in the case of asbestos that their application would have automatically transformed every defendant in the insurer of the others. That rule was not adopted as well by other foreign courts, and was even explicitly excluded by a Court in the Netherlands, which stated instead the existence of the joint and several liability of the defendants (Hondius, 1994)[8].

These cases added another pillar to the set of rules that could be applied to cases of damages caused by technological progress, that is to say the general rule that, unless otherwise provided, when a damage is caused by a number of possible tortfeasors and it is impossible to determine which one actually caused the harm, all the potential tortfeasors are to be held jointly and severally liable for the compensation of the damages, contrary to the traditional rule requiring the defendant to prove which one of them was liable for the damages.

Last but not least, before moving on, we have to take into consideration the development of the instrument of insurance, which may provide the protected party with a quick and sure compensation of the whole damages or part of them. The insurance instrument is generally economically advantageous for all the parties involved, as it saves the insured party the costs of the judicial procedures and spreads the costs of the compensation over a wider number of persons.

A voluntary insurance is the one stipulated by the subject that is exposed to the risk of damages or by the subject that is obliged to compensate third party damages, while compulsory insurance is those insurances imposed by provisions of law or managed by public authorities. The choice of a number of legislators to impose a compulsory insurance in certain sectors of activities is justified by their actual economic efficiency and by the need to protect the parties involved. Common examples of compulsory insurance is that on vehicle circulation, that was introduced starting from the 60s in many European Member States and now is provided for in all the European Member States by the Directive 2009/103/EC of the European Parliament and of the Council of 16 September 2009 relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability. Article 3 of the cited Directive, titled "Compulsory insurance of vehicles" states that Each Member State is obliged to *"take all appropriate measures to ensure that civil liability in respect of the use of vehicles normally based in its territory is covered by insurance"*. Needless to say that the necessity for compulsory insurance for car accidents arose from the large number of victims and damages originated by the increase in vehicle circulation starting from the 50s.

Another widespread category of compulsory insurance is that for the damages suffered by the workers during their occupational activities. Even in this case, the necessity to insure the workers against the possible harms or illnesses suffered because of their working activities arose at the end of the XIXth century, when large numbers of workers started to be employed in modern factories, and consequently to be exposed to the risks of the new technologies, such as factory equipment or dangerous products. The first occupational accidents insurances were first established at the end of the XIXth (for example in Germany in 1884 and in Italy in 1898) and transformed into compulsory systems starting from the turn of the century.

THE PROBLEMS ARISING OUT OF THE NEW TECHNOLOGIES AND THE POSSIBLE SOLUTIONS: DRONES, ROBOTS AND AI

The Choice Between Traditional and Innovative Solutions

The new generation of technological products, such as drones, robots and A.I., features characteristics such as autonomy, self-learning and adaptative abilities that pose new challenges to the tort liability system.

Those products are in fact endowed with a capacity to act and evolve that is generally unknown to the products of the former technological revolution, mainly in force of their ability to autonomously adapt to different situations, choose among different options and in some cases also learn from past experiences. These features, that apparently endow these products of an independent and autonomous life, have probably fascinated some legal scholars to such an extent, that they sometimes have affirmed that traditional legal rules, included those on the compensation liability for the damages caused, are certainly not suitable to the peculiar characteristics of these new tools.

Many inventive solutions have therefore been offered by some scholars to find a viable answer to these problems. We may remember here, among the many (Chopra, White, 2004; Coeckelbergh, 2011; Vincent, 2017), two outstanding theories: the proposal of Teubner (2006) to endow robots of a limited subjectivity, with all the legal consequences for the cases where they would cause damages to third parties or that of Pagallo (2013) to endow robots with their own estate, having the goal to compensate the damages that the robot could eventually cause.

Although it is impossible to deny the elegance and inventiveness of these proposals, nonetheless they seem to overlook the fact that most of the western legal systems already have long time established traditional rules of tortious liability, which are generally quite successful in dealing with the compensation of damages caused by technological development. I am talking about the strict liability rule, the liability for fault, the joint and several liability and the compulsory insurance, which was examined in the previous chapter.

Moreover, those same remedies have frequently proved to be quite efficient in protecting the victims of the new technologies, while the more inventive, new proposals, separating the liability for the damages caused by the tools from the persons actually advantaged by the use of the same technological tools, not only often lacks in practicality but also may limit the damages that could be recovered by the victims. Moreover, it should not be forgotten that, generally, western legal systems rather prefer compensation rules offering an adequate protection to the victims of the new technologies, when those victims cannot be blamed for the damages suffered and the new technology is a source of earning for a determined person or persons.

In fact, provided that the legislator is able to clearly identify the persons that are deemed to be strictly liable for the damages caused by the robots, or drones or AI, in force of their relationship with these latter, the victims can easily ask these liable persons for the compensation of the damages suffered. Moreover, when the law obliges those same persons to insure themselves for the damages that the activity of the tools may cause to third parties, the victims' compensation rights are secured. While in those cases where the liability cannot be imposed in force of a qualified relationship between the tools and the tortfeasors, such as the cases of use of the robot or of the drone by a person not having a qualified relationship with it, the traditional liability for fault rules may apply, eventually joined to the strict liability of the person having a qualified relationship with the robot.

In sum, the old rules of strict liability, compulsory insurance and liability for fault may be able to successfully cover all the cases of damages caused by robots, AI and drones, provided that the legislator is able to identify the persons charged of the strict liability and of the compulsory insurance duty and, eventually, to clearly depict the rules on the liability for fault to be applied were needed.

Although lacking the charm of more elegant and imaginative theories, this approach is probably the most practical, economic and straightforward for cases of robot, drones and AI damages compensation, as it uses rules that are already well known by lawyers and courts, and that have already proved to be very effective. In support of these considerations, it is probably telling that this approach is also the one followed by the European Union in two different cases.

The first case is that concerning the compensation of damages arising out of the use of drones, which was disciplined at the European level by the Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft and Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems.

The second set of rules is that concerning the compensation of damages arising out of the use of robots and AI products, which is still at a preparatory stage but on which a lot could be said from the reading of the European Parliament Resolution of 16th February 2017 with recommendations to the Commission on Civil Law rules on Robotics and of the European Commission White Paper on Artificial Intelligence - A European approach to excellence and trust and the accompanying Report from the Commission to the European Parliament, the Council and the European Economic and Social Committee Report on the Safety and Liability Implications of Artificial Intelligence, the Internet of Things and Robotics of 19th February 2020, making some proposals to overcome supposed legislative gaps.

Our purpose, now, is therefore to investigate the approach used by the European Parliament and Commission in cases of damages caused on one hand by drones and on the other hand by Artificial Intelligence and robots, to ascertain which legal tools they consider more apt in these cases and the reasoning beneath these choices.

Dealing with Drones under European Law

The first example of the use, by the European Union legislator, of the traditional legal rules in cases of damages caused by new technologies is that of the damages caused by drones (Bertolini, 2018).

If we read the Commission Implementing Regulation (EU) 2019/947 of 24 May 2019 on the rules and procedures for the operation of unmanned aircraft and the Commission Delegated Regulation (EU) 2019/945 of 12 March 2019 on unmanned aircraft systems and on third-country operators of unmanned aircraft systems, it is very easy to realize that the European legislator chose to use the traditional rules of strict liability and compulsory insurance also in cases of damages caused by drones.

Beware that the category of drones includes both autonomous and non-autonomous drones. The first are able to conduct a safe flight without the intervention of a pilot, but with the help of artificial intelligence, which enables them to cope with all kinds of unforeseen and unpredictable emergency situations. While the non-autonomous drone with automatic operation flies pre-determined routes defined by the drone operator before starting the flight and, when it encounters unforeseen events for which it has not been programmed, the remote pilot must intervene, taking control of the drone. Non-autonomous drones without automatic operations must be flown, for the duration of the whole flight, by the remote pilot.

The underpinning idea in the European provisions is that the flights of drones are, by themselves, a risky activity, notwithstanding the purposes for which they are employed. Therefore, the regulations do not distinguish between leisure or commercial activities, but instead take into account the weight and specifications of the drone and the operation it is intended to undertake.

Therefore, drones are not treated as risky by themselves but because of the operations they carry out. And, as each type of operation possess a different level of risk, EU Regulation 2019/947 makes a distinction among categories of operations: the 'open', 'specific' and 'certified' categories.

In the lower risk bracket we find the 'open' category, where operational risks are considered low, no authorisation is required before starting a flight and safety is ensured provided the drone operator complies with the relevant requirements for its intended operation.

The 'specific' category covers riskier operations, where safety is ensured by the drone operator obtaining an operational authorisation from the national competent authority before starting the operation. To obtain the authorisation, the drone operator is required to conduct a safety risk assessment, which will determine the requirements necessary for the safe operation of the drone.

In the 'certified' category, the safety risk is so high that certification of the drone operator and the aircraft is required to ensure safety, as well as the licensing of the remote pilot.

The safety of the flights is ensured through the U-space, which creates and harmonises the necessary conditions for manned and unmanned aircraft to operate safely, preventing collisions between aircraft and to mitigate the air and ground risks.

In force of these provisions, drone operators or remote pilots must register in the Member State where they live or have their main place of business.

The drone operator is the person that owns or rents the drone. The operator can either be a natural or legal person and must be registered.

The remote pilot is the person who actually controls the drone. A remote pilot may also be the drone operator or a drone operator may employ one or more remote pilots.

The identification of the operator is made easier using an Electronic identification system, which allows the remote identification of the operator of the drone, while the Geo Awareness system is a software installed in the drone that can automatically block the access of the aircraft to certain areas that are prohibited or high-risk areas.

The operator is liable for the damages caused by the drone in force of strict liability rules. Consequently, the same European Regulations provide that the operator is obliged to have a third parties' insurance for liability, when the drone weights above 20kg. But it should be underlined that most of the Member States requires the operator to buy an insurance for third party liability even when the drone weighs above 250 gr.

Dealing With Artificial Intelligence and Robots Under European Law

Although a European comprehensive legislation concerning the liability for damages caused by AI and robots has not yet been enacted, the studies and official documents on the issue written by the European Parliament and Commission may certainly offer an idea of the future legislative choices at European level.

For our purposes, we can take into consideration the proposals to overcome supposed legislative gaps set out by the European Parliament Resolution of 16th February 2017 with recommendations to the Commission on Civil Law rules on Robotics[9], the European Commission White Paper on Artificial Intelligence - A European approach to excellence and trust and the accompanying Report from the

Commission to the European Parliament, the Council and the European Economic and Social Committee Report on the Safety and Liability Implications of Artificial Intelligence, the Internet of Things and Robotics of 19th February 2020[10] and finally the European Parliament Resolution of 20 October 2020 with recommendations to the Commission on a civil liability regime for artificial intelligence[11]. To this bulk of preparatory works we can add the existing legal provisions, first of all the Product Liability Directive of 25 July 1985 on the approximation of the laws, regulations and administrative provisions of the Member States concerning liability for defective products [12], which are to some extend already fitted for the protection of the victims of AI and robots.

From the reading of these preparatory documents it is self-evident that the European Commission and Parliament are perfectly aware of the need to have a clear and predictable legal framework to discipline Artificial Intelligence and Robotics[13], because their general scope is to have the certainty that all products and services, including those integrating emerging digital technologies, operate safely, reliably and consistently and that damages that eventually may occur would be remedied efficiently.

Implementing high levels of safety for products and systems that use the new technologies and providing reliable mechanisms of compensation for cases of damages caused by them is in fact essential to better protect consumers or those that may be harmed by and to create trust in the new technologies, fostering their use by industries and consumers and therefore the competitiveness of European industries and the growth of the European economy. A clear safety and liability framework is in fact important both to provide the needed protection to consumers, and to offer legal certainty to conduct businesses.

The European Parliament and Commission are perfectly aware that, although the European Union is already endowed of a steady and experimented body of rules on safety and product liability, and all the Member states possess a working system of tortious liability compensation, these rules need to some extend to be adapted to the characteristics of AI and Robotics. Therefore, it is important to outline these characteristics, to understand how the existing rules should be adapted.

AI and robots can combine connectivity, autonomy and data dependency to perform tasks with little or no human control or supervision. They are very complex, and therefore their production generally involves a plurality of economic operators and the need of a multiplicity of components, parts, software, systems or services, which together form the new technological ecosystems. They are generally open to updates and upgrades after their placement on the market. Moreover, as far as AI is concerned, their equipped systems can also improve their own performance by learning from experience and, because they use a vast amount of data, rely on algorithms and have an opaque decision-making, it is often difficult to predict the behaviour of an AI-enabled product and to understand the potential causes of a damage. Finally, as AI systems are connected and open, they may be exposed to cyber-threats.

It is therefore not a surprise that the cited European Commission Report of the 19th February 2020 largely concerns the safety issues of these new technologies[14]. As the EU product safety framework was written before their emergence, it does not always contain provisions explicitly addressing the new challenges and risks arising out of these n technologies. Nevertheless, that legal framework is technologically neutral and therefore it can still be applied to products incorporating these new technologies, as explicitly stated, for example, by some EU legal provisions, such as those on the medical devices or cars, which have taken into consideration some aspects of the new technologies, e.g. automated decisions, software as a separate product and connectivity.

The first problematic issue is that of the connectivity, because as most of the new products are connected, their safety may be directly compromised and the safety of its users may be indirectly threatened when the product is hacked. Union product safety legislation does not generally provide for specific

mandatory essential requirements against cyber-threats affecting the safety of users, although there exist provisions related to security aspects in certain fields (e.g. the Regulation on Medical Devices[15], the Directive on measuring instruments[16], the Radio Equipment Directive[17], or the vehicle-type approval legislation[18]) and the Cybersecurity Act[19] sets up a voluntary cybersecurity certification framework for Information and communications technology (ICT) products, services and processes while the relevant Union product safety legislation sets up mandatory requirements. Moreover, also the loss of connectivity of digital technologies may also entail risks for safety.

In the opinion of the European Commission, the character of connectivity of these products entails risks, and these risks can be deemed to be covered by the extended concept of safety of the product applied in the European Union in order to protect consumers and users. It must also be stressed that, under the safety product legislation of the European Union, the use of the product covers not only the intended use but also the foreseeable use and in some cases, such as in the Machinery Directive[20], even the reasonably foreseeable misuse. Therefore, the Commission proposal on the point is that of taking into consideration explicit legislative provisions on the safety risks of connected products, in order to provide better protection of users and more legal certainty for businesses.

The second problematic issue is that of autonomy. Although their behaviour is constrained by the goal they are given and other relevant design choices made by their developers, AI based products can in fact act autonomously by perceiving their environment and without following a set of pre-determined set of instructions. The unintentional outcomes of these autonomous actions can cause damages to their users and third parties.

The European Union legislation already provides the duty of the manufacturers to take into account in the risk assessment of the product its intended use, foreseeable use and/or the reasonably foreseeable misuse, before the products are placed on the market. In cases of AI based products, that should therefore be done taking into consideration the future "behaviour" of the product. The same legislation also states that manufacturers must provide for instructions and safety information for users or warnings[21]. Moreover, every "significant change" requires a safety assessment report to the proposer of the change by an independent 'assessment body' (the national safety authority or another technically competent authority) and the consequent application of the appropriate measures to mitigate risks by the manufacturer.

Where the outcomes of the AI systems cannot be fully determined in advance, and the autonomous behaviour of the AI based product modifies the intended use, so that the safety requirements are affected because the risk assessment performed before placing the product on the market no longer reflects the use of the product, then a new re-assessment of the self-learning product is required.

In any case, it should be underlined that under the current framework, where producers become aware that a product, throughout its lifecycle, poses risks having an impact on safety, they are already required to immediately inform the competent authorities and take actions to prevent the risks for users[22].

The Commission in its Repost suggest that if the AI based product may undergone, during its lifetime, changes that can have an impact on its lifetime, e.g. different product function, not foreseen by the manufacturer in the initial risk assessment, a new risk assessment procedure could be performed and reinforced requirements for manufacturers on instructions and warnings for users may be provided for by EU legal provisions[23]. The same EU legislation should also provide for the human oversight of AI self-learning products and systems, from the product design and throughout the lifecycle, when their self-learning features may enable the machine to take decisions that deviate from what was initially intended by the producers and consequently what is expected by the users.

A very interesting point of the proposals of the European Commission concerns the mental health risks of AI products, which should in its opinion be explicitly covered within the concept of product safety in the legal provisions. Therefore, AI devices and systems producers should be obliged to take into consideration the immaterial harm their products could cause to users, in particular vulnerable users (e.g. elderly persons in care environments).

The last characteristic that may generate risks for the use of AI-based products and systems and that therefore is taken into consideration by the European Commission is that of data dependency, that is to say the need that data used by AI products are accurate and correct, and therefore that producers anticipate during the design and testing phases the data accuracy and its relevance for safety functions and that the Union product safety legislation contains specific requirements addressing those risks.

The same European Commission also underlines, in its Commission Communication on Building Trust in Human-Centric Artificial Intelligence, that when AI based products and systems improve their performance by learning from experience, it could be difficult to understand and trace their decision making process and that so called "opacity" may interfere with the necessity to trace the responsibility of AI systems[24]. In these cases the Commission deems it to be necessary for the responsibility of the IT technologies to require of the algorithms a certain level of transparency, robustness, accountability and, when necessary, human oversight and unbiased outcomes[25].

Other possible risks may be identified in those that may stem from the complexity of the products and systems, because different products, devices and compounds can interact and influence each other. In those cases, it is required that the producer carry out a risk assessment of the product, taking into consideration the intended use and foreseeable use as well as the foreseeable misuse, following the provisions of art. 2 of the General Product Safety Directive, which specifies that a safe product shall take into account "the effect on other products, where it is reasonably foreseeable that it will be used with other products".

This attention to complexity is for example already part of transport legislation, where approvals and certifications are required both for each component and for the entire car, train or airplane, and also the "system" of transportation must be approved by an authority, after a third party assessment of conformity of technical requirements or a demonstration of how risks are being addressed. But that is also evident where the system involves, as it often happens, the use of software, integrated in the products. In those cases, the producer is asked to foresee the possible risks arising from the use of the integrate software, as for example in the Machinery Directive, which expressly requires that fault in the software of the control system does not lead to hazardous situations[26].

Needless to say, the complex value chains that generally affect emerging digital technologies, such as AI, have been already taken into consideration by the European legislation, as they have already affected products such as computers, service robots, or transport systems. The product safety rules, in fact, already provides that the responsibility for the safety of the product remains with the producer that places the product on the market, notwithstanding the possible existence of a complex value chain. That liability extends to the parts integrated in the product, such as in the case of the software of a computer[27]. So doing, the European Union product safety legislation takes into account the complexity of the value chains, and establishes a principle of "shared responsibility" for the possible damages arising from the use of the products, imposing a joint and several obligation on the several economic operators.

The European Institutions are perfectly aware that product liability rules should intervene only if and when product safety rules fail, although both the sets of rules are of the outmost importance to se-

cure high levels of safety to users and third parties and provide compensation for the damages that are eventually caused by the products.

The purpose of liability rules is double faced, as they must ensure the compensation of the damages suffered by those harmed by a certain product, in our case a robot or AI-based products, and at the same time they must provide economic incentives to the party liable for the compensation to avoid the causation of damages, if possible. This balance permits the natural development of those technological businesses that guarantee a favourable trade-off between the positive economic outcome arising from the new products and the negative burden of the compensation of the possible damages caused by those same products.

In the European Union, the harmonized rules on the compensation of damages caused by products, that is to say the rules that must be applied in every European Member State where a harm is caused by a defective product, are today notoriously contained in the Product Liability Directive 85/374/EEC.

This Directive provides a strict liability system of the producer for the damages caused by a defect of a product. As a consequence, the injured party is entitled to the compensation of the damages suffered when he or she can prove the damage, the defect in the product (for example, that it did not provide the safety that the public is entitled to expect) and the causal link between the defective product and the damage. The provisions of the Product Liability Directive can be applied in the different Member States jointly with the national liability rules, which may be based on fault or strict liability, or both, depending from the case and the national legislation. A good example is that of the damages caused by a car accident, where the victims can generally ask for compensation from the driver on the basis of the national liability for fault rules, from the owner of the car (in most of the Member states) on the basis of the national strict liability rules, and from the car manufacturer in force of the provisions of the European Product Liability Directive. Furthermore, the example of the compensation of the damages caused by motor vehicles also offers us the opportunity to call into action the instrument of compulsory insurance, as the same victims can also claim the compensation of the damages suffered from the car insurer, because in accordance with the European harmonised rules on motor vehicle insurance, the user of the vehicle must be insured[28]. Producers are, instead, not subject to a compulsory insurance.

It is very important to underline that the European legislation does not treat autonomous vehicles differently from non-autonomous vehicles, and they therefore must be covered by the third party motor liability insurance, which is undisputedly the most reliable and easily achievable financial protection offered to the victims of damages caused by vehicles. At the same time, insurance companies can either calculate their risks and claim reimbursement from the party liable for the damage, be it the driver, the owner or the manufacturer of the vehicle.

The above cited Commission Report rightly underlines that these national and European provisions may be challenged by some characteristics of the new technologies, such as robots or AI. For example, sometimes it could be difficult to identify the human behaviour that ultimately caused the victims the injury, identification that is necessary to ascertain the existence of a liability for fault in some national systems.

Either the Expert Group on Liability and New Technologies[29] and the European Commission[30] took into consideration the possibility to facilitate the burden of proof for the victims of AI-related damages or even reversing it, or of linking the burden of proof to the compliance by the relevant operator with specific cyber-security or other safety obligations set by law. The model example of such a modification of the rules on liability for fault is, as we all know, given by the European Product Liability Directive,

which provides for the liability of the producer for the damages caused by a product that does not meet mandatory safety rules, regardless of the producer's fault.

The capacity of AI applications to act autonomously, without human supervision or control and sometimes even without predefinition of their actions, may entail problems in the ascertainment of the person liable for the damages caused by products incorporating AI applications. The same can be said when products are operated using algorithms based on machine-learning, which can be difficult, if not impossible, to understand. In these cases, it is in fact often difficult and costly to ascertain what went wrong with the algorithms and the data used, and the access to the same impossible without the cooperation of the potentially liable party. Moreover, it is not easy to prove if the damages were the consequence of the autonomous choice of the AI or of the fault of its producer or user.

Even in this case, the suggestion of the European Commission is to use the EU rules on products safety and products liability and provide for the liability of the producers for the safety of all the products they put on the market throughout their life-cycle, for the use of the product that can reasonably be expected. As the presence of AI in products does not exclude the need to guarantee the safety of the products, whether they are automatic lawnmowers or surgery robots, the manufacturer should be obliged to respect certain safety parameters when manufacturing a product using AI. Moreover, as the AI is a self-learning tool, it should be taken into consideration the problem of the extension over the time of the liability of the producer and of the limits to the foreseeability of the possible changes of the self-learning applications. In these cases the European Commission Report suggests the revision of the Product Liability Directive so as to take into account the fact that when AI applications are involved, products may change and be altered over the time, and possibly clearly identify the responsible person in these cases[31].

The same Commission underlines that special attention should be devoted to those autonomous AI devices and services that may cause significant harm to important legal interests like life, health and property, and expose the public at large to risks[32], such as AI devices that move in public spaces (e.g. fully autonomous vehicles, drones and package delivery robots) or AI-based services with similar risks (e.g. traffic management services guiding or controlling vehicles or management of power distribution). In its opinion the solution to the compensation problems engendered by AI products could be the application of strict liability schemes resting on a risk-based approach: whenever the risk materializes, the victim is compensated regardless of fault. This approach clearly requires the careful assessment of the person responsible for the compensation of the damages arising from the development and uptake of AI and of the risks to be taken into consideration.

The same European Commission also admitted that it was looking for remedies able to couple strict liability rules with compulsory insurance, following the example of the Motor Insurance Directive, so ensuring compensation irrespective of the liable person's solvency and reducing the costs of damage. In other cases, instead, such as when the potentially liable party has not logged the data relevant for assessing liability or is not willing to share them with the victim, the Commission is taking into consideration the option to adapt the rules on the burden of proof of the causation and the fault of the defendant[33].

This attitude of the European Commission was largely shared by the European Parliament, in its above cited Resolution of 20 October 2020.

For the European Parliament it is of the outmost importance to improve the willingness of users toward new technologies providing them with solid and fair compensation procedures and a level of protection similar to those offered in cases without involvement of an AI-system. But, at the same time, it is aware that legal certainty is also essential for the dynamic development and innovation of AI-based technology.

The same authority is also aware of the necessity to provide sector-specific regulations for the broad range of possible applications with a European horizontal and harmonized legal framework, based on common principles, with the purpose to ensure legal clarity, establish equal standards and to effectively protect European values and citizens' rights. And that the special features of AI, require a specific and coordinated adjustments to the liability regimes to provide an equitable compensation to the injured parties.

After having explicitly denied the opportunity to confer legal personality to AI-systems, the Parliament affirms that, on the basis of widely accepted liability concepts, it is possible to confer the liability for the damages caused to the different persons in the whole value chain who create, maintain or control the risk associated with the AI-system.

Moreover, it suggests the Commission to review the Product Liability Directive, eventually even transforming it into a Regulation, updating its rules and definitions (such as "products" and "damages") to the challenges posed by emerging AI, so as to provide a high level of effective consumer protection, and of legal certainty for consumers and businesses, while avoiding high costs and risks for SMEs and start-ups.

Regarding the rules to be applied to damages caused by AI products, the Parliament hypothesizes of reversing the rules governing the burden of proof for harm caused by emerging digital technologies in clearly defined cases, after a proper assessment, and underlines that the Product Liability Directive rules on civil liability should be used also against the producer of a defective AI-system, when that system may be qualified as a product under that Directive. That is to say that in those cases strict liability should be applied.

Regarding instead the operators' liability, it affirms that the operator, who may be compared to the owner of a car, is the person that is controlling a risk associated with the AI-system and that, due to the AI-system's complexity and connectivity, is in many cases the first visible contact point for the affected person. In its opinion, the operator's liability should cover all the AI operations and be ruled under the Product Liability Directive provisions. When there is more than one operator, all operators should be jointly and severally liable while having the right to recourse proportionately against each other, and the proportions of their liability should be determined by the respective degrees of control over the risk connected with the operation and functioning of the AI-system.

In the opinion of the Parliament, when there exists an inherent high risk of damages and the autonomy of the AI potentially endangers the general public, it would be reasonable to provide for a strict liability regime of responsibility of the operators and introduce a compulsory insurance system for the compensation of the damages arising from them.

The liability for fault rule should instead be applied to cases where the AI operations were not considered inherent high risk of damages. But in these cases the fault of the operator could be presumed, although this latter can exculpate himself by proving he has abided by its duty of care

The same liability for fault rule should be used when the damages are instead caused by an interfering third party, such as a hacker.

These liability rules should be applied, in the opinion of the Parliament, jointly with a continuous monitoring of the potential risks of the new AI technologies.

Lastly, considering that the public trust for the new technologies can be reinforced by the use of liability insurance, the Parliament affirms that it would be wise if all the operators of high risks AI-systems should hold liability insurance, analogously to the rule on compulsory insurance provided for by the Directive 2009/103/EC relating to insurance against civil liability in respect of the use of motor vehicles.

CONCLUSION

The technological evolution we are facing in these years brings with it an actual or possible, depending on the product, increase of cases of damages caused by these new technologies, where software and AI are often incorporated into the products. The emergence of these new digital technologies and robotics certainly raises new challenges in terms of product safety and liability, which are made more complicated by their special features of connectivity, autonomy, data dependency, opacity, complexity of products and systems, software updates and more complex safety management and value chains.

The problem we face in these new cases lies therefore in the need to provide the victims of the new technologies with the same level of protection that is already guaranteed with reference to other products or services in their national systems. In so doing, we should be able to provide the victims of the new technological products with their rightful compensation and at the same time we should not impair the general social trust in those new technologies and, as a consequence, on the economy surrounding them.

The set-up of a clear compensation plan, that could be applied in every Member State, is not only advantageous for the victims of the new technologies, but also for the economic activities and the investments concerned, including the costs of the production activities. Moreover, the producers of these innovative technologies would be advantaged by common compensatory European rules, because a fragmented national legal situation increases the costs for reducing the risks, insure against liability and cross-border trade in the Single market.

Although, as we have mentioned, a number of different solutions could be used to sort out this conundrum, most probably the only viable solutions are those offered by the traditional rules on the liability for fault, the inversion of the onus of proof, the strict liability and the compulsory insurance that are already used in a large number of cases by the European and Member States legislation.

These tools are in fact well rooted in the European and in the Member States legal systems, where they proved to be effective in many other cases of damages caused by technological products, and fit to adapt to the new challenges posed by the last technological development.

These qualities were certainly taken into consideration also by the European Parliament and Commission in their proposals, which substantially envisage the following steps to be taken at the European legislative level.

First of all, the modification of the European Directive on Product Liability and of other special legislation, whose provisions are notoriously based on the strict liability of the producer of the goods and the distribution chain, when the producer could not be identified, to better suit the cases of damages arising out of the new technological products, taking into consideration also their interaction with AI and software.

Secondly, to provide for the strict liability of the owner or user of the products, coupled with a compulsory insurance, on the model of the liability for vehicle damages that already proved to efficiently operate.

Thirdly, establish the liability for fault of third parties that interfere in the operations of the products, causing damages, and regulate the cases in which the reversion of the burden of proof of the negligence of the tortfeasor applies, to better protect the victims in those cases where it would be very onerous or difficult for them to prove the negligence of the tortfeasor.

Lastly, to provide for the joint and several liability of all the parties involved, when the possible tortfeasors are more than one.

So, old rules for new tools. But what else should be used, if the old rules are still fit for their job?

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5 E.G. *Zaff v. Eli Lilly and Co.,* 676 SW 2d 241 (Mo. Banc. 1984)

6 *Shackil v. Lederle Laboratories*, 561 A 2d 511, 528 (NJ 1989)

7 *Starling v. Seabord Coast Line R.R.* 533 F. Supp. 183 (S.D. Ga. 1982).

8 *Van Ballegooijen v. Bayer Nederlaand BV* (Rvdv 1992, No 219).

9 https://www.europarl.europa.eu/doceo/document/TA-8-2017-0051_EN.pdf

10 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0064&from=en

11 https://www.europarl.europa.eu/doceo/document/TA-9-2020-0276_EN.pdf

12 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:01985L0374-19990604&from=EN

13 See the Commission Staff Working Document of the European Commission (2018) 137. https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A52018SC0137

14 On the issue of the risks of AI, please read the European Commission Proposal for a Regulation of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts, of 21th April 2021

15 Regulation (EU) 2017/745 on medical devices

16 Directive 2014/32/EU relating to the making available on the market of measuring instruments

17 Radio Equipment 2014/53/EU Directive

18 Regulation (EU) 2018/858 on the approval of motor vehicles and their trailers, and of systems, components and separate technical units intended for such vehicles, amending Regulations (EC) No 715/2007 and (EC) No 595/2009 and repealing Directive 2007/46/EC with effect from 1 September 2020.

19 Regulation (EU) 2019/881

20 Directive 2006/42/EC on machinery

21 Decision No 768/2008/EC of the European Parliament and of the Council of 9 July 2008 on a common framework for the marketing of products, and repealing Council Decision 93/465/EEC, OJ L 218, 13.8.2008. p. 82–128. Annex I, Article R2.7 reads: "*Manufacturers shall ensure that the product is accompanied by instructions and safety information in a language which can be easily understood by consumers and other end-users, as determined by the Member State concerned."*

[22] Article 5 of Directive 2001/95/EC of the European Parliament and of the Council of 3 December 2001 on general product safety.

[23] Similar risk assessments are already required in transport, in case of any change to the railway system that may have an impact on safety (e.g. technical, operational change or also organisational change which could impact the operational or maintenance process), see Annex I to COM Implementing regulation (EU) 2015/1136 (OJ L 185, 14.7.2015, p. 6).

[24] https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top

[25] Based on the key requirements proposed by the High-Level Expert Group in the Ethics guidelines for trustworthy AI. https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines

[26] Section 1.2.1 of Annex I of the Machinery Directive

[27] For some specific cases, please see, for example, Article 16(2) of the Lifts Directive 2014/33/EU, which equate the installer to the manufacturer or Article 1.7.4.2 of the Machinery Directive 2006/42/EC, which requires manufacturers of equipment to provide information to the operator on how to assembly that equipment with another machinery

[28] Harmonized for motor vehicles by Directive 2009/103/EC relating to insurance against civil liability in respect of the use of motor vehicles, and the enforcement of the obligation to insure against such liability.

[29] Liability for Artificial Intelligence and other emerging technologies, Report from the Expert Group on Liability and New Technologies, 2019. https://ec.europa.eu/newsroom/dae/document.cfm?doc_id=63199

[30] Report from the Commission of 19th February 2020, 15

[31] Report from the Commission of 19th February 2020, 16

[32] On the basis of the outcomes of the above cited Liability for Artificial Intelligence and other emerging technologies' Report, note 40

[33] Report from the Commission of 19th February 2020, 18

Section 3

Chapter 12
Open Banking and Privacy:
Users' Personal Data and Payment Service Providers' Liability

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ABSTRACT

Payment services user's personal data processing between European Directive no. 2015/2366/EU on electronic payment services (PSD2) and Regulation no. 679/2016 on the processing of personal data of natural persons (GDPR). This chapter focuses on the interference and possible conflicts between digital payments and personal data protection and processing rules, identifying and addressing certain issues. In particular, the work analyses and discusses three themes: 1) the role played by banking intermediaries (PSPs) and new payment service providers (third party providers – TPPs) and their involvement in the digital payments, 2) the cases where the PSPs and TPPs can lawfully use personal data and the limits imposed on them by both regulations to the processing of data of payment service users in order to verify whether the combined provisions of these pieces of legislation effectively achieve greater protection for payment service users, 3) the issue of unlawful use of personal data and the distribution of responsibilities and liabilities between intermediaries.

TECHNOLOGICAL INNOVATION AND BANKING MARKET: OPEN BANKING AND THIRD PARTY PROVIDERS

The payment sector has been, as we know, one of the first in which a regulatory framework had to be defined in view of adequately regulating the significant changes in the market without hampering the technological innovation[1].

Actually, it must to be aware that the rapid development of technological innovation results in the risk that the current legal framework soon become outdated and insufficient to regulate the new types of payment services in the market place.

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That happened as regards to the activity of the so-called Third Party Providers (TPPs), which are not a party to the contractual relationship between the user and the account servicing payment service provider (ASPSP), but can access the payment account to perform certain services on behalf and on the request of the user. TPPs appeared on the scene since the issuing of the Directive no. 2007/64/EC (Payment Services Directive - PSD) and, thanks to their unprecedented ability to innovate, they have emerged in the payment market despite the absence of any regulation concerning their organisation and activity. This regulation was introduced by the later Directive no. 2015/2366/Eu (Payment Services Directive 2 - PSD2).

The services provided by the TPPs are the provision of payment initiating[2] and the account information[3]. They are complementary, at least to some extent, to the ones offered by banks but they are more efficiently because they are able to offer an easy and swift services, due to their technologies. The first, known mainly thanks to Paypal, allows the user to issue a payment order on an online account, having a closed platform that acts as a bridge between the banking platform of the user and the website of the merchant. Such service offers several advantages as it directly links the payer and the payee; in fact, the first does not disclose account number or credit card references to the beneficiary while the merchant is informed once the payment has been ordered and funds are on his way.

Therefore, the payment initiation service provider (PISP) initiates the payment transaction and it intervenes and performs the payment order immediately by transferring money from user's account to the ones of the merchant but it does not manage the account maintenance or the processing of transfer and debit which are responsibility of the account servicing payment service provider.

The account information service, on the other hand, offers the user an immediate overview of his financial situation by collecting and aggregating online information taken from one or more payment account held with different payment service providers and they display those data in a way that makes them more intelligible. Essentially, the account information service provider (AISP) gives the user an overall simplified view of his accounting position in all the banks he operates and allows him to rationalize the management of payments from different accounts.

In both cases, the performance of the payment initiation service and account information service is dependent on the possibility for the TPPs to enjoy open access to payment account and to use the account data and information. The particularly innovative aspect does not thus consist in the fact that these activities are carried out by entities other than banks but in the fact that the subject offering the service does not hold the user's payment account (Rabitti, Sciarrone Alibrandi, 2019).

The operating practice imposed by the new players has, therefore, led to an inevitable change in the overall structure of the banking system, as regulated by the PSD, addressing new issues (Sertoli, 2019).

Firstly, we assist to an increase of the phenomenon of "disintermediation" — namely, a further reduction of the role of banks in the provision of payment services — which has already begun with the PSD (Omarini, 2020; Pitruzzella 2018). In fact, the Directive had allowed subject outside the financial sector to carry out this specific business activity, by considering as payment service providers not only banks but also Electronic Money Institutions (EMIs), which existed since the introduction of electronic money, and Payment Institutions (PIs), which were regulated by the PSD in the first place.

By entering of TPPs in the payment market, banks lose their tight control over their customer data and the competitive advantage deriving from this circumstance (Argentati, 2018; Vezzoso, 2018). In fact, as already noted, in order to permit to TPPs to perform their services, banks have to share consumer data and information which are a very important resource of profit enabling the banks and other payment providers to process the tastes of a multitude of customer and offer personalised services.

Furthermore, the increased number of intermediaries involved in the payment procedure and the interposition of TPPs disintermediate single segments of the banking supply chains (Di Porto, Ghidini, 2019). The procedure is no longer controlled exclusively by the ASPAS, since this is now supplemented or substituted by TPPs. This circumstance results in increased risks related to the safety of operations which were particularly evident before the PSD2 came into force.

Indeed, the absence of a regulatory framework concerning TPPs affects the effectiveness of the PSD rules concerning enhanced user protection in the event of an unauthorised payment transaction. In order to perform their services, TPPs used the screen scraping technique, now prohibited, utilizing personalised security credentials, provided directly by the user, to access his payment account and to acquire the information useful for the execution of the service. In this way, on the one hand, the bank was not able to distinguish the orders issuing directly by the user form those executed through TPPs, and on the other, the user violated his custody obligation. Therefore, the communication of the users' personalised security credentials to the TPPs results in a custody failure and entitles the loss of protection set forth by PSD in case of unauthorised operation which keeps the user harmless from any liability except in case of fraud or gross negligence.

In summary, the main issues concerned and concerns: i) the necessary opening up of the market to the new players; ii) the security of transactions and the liability of the intermediaries for their execution; iii) the protection of users' personal data with particular regard to accessibility to payment accounts and the use of data by third party (Ciraolo, 2020).

The latter is one of the most delicate aspects. The digitalization of payments and the need for an easy exchange of user's data between the intermediaries, PSPs and TPPs, raises a series of legal issues relating to security of operations and protection of privacy of natural persons. As noted above, the payment order initiating the transaction does not transfer a single amount, meaning the funds which transfer from the payer's account to the one of the payee, but also information which must at least indicate the amount to be transferred and the elements for identifying two payment accounts, the one of the payer and the one of the payee (De Stasio, 2020).

On the other hand, the importance of personal data in the various areas of society has led to reformulate the concept of privacy (Cuffaro 2018; Ricci, 2017), as demonstrated by the Regulation on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (EU Regulation no. 2016/679 – GDPR)[4].

It overcomes the idea that the individual has an absolute right to keep confidential the information concerning him. It is noted that sharing of personal data is essential to grant the development and performance of many activities, scientific, economic, etc. Consequently, the legislator does not prevent the use of personal data but focuses on the right of every individual to a lawful, correct and transparent processing of his data.

Therefore, it is crucial to identify the cases where TPPs and PSPs can lawfully use personal data; in the second place, it is necessary to establish who is the subject responsible to the user and the protection provided in case of unlawful use of personal data.

THE PROVISIONS OF THE DIRECTIVE NO. 2015/2366/ EU (PAYMENT SERVICES DIRECTIVE 2 – PSD2)

The above scenario has shown the regulatory gaps of the PSD as regards to the rapid growth of technical innovation; as a consequence, it was necessary to update the legal framework, taking into consideration the emergence of the new services offered by the TPPs and the issues related to them[5]. PSD2 has replaced the previous Directive but has kept firm the aims to ensure the efficiency of the payment market and to guarantee enhanced protection to the user, focusing on the exchange of data between intermediaries and the increase of security of the operations (Porta 2019; Girompini, 2018).

The so-called open banking takes place, namely a new banking system in which banks and other authorized intermediaries, in order to permit the provision of new types of services, allow specific categories of intermediaries, free access to their client's account and share the data necessary for the execution of the operations requested by the user.

First, the legislator has reformed the rules on access to payment services market, establishing stricter requirements to obtain authorisation as a PI from the competent authority of the home Member State (Art. 11, PSD2)[6].

Accordingly, the application has to contain details of: i) the programme of operations setting out and the payment services envisaged; ii) the business plan and the identity of persons holding in the applicant, directly or indirectly, qualifying holding, directors and persons responsible for the management as well as a description of the measures taken for safeguarding clients funds; iii) the security policy adopted, the risk management and accounting procedures take to adequately protect service payment users and the procedure in place to handle, monitor and follow up a security incident; iv) the process in place to file, monitor, track and restrict access to sensitive payment data and the principles and definitions applied for the collection of statistical data on performance, transactions and fraud (Art. 5, PSD2)[7].

Special exceptions are then established for the TPPs. In particular, as regards to PIs that provide only the payment initiation service, its capital shall at no time to be less 50,000 euros while the capital of the IPs that provide the other payment services is 125,000 euros (Art. 7, PSD2). In addition, given the fact that the PISP not hold in any time the payer's funds, the special safeguarding requirements referred to Art. 10, PSD2, are not applied. Is however required, as a condition for authorisation, to hold a professional indemnity insurance or some other comparable guarantee against liability to cover losses resulting from the execution of an authorised operation, the non-execution, defective or late execution of a payment transaction, the request of financial compensation by the user or the exercise of the right of recourse by one of the intermediaries who are involved in the transaction. [Art. 5(2), PSD2].

The provisions are therefore proportioned to the specific activity carried out and the risks associated with it (principle of proportionality). As a result, additional facilities are provided for the AISPs as their activity is purely informative. More specifically, they are exempt from the obligation to have a minimum initial capital, to adopt measures to safeguard client funds and some other requirements to which all other PIs are subject to (Art. 33, PSD2).

For the AISPs also is considered a prerequisite for the authorization to hold a professional insurance or some other comparable guarantee against their liability vis-à-vis the ASPSP or the user resulting from non-authorized access or from fraudulent access to or use of payment account information [Art. 5(3), PSD2].

It can be said that, in general, the legislator's aim is to reserve the entry to the market only to PIs which demonstrate that they have a capital and an organisational system which are adequate and proportionate

to the risks associated with the performance of this specific business activity; risks consisting in the inability of the PI to fulfil the obligations entered into to execute the payment operations or to reimburse the user and the provision of a security system insufficient to protect the assets and data of users.

Concerning, in particular, PISPs and AISPs, the performance of their services is subject only to the consent of the payment service user, whereas it is not necessary that there is a contractual relationship between the TPP and the ASPSP; therefore, the latter is obliged to provide access to the user payment account and to make available all the information necessary for the execution of the TPP service. It also has to treat the payment order requested by TPP under the same condition as it were transmitted directly by the user. In essence, the ASPSP is subject to an obligation of forced collaboration, provided by law (Szego, 2020). It may deny the access only for <<objectively justified and duly evidenced reasons relating to unauthorised or fraudulent access to the payment account>> [Art. 68(5), PSD2].

The obligation applied to the ASPSP reflects the legislator's aim to encourage competition between the different intermediaries. In fact, most of technological advances and innovative products in the sector of electronical and digital payment are attributable to subject outside the financial system that have considerable financial resources and technical expertise able to guarantee higher technology than banking intermediaries; suffice is to say that currently at PayPal, have joined in the offer of digital services giants, such as Apple, Amazon and Google (Arezzo, 2021; Falce, 2021; Vezzoso, 2018).

This situation, on the one hand, it constitutes an opportunity for the payment market and an advantage for the consumers, on the other hand, it reduces the role of the banks, which, in absence of specific rules, could strategically refuse access to consumer data <<because of the fear to end up functioning solely as account and deposit holders for customers>> (Vezzoso, 2018, p. 35). The PSD2, therefore, facilitates the open banking and the competition, by preventing banks from taking advantage of the condition that they hold the payment account and, consequently, they can decide which TPP and under what conditions to allow access to consumer accounts, which would also limit the choice of consumers. For this reason, the Directive allows TPPs to access user's account upon only the latter's consent (Meli, 2020; Szego, 2020).

Regarding the execution of the transaction, since the PISPs and the AISPs never hold the client's funds, the PISP is prevented from requesting from the user any data other than those necessary to provide the service or using, accessing or storing data for purposes other than for the provision of the service [Art. 66(3), lit. f) and lit. g)]. Particular attention is paid to sensitive payment data[8] that can't be stored [Art. 66(3), lit. e)]. Finally, the PISP must ensure that the information obtained is provided only to the payee with the user's explicit consent [Art. 66(3), lit. c)]

Equivalent rules are provided for AISPs with the difference that, due to the characteristics of the service offered, it can only access information from designated payment accounts and associated payment transactions [Art, 67(2), lit. d)] and can never request the user's sensitive payment data linked to the payment account [Art. 67(2), lit. e)], which are not necessary for the provision of the service. In essence, TPPs do not have full access to the account data of the user.

Moreover, security is another of the main objectives of the payment service regime. The legislator has intervened to strengthen two elements considered essential to ensure effective protection against external attacks. This concerns authentication and communication between intermediaries. Their characteristics were specified by Regulation Eu no. 389/2018 which integrated the PSD2[9].

i) Authentication (Articles 5-27, Reg. no. 389/2018) is the <<procedure which allows the PSP to verify the identity of a payment service user or the validity of the use of a specific payment instrument, including the use of the personalised security credentials>> (Art. 4(1), no. 29, PSD2).

Article 97 of PSD2 has required all intermediaries to adopt a strong authentication system (Strong Customer Authentication) based on the use of two or more elements classified in the categories of knowledge[10], possession[11] and inherence[12] that are independent, in that the breach of one does not compromise the reliability of the others [Art. 4(1) n. 30. PSD2]. This system is currently considered the safest. Therefore, all intermediaries must make available to the user a strong authentication system whenever he accesses his payment account online, initiates an electronic payment transaction or carries out any action, through a remote channel, which may imply a risk of payment fraud or other abuse.

ii) As far as "common and secures open standards of communications" (Articles 28-36, Reg. no. 389/2018), these are aimed at ensuring the security of communications and data exchanges between intermediaries participating in the procedure.

With regard to the security obligations imposed on the TPPs, an obligation to identify them when they access the payment account [Art. 66(2), lit. d) and Art. 67(2), lit. c), PSD2] is provided in order to allow the ASPSP to distinguish transactions carried out directly by the user from those requested through TPPs[13] (Gammaldi, Iacomini, 2019). It must also be ensured that the personalised security credentials of users are not accessible to other parties and are transmitted through safe and efficient channels [Art. 66(2), lit. b) and Art. 67(2), lit. b), PSD2].

In this regard, the APSPs are required to adopt digital interfaces (Application Programming Interface) to communicate securely and share with the TPPs the data necessary for the execution of the requested service. API technologies, born in the digital world, simplified integration between different systems and conversation with third parties, and are considered one of the most effective infrastructures in terms of communications security (Zachariadis, Pinar, 2017; Noctor, 2019; Rabitti, Sciarrone Alibrandi, 2019; Colangelo, 2021).

THE PROCESSING OF THE USERS' PERSONAL DATA IN ACCORDANCE WITH THE PSD2 AND THE REGULATION NO. 679/2016 (GDPR)

PSD2 contains few provisions regarding to the effects that the new open banking model may have on the protection of privacy. The Directive, in fact, focuses on the issues of the payment transaction and on the security of information exchanges between intermediaries for the completion of the transaction. Only Art. 94, PSD2, which refers to Directive no. 95/46/EC, now repealed by the GDPR Regulation, deals with processing of personal data.

Taking into consideration the generic reference to the Regulation on the processing of personal data and the absence of coordination between the two pieces of legislation, the paper focuses on interactions and possible conflicts between digital payments and personal data protection and processing rules, identifying and addressing certain issues.

On the one hand, PSD2 aims to increase the use of electronic payments, ensuring the security of operations and, on the other hand, the GDPR aims to balance the interest to share and process the data.

In fact, according to the GDPR, the subject who acquires the personal data (controller) of the natural person (data subject) is allowed to perform the treatment as long as the processing is based on a legal basis. In particular, the Articles 5[14] and 6[15] identify the principles that must characterize the controller's activity and the legitimate basis on which the processing is based to be lawfulness, i.e., specific circumstances

identified by the Regulation that legitimize the processing[16]. Among them, the data subject's consent plays a remaining role. In fact, whenever the processing is not linked to one of the other legitimate basis, the processing is allowed with the consent of the data subject only if it is related to specific purposes.

As will be clarified later, these rules are of particular importance as regards liability for unlawful processing of data subject's personal data as they provide a standard of conduct to which the controller must comply with. They ensure that data subject's data are lawfully processed and grant transparent information about means and limits of the use of his data.

Firstly, the controller has to choose the legitimate basis further in accordance with the objectives pursued because each one of these determines the purposes of the processing. It must also process the data in compliance with the principles of Art. 5 that are expressed in the provisions of the following articles of the Regulation. All these provisions aimed to hold responsible the controller who has to carry out a prior examination of the purposes pursued and the risks of processing in order to be able to demonstrate compliance with the GDPR.

With regard, in particular, to the activity carried out by intermediaries, it's first necessary to identify what data are considered personal data; only personal data are subject to the regulation of GDPR, while the free flow of non-personal data is recently amended by Regulation Eu no. 1087/2018 on the circulation of non-personal data.

The Art. 4(1), no. 1, of the GDPR provides a rather board definition of "personal data" and underlines how their main features is to provide information that qualifies and allows to identify a specific natural person[17]. From this, it can be inferred that, in the context of digital payments, are personal data both the ones which are related to payments (for example, the unique identifier[18]) and the ones that are allowed to identify the user, payer or payee (for example, name, email address, residence, telephone number, etc.).

In this regard, it should be noted that PSD2 also refers to "sensitive payment data", i.e., data which can be used to carry out fraud [Art. 4(1), no. 32, PSD2]. These are exchanged between intermediaries and they are subject to an enhanced protection. However, this category does not correspond with that of sensitive payment data according to the GDPR that identify racial or ethnic origin, political opinions, sexual orientation, philosophical or religious beliefs, trade and union membership, biometric or health data (Rabitti, Sciarrone Alibrandi, 2019).

Concerning the activity of PSPs and TPPs, the comparison of the two disciplines reveals several critical points. Some of them will be reported without calming of exhaust them.

It is clear that PSD2 promotes personal data transfer in order to ensure the full operation of TPP which, as already underlined, can access the payment account and use the user's data necessary to perform the service. The exchange of data is therefore essential for the proper functioning of the payment system[19].

The PSD2 provides for two circumstances that authorize the processing of user data: i) the activity of prevention, investigation and detection of payment fraud [Art. 94(1)]; ii) the provision of the payment service requested by the user [Art. 94(2)]. In order to legitimize the processing also pursuant to the GDPR, these circumstances have to correspond with one of the legitimate basis identified by Art. 6, GDPR.

In the first circumstance, the occurrence of a legitimate interest of the controller is the condition which makes the processing lawful [Art. 6(1), lit. f,), GDPR][20]. In this way, the sole interest of the intermediary in preventing payment fraud suffices to allow the processing even without the data subject's consent. However, there are two limits: the processing must not affect the interests or the fundamental rights and freedoms and takes into consideration the reasonable expectations of the data subject, based on his relationship with the intermediary. The characteristic and the nature of the relationship between

the two subjects therefore, limit the intermediary's activity and allow the user to assume what data are and for what purposes they will be used.

In summary, the possibility of the intermediary to process the user's personal data without obtaining his consent is balanced by the specific provisions imposed by the legitimate basis of reference; these require the intermediary to evaluate the interests inherent in the processing in order to avoid that, in any *ex post* assessment, the treatment may be considered unlawful.

The second circumstance expressly provided for by PSD2 concerns the provision of the payment service. However, for a lawful treatment two conditions must be met. The PSP: a) shall only process personal data necessary for the service provision; b) has to obtain the explicit consent of the payment service user.

In the first case (a), the processing is also lawful for the GDPR as it is necessary for the performance of a contract to which the data subject is a party [Art. 68(1), lit. b), GDPR].

The object of the contract between the parties, user and ASPSP or TPP, determines the limit of the processing and it involves an assessment on his adequacy, relevance and minimisation. Consequently, any processing that is not strictly necessary and not functional to the performance of the contract has to be justified by another legitimate basis.

Therefore, the controller is responsible for verifying, before executing the processing, what data are actually necessary for the service provision so as not to exceed the limits imposed and to incur unlawful processing.

The legitimate basis of the performance of the contract complies with the provision of the PSD2 regarding limitation of processing to what is necessary for the performance of the object of the contract.

Otherwise, with regard to the user's consent, there is a divergence between the two pieces of legislation.

Whereas the treatment necessary for the performance of the contract is allowed without the data subject's consent, under GDPR, the PSD2 provides the user's explicit consent even when the processing is necessary for the service provision requested.

The issue is to be resolved according to a share doctrine (Rabitti, Sciarrone Alibrandi, 2019) in the sense that consent required for the execution of a payment transaction (Art. 64, PSD2)[21] absorbs that required for processing [Art. 94(2), PSD2], provided that in acquiring the consent necessary for the payment transaction, the controller informs the user about the data that will be used for its realization[22].

With particular reference to TPPs operations, two specifications are required.

The first concerns their access to the payment account. As already examined, the access to the user's account is allowed by PSD2 even in the absence of a relationship between TPPs and ASPSP; consequently, the processing shall not be based on legitimate basis of the performance of a contract.

In this case, the processing is lawful because it is necessary for compliance with a legal obligation to which the intermediaries are subject [Art. 6(1), lit. c), GDPR]. As discussed in the previous paragraph, in order to enable TPPs to provide payment service under the same conditions, the PSD2 requires banks to provide access by third party to a user's account and associated data [Art. 66(4), lit. b) and Art. 67(3), lit. b), PSD2].

The second concerns the execution of the transaction by the TPPs. In this case, the treatment is justified as necessary for the provision of the operation; in this regard, the restrictions on the use and retention of user's data by TPPs, provided for by Art. 66(3), lit. f) and Art. 67(2), lit. d), PSD2, seem to specify the principle of data minimisation provided for by GDPR.

Finally, the issue regards the processing of the payee's data (the so-called silent party). When the payer uses a payment service to transfer money, the payee's personal data are transferred outside any

contractual relationship between the latter and the ASPSP or the PISP; therefore, the explicit consent for the processing of personal data has only been given by the payer.

So, what is the legitimate basis for processing of the payee's personal data? On this point, PSD2 regulates only the relationship between the user and its intermediary; consequently, the issue has been resolved on the basis of the GDPR.

In that case, the occurrence of the legitimate interest [Art. 68(1), lit. f), GPDR] of the intermediary — i.e., the performance of the contract with the payer — is the condition which makes the processing lawful. Such a solution has been embraced by the European Data Protection Board which has specified that any processing of personal data based on the GDPR must be in line with the principles of minimisation, limitation and transparency.

This means that, in the context of electronic payments under PSD2, the processing of the payee's personal data is limited to the specific purpose of the execution of the payment transaction and determined by the reasonable expectations of the payee.

In conclusion, the processing of the payee's personal data by the PISP or the payer's PSP should be considered as permitted. In particular, from the joint provisions of GDPR and PSD2, results, on the one hand, that the payment transaction is sufficient to justify the processing, although there is no direct relationship between the payer's intermediary and the payee, on the other, that the obligation of the intermediary to use only the data necessary for the execution of the payment transaction ensures an enhanced protection of the payee. In fact, GDPR exempts the intermediary from the need to obtain the payee's explicit consent to the processing of his personal data which shall compromise the efficiency of the requested transaction; PSD2 identifies the specific limits to the treatment activity. Thereby, intermediaries, in particular TPPs, are prevented from misconducting by using the payee's personal data for other purposes than the execution of the payment operation.

THE CASES NOT EXPRESSLY PROVIDED FOR BY PSD2

In the financial market, the issue also refers to cases not expressly covered by PSD2.

In this context, it should be recalled that, in order for processing to be lawful, personal data have to be processed on the basis of the legitimate basis laid down by Art. 6, GPDR, and the burden on the controller is the adoption of the one best suited to the purposes pursued. Among these, the data subject's consent has a residual value [Art. 6(1), lit. a), GDPR], as it must be required whenever the basis for the processing cannot be referred to one of the specific circumstances covered by Art. 6(1), lit. b) - f), GDPR. The consent allows the processing and, as already underlined, provides enhanced protection to the data subject by enabling the latter to be aware of and to evaluate the use of his personal data (Bravo, 2019).

On a general level, the processing of the user's personal data for purposes other than the execution of the payment service or the activity of prevention of payment fraud must be based on the user's consent [Art. 6(1), lit. a), GDPR], that has to fulfil the requirements in Art. 7, GDPR[23].

In the light of the above, the issue mainly concerns profiling. This consists of any form of processing of personal data, analysing aspects relating to a natural person and predicting aspects concerning his characteristics and his behaviour (for example, economic situation, personal preference or interests, performance at work, etc..). It is an important source of information for those who carry out the business activity as it enables to offer products and personalized services for the customers (Pierucci, 2019).

Processing data for profiling seems prohibited by Art. 94, PSD2, while it is allowed by the GDPR within certain limits.

In particular, automated processing, including profiling, which produces legal effects concerning a data subject or significantly affects him are prohibited by Art. 22(1), GDPR. This provision has relevance to the protection of the data subject's rights as profiling can purse many purposes; for example, consider profiling related to direct marketing which offers consumers services based on their preferences or the automatic refusal of an online credit application or e-recruiting practices based on their profiling[24].

However, the limitation on processing provided for paragraph 1 of Art. 22, is not applied where there are certain circumstances set out by Art. 22(2), i.e., the decision: is necessary for the entering into, or performance of, a contract between the data subject and the controller [lit. a)]; is authorised by Union or Member State law which the controller is subject [lit. b)]; is based on the data subject's consent [lit. c)].

On this point, it has been observed (Frau, 2019) that, the case referred to in point (c) of paragraph 2 affects the real application of the prohibition set out in Art. 22(1). In fact, although the following paragraphs of Art. 22 require the controller to implement specific safeguards to protect the data subject's rights and freedoms (for example, the right to obtain the human intervention or to contest the decision), the data subject's consent is sufficient for automated processing, including profiling.

Finally, the processing of biometric data[25] is analysed. Due to the significant technological development, the use of this special categories of personal data is increased in many sectors (Ducato, 2019); with regard to the financial sector, decision is made in favour of biometrics, for example, to sign the bank documents with graphometric signature or to access banking services through fingerprint recognition, since biometric data ensure a high level of security being difficult to counterfeit.

In this scenario, it is necessary to consider both PSD2 and GDPR.

Taking into consideration the interests of the natural person involved, biometric data are considered by the GDPR as a particular category of personal data, whose processing is exclusively allowed in specific cases set out by Art. 9(2); therefore, in a general level, intermediaries can process such data in compliance with the specific provision of Art. 9, GDPR.

Additionally, it should be noted that biometric data may be material for payment purposes ad user's personalised security credentials; in such a case, it should be considered as sensitive payment data and as such their use will be subject to even stricter rules applicable to TPPs. Since TPP does not create ongoing relations with the user, PSD2 limited to TPPs the use of sensitive payment data as not necessary for the execution of the service; so, PISPs cannot store such data [Art. 66(2), lit. e)] and AISPs cannot request sensitive payment data linked to the payment accounts [Art. 67(2), lit. e)].

THE ROLE OF THE PSPS AND TPPS IN THE PROCESSING OF PERSONAL DATA

As noted above, processing of personal data shall be based on one of the legitimate basis provided for by Art. 6, GDPR, and be in compliance with the principles of Art. 5, GDPR, to be lawful.

These principles, which ensure a fair and transparent processing of data subject's personal data, consist of proper obligations for the controller to prevent the risks of data's free movement through his accountability. Moreover, GDPR contains other obligations defining a standard of conduct for the subjects who process personal data based on the role that the subjects play in the processing. In the following, we will see that these obligations are relevant with regard to liability for unlawful processing of personal data.

As well known, under the Regulation the subjects who can process personal data are the controller[26] and the processor[27].

The first plays an essential role given that he has to be appointed whenever there is a processing of personal data. Given that, the controller has been empowered to determine the means and purposes of processing and he has general obligations provided by the principles of Art. 5, GDPR[28], and specific obligations concerning information and communication that must be provided to the data subject (Articles 12-22 and 34, GDPR)[29] and to the Supervisory Authority (Art. 33, GDPR)[30] and security, both in terms of prevention and in terms of transparency and integrity of the processing[31].

In fact, the controller must ensure integrity and confidentiality of data processed using appropriate technological and organisational measures [Art. 5(1), lit. f), GDPR]; consequently, he has to provide security measures that, in compliance with the Regulation, takes into account the nature, the contest and the purposes of the processing as well as the risks for rights and freedoms of natural person posed by processing. In fact, according to Art. 25, GDPR, technical and organisational measures have to be implemented both at the time of determination of the means for processing and at the time of the processing itself (data protection by design) and on the basis of a default (data protection by default); therefore, the controller has to assess the processing carried out and the risks linked to it.

A further assessment is required when the processing uses technologies and in cases covered by Art. 35(2), GDPR. The controller, by reason of high risk, must, prior to the processing, carry out an assessment of the impact of the processing operations on the privacy of personal data, taking into account the nature, scope, context and purposes of the processing.

The controller's obligations aim to balance the public interest of free movement of personal data with the protection of natural persons. With the aim of achieving the data subject's protection, GDPR both increases the "protection obligation" of the controller who is required to prevent and manage the risks linked to the processing and establishes his accountability (Bravo, 2019). In fact, Art. 5(2) provides for the principles of accountability, that means that the controller must be able to demonstrate that processing is performed in accordance to Regulation (Art. 24); thus, in order to minimise the risk of unlawful processing, the rules of GDPR Entrust the controller with the assessment of his conduct encouraging him to an actual examination of the purposes pursued and of the interests involved in the processing.

The processor, rather, is not autonomous subject because he carries out instructions and purposes given by the controller (Articles 28 – 30, GDPR)[32].

This is supported by the circumstance that the controller is always liable for the processor's activity save where the processor has acted outside or contrary to lawful instructions of the controller or he has not complied with the obligations of the Regulation specifically directed to him. Failure to respect behavioural obligations will result giving the processor the role of controller; in other words, the processor is treated as if he is a controller in respect of the processing and, as such, he is liable for the damage caused to the data subject [Art. 28(10) and Art. 82(2), GDPR]. The controller, thus, has to assess the competence, reliability and resources at disposal of the processor.

The framework described has importance for the purpose of liability for the unlawful processing of personal data of natural person whose rules are set by Art. 82, GDPR, under which <<any person who has suffered material or non-material damage as a result of the infringement of this Regulation shall have the right to receive compensation from the controller or the processor for the damage suffered>>.

In this respect, it is noted that PSD2 does not provide any further indications for the issue of the unlawful processing. In fact, it provides for two cases relating to liability of the ASPSP and of the PISP: non-execution, defective or late execution of payment transactions (Art. 89) and unauthorised payment

transactions (Art. 73). Despite this latter case presupposes unauthorised disclosure of user's personal data by third parties, PSD2 does not provide for any consequence for intermediaries in relation to the breach of privacy. For the AISPs, indeed, there is no type of liability.

Consequently, the issue must be addressed in the light of the GDPR rules.

In this regard, it is indisputable that when the user opens a payment account, the ASPSP assumes the role of controller of his personal data; instead, identifying the role played by TPPs is more complex. In fact, in order to state that the TPP is the processor, the establishment of a contractual relationship between the latter and the ASPSP shall be ascertained. Before entrusting certain activities to the TPP, the ASPSP should, therefore, assess his reliability and resources. In this way, TPP becomes an employee of the ASPSP and he should carry out his performance on behalf of him. This conclusion, however, is not in accordance with the PSD2 rules.

In fact, as previously noted, with respect to the payment account, TPPs are characterized to be third parties. Additionally, they are allowed to access the user's payment account and to perform their services upon the user's consent, while the existence of a previous contractual relationship with the ASPSP is not necessary. Even the occasional relationship between the ASPSP and TPP to execute the transaction, can be considered sufficient to state that TPP carries out his service on behalf of and for the purposes of the ASPSP.

In summary, despite both intermediaries participating for the completion of the operation, TPPs remain independent subjects that autonomously determine the purposes and means of the processing; so, when they provide their services, they assume the role of controller.

Given that, both TPPs and ASPSP play the role of controller, the issue to be investigated is that they are joint or autonomous controllers.

In fact, Art. 26, GDPR, establishes that <<where two or more jointly determine the purposes and means of processing, they shall be joint controller>> but it does not clarify what characterizes joint determination. In this regard, it does not seem sufficient that the activities of the controllers are inextricably linked to the extent that processing would not be possible without the participation of both (Tuzzolino, 2019). Additionally, joint controllers have to determine their responsibilities for compliance with obligations under GDPR, in particular as regards the exercising of the data subject's rights and their respective duties to provide information, by means of an arrangement between them. The arrangement is not constitutive of the joint controllers but it determines the respective role and relationships of joint controllers *vis-à-vis* the data subject. Therefore, it is relevant only for the internal sharing of the liability.

This conclusion is confirmed by the fact that, irrespective of the terms of the arrangement, the data subject is allowed to exercise his rights in respect and against each of the controllers [Art. 26(3), GDPR].

With regard to TPPs and ASPSPs, the exchange of information itself, including personal data, does not determine a situation of joint controller; however, can not to be excluded that TPPs and ASPSP arrange with each other to create a common infrastructure and to jointly determine the purposes and means of the processing. It is therefore necessary to address the specific case whether or not the case is one of joint controllers.

On a general level, it can be concluded that, in absence of evidence concerning the sharing of purposes or means of processing by TPPs and ASPSP, both have to be considered as autonomous controllers of the user's personal data.

THE ISSUE OF LIABILITY FOR UNLAWFUL PROCESSING OF PERSONAL DATA

The proper identification of the roles is crucial for the distribution of liability.

GDPR defines the relationship between the subjects who can process the data subject's personal data and, consequently, are liable for any unlawful processing. Controller, joint controllers, processor and sub-processor are potentially liable for the damage suffered by the data subject. However, while controller is liable for the damage caused by an infringement of the GDPR – whether he has directly performed the processing or that has been carried out on his behalf by the processor – the latter can be considered liable only where: a) he has not complied with the obligations of the GDPR specifically directed to him; b) he has acted outside or contrary to lawful instructions of the controller [Art. 82(2)].

This limit is justified by the fact that, as previously observed, only the controller determines the purposes and means of the processing.

In order to grant that data subject and third parties have an effective protection, GDPR stipulates that, where more subjects are involved in the same processing (controller and processor or more controller or more processor), each subject is liable for the entire damage; the data subject, therefore, is allowed to claim compensation from each subject involved in the processing, independently of his role and share of responsibility [Art. 82(4)].

In internal relation, instead, it has to be taken into consideration the role played and compensation is apportioned according to the responsibility of each subject involved for the damage caused by the processing. This means that the subject who has restored the damage may claim back from the other ones a share of compensation corresponding to the damage caused by each of them [Art. 82(5)].

Further observations are necessary on topic and, in particular, on the criteria used to determine the attribution of liability.

According to Art. 82 every material or non-material damage linked to the processing[33] operation and resulting from the infringement of the Regulation may be compensated; Recital no. 146 supplements this provision specifying that the processing not in accordance with the GDPR also includes <<processing that infringes delegated and implementing acts adopted in accordance with this Regulation and member State law specifying rules of this Regulation>>. Consequently, the position of the controller is more onerous for two reasons.

Firstly, the provision, as sets out, widens the number of unlawful. Secondly, it should be noted that the controller's obligations determine an increase of the level of diligence required to him, especially when there is a precise description of the conduct to be adopted. In fact, the obligations contained in the GDPR set out a standard of lawful behaviour and they become an assessment parameter of the controller's diligence that diverge from the general principle of the Italian Civil Code. Essentially, due to the processing activity carried out, the controller must demonstrate that his organisation complies with the provisions of the GDPR. The result is that the controller's obligations are more onerous than those which require the adoption of the technical diligence standards.

The European legislator's decision to assess the diligence of the controller according to a predetermined standard behaviour promotes the objective of a harmonized regulatory framework by eliminating the possibility of a different assessment of the controller's diligence by Member State. However, the high level of diligence, in terms of organisational efficiency, significantly increases the costs for controller which are likely to be passed on the consumers or, in the case of payment services, on the payment service users.

The liability regime is particularly onerous also because of the provision of Art. 82(3), GDPR, pursuant to which controller shall be exempt from liability only if it proves that is not in any way responsible for the event giving rise to the damage.

The provision to place on the controller the burden of proof is explained by the awareness of the legislator of the difficulty for the data subject to demonstrate the controllers' liability, especially when the processing is carried out by electronical means.

This rule can be interpreted in two different ways. According to the first (Gambini, 2019), the controller has to demonstrate compliance with the GDPR's rules that are designed to prevent the damage. In this scenario, the liability for unlawful processing is particularly onerous but the controller may escape liability proving his diligence.

For the second interpretation, instead, the controller's liability is a strict liability (Tosi, 2020). In this case, the controller's fulfilment of the burden of proof of having adopted all measures required to prevent the damage, acting as a necessary condition, but not yet sufficient for the liability to be considered not attributable to the controller. In fact, the latter has also to demonstrate that the damage was caused by an event outside his control such as unforeseeable circumstances or major force.

In brief, without prejudice to the reversal of the burden of proof to the advantage of the subject who suffered the damage, the unsolved issue is as to the controller should only demonstrate his diligence, namely his behaviour is in compliance with the standards set forth by the GDPR's rules whether he also has to identify the act that caused the damage, in order to avoid the allocation of liability.

Therefore, the case-law and, in particular, that of the Court of Justice, will be responsible for harmonizing the interpretation of the provision, in order to avoid an equivalent application of the rule which could induce the controllers to place their establishments in the Member State where there is a less strict application of the provision. This could prejudice the consistency and homogeneity of the rules for the protection of the rights and freedoms of natural persons that are crucial to ensure a high level of protection (Recital no. 10, GDPR).

As compensable damage, it should be noted that, Art. 82(1), GDPR, recognizing the right to receive compensation both for material e non-material damage, incorporates the idea that the unlawful processing of personal data may damage non strictly financial aspects of the natural person, for example, where the processing gives rise to discrimination, damage reputation, identity theft or fraud. On this point, Recital no. 146, GDPR, clarifies that <<the concept of damage should be broadly interpreted in the light of the case-law of the Court of Justice in a manner which fully reflects the objectives of the Regulation>>; thus, the task of determining compensation, especially with regard to non-material damage, the quantification and settlement of which is more difficult, is conferred to the Court.

Instead, the idea, based on the previous interpretation of Art. 15 Code of privacy, that the damage is *in re ipsa*, i. e. in the same unlawful conduct, is not reflected in the data protection framework; in fact, in this way the function of rigorously overseeing the lawfulness of the conduct of the controller is accorded to the provision of GDPR[34]. However, has noted above, the free movement of personal data is one of the main objectives of the Regulation and, for this reason, GDPR allows the controller to carry out the processing activity. These, as has been underlined, fulfils both the interest of the subject who carries out the business activity and general interests since the use of personal data pursues different activities, economic, scientific, of historical research, of fraud prevention etc…In this scenario, a strict interpretation of Art. 82, GDPR, could prejudice the achievement of those objectives of the Regulation.

Finally, the provisions of Art. 82, according to which anyone can claim compensation for the damage suffered as an infringement of the rules of the Regulation, seems to recognise the right to receive

compensation also to the persons other than the data subject who have been otherwise affected by the infringement of this rules.

In conclusion, both with reference to the specific issue of the controller liability and with reference, on a general level, to the other aspect provided for by the GDPR, in the interpretation of the rules on personal data processing and protection, it is necessary to take into consideration the balance between the general interest in the free movement of personal data and the specific interest of data subject to be able to control the use of his data.

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ENDNOTES

1 The PSD (Directive 2007/64/EC) is based on the principle of "technological neutrality" under which regulation should not hinder, but encourage, the development of technology. In this respect, Recital No. 4 of the PSD states that <<it is vital, therefore, to establish at Community level a modern and coherent legal framework for payment services, whether or not the services are compatible with the system resulting from the financial sector initiative for a single euro Payments area, which is neutral so as to ensure level playing field for all payment systems, in order to maintain consumer choice, which should mean a considerable step forward in terms of consumer cost, safety and efficiency, as compared with the present national system>>. In this context, <<neutralità tecnologica è sinonimo del termine "standard di prestazione"; questi sono gli standard che descrivono il risultato previsto ma non impongono una regolazione come mezzo per strutturare il mercato in un certo modo. In un mercato altamente competitivo, i regolatori dovrebbero impegnarsi a non scegliere Minuscule vincitori tecnologici>> (Cervone, 2016).

2 Actually, Art. 4(1), no. 15, PSD2.

3 Actually, Art. 4(1), no. 16, PSD2.

4 Recital no. 9 of GDPR states that the protection of personal data cannot become an obstacle to the free movement of data or distort competition.

5 See Recital no. 3, PSD2.

6 PSD2 establishes that the competent authority of each Member State is entitled to grant the authorisation (Art. 13) and to monitor the permanent compliance with the requirements to obtain it (Art. 23, PSD2).

7 Security is considered a priority by the legislator in order to encourage the use of electronic payment services. For this reason, under PSD2: a) all intermediaries are required to establish a framework with appropriate mitigation measures and control mechanisms to manage the operational and security risks relating to the payment services they provide; b) they must adopt the strong customer authentication, in order to ensure enhanced protection (Art. 97 and Art. 98, PSD2).

8 Sensitive payment data means <<data, including personalised security credentials which can be used to carry out fraud. For the activities of payment initiation service providers and account information service providers, the name of the account owner and the account number do not constitute sensitive payment data>> [Art. 4(1), no. 32, PSD2].

9 With regard to security, the PSD2 has entrusted the EBA (European Banking Authority) with the task of developing standards and rules on the most technical aspects in order to make the obliga-

tions imposed on intermediaries in concrete terms applicable. For this reason, the EBA has issued the Regulation Eu no. 389/2018.

[10] Something that the payment service user knows. On this point, the EBA, in its document of 21 June 2019, "Opinion of the European Banking Authority on the elements of strong customer authentication", specified that passwords, pins or security questions may fall into that category, while payment card details, security code and email address should be excluded.

[11] Something that the payment service user owns. According to EBA, non-material assets such as an app or evidence of OTP generation by software and digital signature are also included in this category.

[12] Something that characterised the payment service user. According to EBA, fingerprint, retinal and iris scanning, speech or facial recognition, or typing dynamics fall into this category.

[13] In accordance with Art. 30 and Art. 34, Regulation Eu no. 389/2018, all intermediaries to comply with the obligation to identify, must adopt digital certificate released by Qualified Trust Service Provider (QTSP), whose rules are contained in Regulation Eu no. 910/2014 (Regulation e-IDAS). These certificates identify the intermediaries, if they are PISP or AISP, and they are of two types: one of them ensures the integrity and the correctness of the data transmitted; the other, indeed, guarantees that the data are uniquely linked to the creator of the seal and that the seal is linked to the data to which it is related in such way that any subsequent change in the data is detectable. The Qualified Trust Services Providers has to verify, by appropriate means and in accordance with national law, the identity, and if applicable, any specific attributes of the natural or legal person to whom the qualified certificate is issued. In the case of the payment service providers, they must have obtained authorisation to carry out the activity as a payment service provider in order to obtain the qualified certificates.

[14] Article 5 provides that: <<Personal data shall be: a) processed lawfully, fairly and in a transparent manner in relation to the data subject (lawfulness, fairness, transparency); b) collected for specified, explicit and legitimate purposes and not further processed in a manner that is incompatible with those purposes; further processing for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes, shall, in accordance with Article 89(1), not to be considered to be incompatible with the initial purposes (purpose limitation); c) adequate, relevant and limited to what is necessary in relation with the purposes for which they are processed (data minimisation); d) accurate and, when necessary, kept up to date; every reasonable step must be taken to ensure that personal data that are inaccurate, having regard to the purposes for which they are processed, are erased or rectified without delay (accuracy); e) kept in a form which permits identification of data subjects for no longer than is necessary for the purposes for which the personal data are processed; personal data may be stored for longer periods insofar as the personal data will be processed solely for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes in accordance with Article 89(1) subject to implementation of the appropriate technical and organisation measures required by this Regulation in order to safeguard the rights and freedoms of the data subject (storage limitation); f) processed in manner that ensure appropriate security of personal data, including protection against unauthorised or unlawful processing and against accidental lost, destruction or damage, using appropriate technical or organisational measures (integrity and confidentiality).
The controller shall be responsible for, and able to demonstrate compliance with, paragraph 1 (accountability)>>.

[15] Article 6 provides that: <<processing shall be lawful only if and to the extent that at least one of the fallowing applies: a) the data subject has given consent to the processing of his or her personal data for one or more specific purposes; b) processing is necessary for the performance of a contract to which the data subject is party or in order to take steps at the requests of the data subject prior to entering into a contract; c) processing is necessary for compliance with a legal obligation to which the controller is subject; d) processing is necessary in order to protect the vital interests of the data subject or of another natural person; e) processing is necessary for the performance of a task carried out in the public interest or in the exercise of official authority vested in the controller; f) processing is necessary for the purposes of the legitimate interests pursued by the controller or by third party, except where such interests are overridden by the interests or fundamental rights and freedoms of the data subject which require protection of personal data, in particular where the data subject is a child>>[…].

[16] It has been observed (Bravo 2019) that the Regulation confers to the controller the power to perform the processing, determining purposes and means. The legitimate basis, therefore, identify the interests involved in the processing and become an "element of control" of the processing. They remove a restriction placed on the existing power of the controller and permit a balance of interests involved: on the one hand, the protection of the natural person, on the other, the free movement of the personal data (42).

[17] The definition contained in Art. 4(1), no. 1, may be supplemented by certain references in Recitals no. 30, 57 and 64 which clarify, with regard to the online services, what elements can be classified into this category.

[18] Unique identifier means <<a combination of letters, numbers or symbols specified to the payment service users by the payment service provider and to be provided by the payment service users to identify unambiguously another payment service user and/or the payment account of that other payment service user for a payment transaction>> [Art. 4(1), no. 33, PSD2].

[19] GDPR provides for personal data exchanging but does not contain any reference to payment. In fact, according to Art. 20, the data subject enjoys the right of data portability, i.e., he has the possibility of receiving the personal data, which he has provided to a controller, and the one that the personal data to be transmitted directly from one controller to another, as is the case, for example, of the change of telephone service provider.

Nevertheless, the data subject's right is limited to processing carried out by automated means and based on consent pursuant to point a), Art. 6(1) or point a), Art. 9(2) or in a contract pursuant to point b), Art. 6(1). Related to that, it is noted (Sertoli, 2019) that the data portability raises several issues including the identification of personal data actually transmitted. In fact, having regard to the provisions of Art. 20, it can be assumed that only data directly provided by the data subject may be transmitted. However, the means of processing allow the controller to acquire further information by extrapolating from those already owned or received from third party.

[20] This conclusion is also suggested by Recital no. 47, GDPR, which underlines that the processing of personal data strictly necessary for the purposes of preventing fraud constitutes a legitimate interest of the data controller concerned.

[21] According to Art. 64, PSD2, a payment transaction is considered to be authorised only if the payer has given consent to execute the transaction. Therefore, the PSP must obtain the user's consent each time it performs a given operation.

[22] In this regard, in the EBA's letter, published on 15 July 2018, it is observed that the explicit consent referred to in Art. 94(2) of PSD2 is a contractual consent and should be interpreted, on the one hand, in coherence with the applicable data protection legal framework, and on the other, in a way that preserves its useful effect. Therefore, <<when entering a contract with a payment service provider under PSD2, data subjects must be made fully aware of the purposes of which their personal data will be processed and have to explicitly agree to these clauses>>. In summary, the concept of explicit consent under PSD2 is an additional requirement of a contractual nature and is not the same as explicit consent under GDPR.

[23] The consent, the legitimate basis referred to in point (a) of Art. 6(1), consists in a freely given, specific, informed and unambiguous indication of the data subject's wishes (see Recital no. 32). In this regard, Art. 7, GDPR, is essential with reference to the data subject's protection as it provides for specific obligations for the controller who bases on the data subject's consent the processing. In particular, the controller is subject to the obligation to provide any information referred to in Articles 12, 13 and 14, GDPR. Such information must be provided in an intelligible and easily accessible form, if the data subject's consent is given in the context of a written declaration which also concerns other matters [Art. 7(2), GDPR]. Additionally, the controller is avoided to adopt an un fair behaviour, for example, by making the performance of the contract or the provision of the service conditional upon consent to the processing that is not necessary to the performance of the contract [Art. 7(4), GDPR]. Finally, the controller has to be able to demonstrate that the data subject has consented to processing of his personal data [Art. 7(1), GDPR]; this circumstance has relevance in order to the assessment of the lawfulness of the controller's conduct. On this latter point, it is noted that, in order to ensure that the data subject is aware, GDPR states that information must be provided in writing, while it contains no formal requirements for consent is given. However, Recital no. 32, GDPR, offers some guidelines on the means through which the data subject signifies consent, including electronic means; in this regard, clearness and intelligibility of the means by which the data subject's consent to the processing is given have been discussed (Caggia, 2019; Lucchini Guastalla, 2018; Zeno Zencovich, 2018; Bravo, 2017; Mantelero, 2017; Pizzetti, 2016). Both the regulation on payment services and the one on personal data processing enhance the function of the consent as expression of the power of individual's self-determination. However, with respect to the regulation on personal data processing, it has been observed that consent, as an act of will by which the individual exercises his power to decide freely on matters concerning him, does not guarantee effective protection to the subject who expresses it but it reduced to "an empty ceremony" because the reading of the privacy policy tends to be only a passage to obtaining the service to which the processing of personal data is functional (Caggiano).

[24] in this regard, Recital no. 71 recognises the data subject's right not to be subject to a decision based solely on automated processing, such as automatic refusal of an online credit application.

[25] Biometric data means <<personal data resulting from specific technical processing relating to the physical, physiological or behavioural characteristics of a natural person, which allow or confirm the unique identification of that natural person, such as facial images or dactyloscopic data>>. (Art. 4(1), no. 16, GDPR).

[26] <<Controller means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data; where the purposes and means of such processing are determined by Union or member State law,

the controller or the specific criteria for its nomination may be provided for by Union or member State law>> [Art. 4(1), no. 7, GDPR].

27 <<Processor means a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller>> [Art. 4(1), no. 8, GDPR].

28 As already considered, Art. 5, GDPR, contains principles that, in certain cases, consist in specific obligations as for example, the obligation of rectification and erasure of personal data, in order to ensure that information concerning data subjects are accurate. In other cases, the article indicates the objectives to be achieved without indicating the measures to achieve them. Thus, these must be determined by the controller.

29 Transparency consists of controller's obligation provided for by Articles 12 – 22, GDPR. In particular, in compliance with the principle of transparency, controller must: take appropriate measures to provide any information referred to in Articles 13 and 14 (Art. 12); indicate the personal data to which the data subject has the right to access (Art. 15); inform the data subject that he has the right to rectification (Art. 16), to erase (Art. 17), to restriction of processing where one of the circumstances provided for by Art. 19(1) applies (Art. 19). Moreover, data subject has: the right to data portability (Art. 20); the right to object the processing (Art. 21) and the right not to be subject to automated individual decision making (Art. 22).

30 In order to ensure enhanced protection to data subject and a consisting monitoring of processing of personal data, the controller is subject to the obligation to notify, without undue delay, the personal data breach to the Supervisory Authority. This obligation is an example of the general obligation of cooperation with the Supervisory Authority (Art. 31).

31 Recital no. 39 establishes that personal data shall be processed in a manner that ensure appropriate confidentiality and security of personal data, including for preventing unauthorised access to or use of personal data; Recitals no. 85 and 86 establishes that the controller must notify the personal data breach to the Supervisory Authority without undue delay; Recital no. 87 underlines that it is important to ascertain whether all appropriate technological protection and organisational measures have been implemented to establish immediately whether a personal data breach takes place.

32 The controller designates the processor and he have to evaluate that the latter provides sufficient guarantees, in terms of knowledge, reliability and resource. The relation between the parties is governed by a contract or other legal act under Union or Member State law and it is concluded in writing or in electronical manner. In this regard, Art. 28(3), GDPR, establishes that the contract sets out the subject-matter and duration of the processing, his nature and purposes, the type of personal data and categories of data subjects and the obligations and rights of the controller.

33 As referred to Art. 4(1), no. 2, processing means <<any operation or set of operations which is performed on personal data or sets of personal data, whether or not by automated means, such as collections, recording, organisation, structuring, storage, adaptation or alteration, retrieval, consultation, use disclosure by transmission, dissemination or otherwise making available, alignment or combination, restriction, erasure or destruction>>.

34 See Gambini, who reports the thought of part of the doctrine concerning Art. 15, of the Italian Code of Privacy, actually repealed.

Chapter 13
New Technologies and Privacy:
Some Reflections on Subjects, Legal Categories, and Evolving Rights

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ABSTRACT

This work proposes a necessarily partial and evolving reflection on the dynamics by which information technologies have progressively changed the definition and interaction between privacy and knowledge, focusing on crucial points from a legal point of view. The relevance of the debate that has developed in recent years, on these issues, is evidenced by numerous initiatives and measures—both European and international—which offer answers to phenomena such as the development of the internet of things and, more generally, to progress in computer science and robotics. From this perspective, uncertainties are raised concerning the necessary respect for privacy and individual dignity to be balanced with the right to inform and to be informed, as evidence of an effectively shared knowledge. The critical point of the question is, in any case, the identification of a flexible balance between freedom and constraint, considering the violation of privacy not only as a mere limitation of individual potential, but as a factor capable of undermining the core of personal freedoms.

INTRODUCTION

This essay initiates a, necessarily partial and evolving, reflection on the dynamics by which information technologies have progressively changed the definition and interaction between privacy and knowledge, focusing on crucial points from a legal point of view. The relevance of the debate that has developed in recent years, on these issues, is evidenced by numerous initiatives and measures - both European and international - which offer answers to phenomena such as the development of the Internet of Things and, more generally, to progress in computer science and robotics. From this perspective, uncertainties are raised concerning the necessary respect for privacy and individual dignity, to be balanced with the right to inform and to be informed, as evidence of an effectively shared knowledge.

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In fact, in the new economy, information represents one of the main economic resources of the production process (Amato Mangiameli & Campagnoli, 2020; Rifkin, 2000), given that traditional markets give way to the IT network markets and ownership, as usually understood, is progressively replaced by the value of the possibility of access informations. In other words, information technologies - through which it is possible to exchange goods, services and knowledge outside the traditional intermediation processes - outline market forms characterized by an increasing use of de-territorialized assets (Amato Mangiameli & Campagnoli, 2020). "In the new network economy, what is actually being sold are images and ideas. The material form that these ideas and images take is becoming increasingly irrelevant to the production process. If the industrial era market was characterized by the exchange of objects, the new economy is characterized by access to concepts, contained in material form" (Rifkin, 2000). The ability to control and sell knowledge becomes the most sophisticated and profitable form of commercial exchange, so that the greatest profit comes not so much from production processes and products, but from the control of information and trends (Rifkin, 2000). The activities of collection, selection and monitoring of personal data, therefore, assume fundamental importance as they are aimed at building customer loyalty. The so-called *database marketing* is aimed, in fact, at the segmentation of customers, perfected up to segment of one, that is, set on personalized offers on the individual customers: in this regard, it is interesting to recall the formulation of the *Unicity* concept estimating the fraction of users uniquely identified by a number of randomly chosen information to which a potential interested party could have access (Longo & Scorza, 2020, pp. 133).

In general, then, the customer relationship with the company is not static, but evolves over time, so it is commercially advantageous to understand its internal dynamics through the use of "rational technologies", *R-Technologies*, which allow companies to describe evolving existential profiles (Rifkin, 2000). For these reasons, the progressive commodification of the consumer's long-term relationship with the company, functional to anticipating customer wishes, entails considerable perplexity regarding respect for individual privacy and the essential autonomy of individual choice. "The type of relationships that these technologies are able to devise is, by its very nature, one-sided. Although the Internet and cyberspace give the individual consumer a limited power of counter-surveillance and allow interactivity, the company knows much more about the consumer than the consumer can even imagine about the company in front of him" (Rifkin, 2000). In the personalization of business performance, facilitated by the massive use of Big Data, and in addressing information towards certain objectives, the coincidence between knowledge and power and the asymmetry between supplier and user of services are revealed (Faini, 2019, pp. 316; Perri, 2020, pp. 17-18). Through an effective data analysis it is possible, in fact, to define the type of message to be sent to a specific type of consumer, making individual choices precalculable: as Zuboff warns, to minimize the unknowns and outline increasingly updated and realistic models of behavior constitutes the purpose of *surveillance capitalism* (Zuboff, 2019), based on the essential link between persuasion and prediction. In fact, the most predictive data are obtained by intervening on individual behaviors, persuading individuals to hire those that generate the greatest profit. In this way, automatic processes of data not only know our habits, but contribute to forming our behaviors, in fact, multiple cognitive and behavioral psychology studies have shown that the more critical information is known about a person or a group, the easier it is to influence their opinions, choices and behaviors, consequently, sending a very targeted message at the most opportune moment considerably increases the chances of success, while highlighting all the doubts and unknowns concerning the long-term social consequences, especially on the new generations, of commercial *datification* (Longo & Scorza, 2020, pp. 136-37). The delineation of individual profiles and preferences, therefore, influences subjective choice, as demonstrated

by the phenomena of anticipatory shipping and anticipatory selling, developed by Amazon, capable of anticipating and inducing, apparently without any forcing, future customer purchases (Talia, 2018, p. 25). With *advance shipping*, the idea is to use personal data to predict what customers want and, then, ship the products automatically: when it works, such a system basically outsources the shopping list to an algorithm, creating potentially worry-free and happy, loyal customers (Kopalle, 2014). So, "the efficiency of the digital revolution is also manifested in the 'recommendations', in the algorithmic 'suggestions' we receive from search engine advertisements or highlighted on e-commerce sites: opportunities that could be of interest, as they have interested others, similar to us, before us" (Delmastro & Nicita, 2019, p. 13). Finally, just think of the so-called NBIC technologies (*Nanotechnology, Biotechnology, Information technology, Cognitive science*) that control information necessary for the reproduction of reality by influencing the sense of reality through the standardization of social behaviors and practices, modifying the imagination and the relationship that man has with himself and his environment: these technologies not only represent mere forms of instrumental rationality but they are able to define the relationship between man and the world, showing how technology has become decisive for the genesis of subjectivity and sociality (Amato Mangiameli & Campagnoli, 2020; Bisol et al., 2014, p. 244). So, technological cognitive enhancement is developing not only at an information level, but also in a more specifically human sphere, assuming a very relevant normative value, united by a deep reflection on the possible technological transformations of the human (Palazzani, 2015, pp. 122-39), showing how artificial intelligence and current data extraction and analysis methodologies can represent a great potential for the benefit of humanity, as long as they are connected to the fundamental distinction between what can be programmed and what otherwise belong exclusively to man and to his capacity of autonomous reflection (Amato Mangiameli, 2019, p. 123).

THE RIGHT TO PRIVACY

At the international level, privacy is recognized as a fundamental human right enshrined in art. 12 of the Universal Declaration of Human Rights of 1948, the International Covenant on Civil and Political Rights of 1966 and many other international Conventions. The right to privacy, as well as the right to the protection of personal data are also recognized at the European level as evidenced by the Charter of Fundamental Rights of the European Union of 2009, according to which "Everyone has the right to the protection of personal data concerning him " (Article 8.1).

In an attempt to outline a current definition of the right to privacy, many questions arise related to the need to establish rules of principle on the complex dialectic between the protection of freedom of initiative and the legal guarantee of public interests (Bessone, 2002). This delicate balance is made even more complex by the transnational value of the subjects and interests involved: in fact, national policies sensitive to privacy are flanked by legal systems still far from effective awareness on this issue (Bessone, 2002). Indeed, it should be noted the gap that still exists between the EU approach, aimed - albeit in a non-homogeneous way among the EU countries - to the protection of the fundamental rights of the person and supported by a rigorous regulatory apparatus, and the US approach, more condescending to the market in favoring self-regulation initiatives and in proposing mainly technological security measures (Guerra, 2001). In this regard, on the necessary balance between the protection of the private sphere of action and the public interest in the use of personal data, the European approach and the US system do not seem perfectly aligned: if the latter seems to enhance the negotiating value economic and economic aspects

of personal data, which can therefore be freely transferred by users, the European criterion starts from the centrality of the person and from the right to intervene to protect the correct processing of informations (Mensi & Falletta, 2018, p. 352). In other words, while in Europe the protection of personal data is recognized as a fundamental right of the person, the US approach focuses more on commercial aspects and consumer law. Furthermore, it can be noted that in USA there is no federal regulatory authority with functions and powers similar to those of the European authorities for the protection of personal data and how respect for the right to privacy is mostly guaranteed through litigation, in the judicial, which is the responsibility of the injured party to act (Mensi & Falletta, 2018, p. 352). Consequently, it can be noted that the point of view on the protection of personal data between the two sides of the Atlantic is very different, as evidenced also by the Schrems II judgment of July 2020 in which the Court of Justice of the European Union (CJEU) declared the European Commission's decision on the Privacy Shield null and void due to invasive US surveillance programs, thus carrying out transfers of personal data based on the illegal privacy shield decision. The US legislation relating to intelligence systems for reasons of national security and public interest was judged unbalanced and unsuitable to guarantee an adequate level of protection of personal data, since the principles of proportionality and minimization of processing would not be respected, in addition to the right to a effective protection and to take action to assert the failure to respect their rights. In this discussion on the difficult balance of interests at stake, even in the face of reasons of public interest - and in a situation made even more uncertain by the abolition of the Privacy Shield - European legislation and the GDPR reaffirm the principle of proportionality and respect for the right to the protection of personal data, as well as the importance of applying appropriate measures to guarantee it. In addition, the protection of personal data is constantly evolving and it is strictly connected to the application that operators make of the legislation, as demonstrated, in 2020, by the recent recommendations of the EU Data Protection Board, which, among other points, recommends a greater use of a periodic impact assessment, to minimize data processing as much as possible, for example through pseudonymisation or encryption tools, as well as by the latest draft of the new standard clauses issued by the European Commission and open to public consultation. It should also be noted that the different approach between USA and Europe derives from their different legal and economic systems and how these distances are increasingly shortened by a global economy, a convergence in which digital systems capable of making people and interconnected processes regardless of where they are (Hyeraci, 2020). Here appears, in the transnationality of the interests and of the subjects involved, all the need for good practices, also taken over by the G20 Digital Economy Ministers Meeting last 2020, and supranational and international guidelines as crucial and indispensable common reference points for all operators as digital security and privacy are a priority for individual citizens as well as for governments (Hyeraci, 2020).

It should also be remembered that the use of PET (Privacy Enhancing Technologies) - developed to ensure a sufficient level of confidentiality in cyberspace, by eliminating or reducing the use of personal data in the processing or by preventing unnecessary processing of personal data without compromising the system functionality (Pascuzzi, 2020, pp. 97-98) - as well as the use of techniques such as cryptography and steganography, do not appear sufficient to ensure complete anonymity on the Web, given the ease of reaching an automatic identification of individual profiles, as well as the ability of IT systems to track, identify and store any virtual activity (Palanza, 2016). For these reasons, US jurisprudence has, for some time already, developed the principle of the *reasonable expectation of privacy*, according to which violations of the right to privacy should be related to the level of confidentiality reasonably enforceable, given the subjective and objective context – areas in which the needs of large users, such as networks connected to the territory, can be distinguished from the expectations of the individual user (Calvo et al.,

2004) - and by classifying the means of communication by means of their potential of intrusiveness in human relations. The first jurisprudential affirmation of the right to privacy by the American Supreme Court, in fact, took place in 1967 with the *Katz vs. United States*: the Supreme Court, in a context of intangible property such as electronic telephone communications, established the principle of "reasonable expectation of privacy" by stating that a conversation, even if made from a telephone booth and therefore in a public place, however, it deserved protection under the Fourth Amendment and extending the protection of the Fourth Amendment to the various areas of individual action, subjected to the so-called *Katz test*, functional to determine the aforementioned principle.

The critical point of the question is, in any case, the identification of a flexible balance between freedom and constraint, considering the violation of privacy not only as a mere limitation of individual potential, but as a factor capable of undermining the core of personal freedoms since it attacks the individual possibility to plan autonomously and individual freedom itself (Rodotà, 2019, p. 40).

This is also evidenced by the intense debate on the difficult balance between the right to information, to be informed and the right to be forgotten (Faini, 2019, pp. 243-249, 314-320; Ziccardi, 2017) – an aspect that we can only hint at here - as can be also deduced from the analysis of the recent rulings on of the italian Supreme Court of Cassation with which it has identified the hypotheses in which the right to be forgotten can be compressed in favor of the right of the press (Cass. civ., sez. I, ord. 20/03/2018, n. 6919), issue subsequently referred to the United Sections in order to allow unambiguous identification of the criteria to be adopted for the balancing of the rights in question (Cass. civ. S.U., 22/07/2019, n. 19681). In the same direction we have the recent order of the Civil Court of Cassation (Cass. civ., sez. I, ord. 19/05/2020 n. 9147) - which, while recalling the previous jurisprudential settlements on the subject, ruled as the right to be forgotten of the subject who complains about the presence on the web of news that it concerns him and the re-emergence of the same through the consultation by typing the query on the search engine can be ensured not with the cancellation of the news from the online newspaper but rather through its de-indexing from search engines by the manager - and the very recent provisions of the Guarantor privacy n. 192 and n. 195 of 15 October 2020 which, following two complaints against the Google search engine, regarding the right to be forgotten, affirmed the right to de-index news even if recent, making the right to de-index the news prevail on the search engine, even in the absence of the requirement of the passage of time, if there is no public interest in the dissemination of the same, a ruling that seems to open up to future situations which could entail a restriction of the right to information, if the circumstances exist (Sabbatini, 2021).

The development and growing pervasiveness of information technologies, fueled by the phenomenon of technological convergence (Pascuzzi, 2020, pp. 59-66), outline the right to privacy in the dual meaning of guaranteeing the most reserved sphere of the human being and the protection of personal data concerning him, highlighting the impossibility of hypostatization of a phenomenon in which the technical-scientific evolution is linked to social processes of different nature, first of all to the increasingly felt needs of collective security (Passaglia, 2016, p. 332). Being able here only briefly to mention this evolutionary path (Viggiani, 2015, pp. 32-33), it should be remembered that even in the most remote ancient times man sought moments of solitude to protect private life and had developed the concept of confidentiality and secrecy of information. In any case, the modern origins of the concept of privacy can be traced back to two US jurists, Samuel Warren and Luis Brandeis who, in volume 1890-91 of the *Harward Law Review*, published the essay *The Right to Privacy*. In this work - which arose from the controversy against the *Evening Gazette*, accused by Warren of undue interference in the intimate life of his wife - the two authors questioned, precisely, what information from private life should remain secret

and which, otherwise, could become public domain, outlining the right to privacy through the intrinsic value it possesses for its owner. The notion of privacy was, then, extended to speak of *computer privacy*, indicating the need to have control of personal information circulating through electronic computers and the telematic network, data which, if correctly interpreted, reveal the most confidential details of the human existence (Pascuzzi, 2020, pp. 79-82). From this perspective, the right to privacy is configured as "informative self-determination" (Rodotà, 2019, p. 40), that is, the right to have full control of personal information which does not always coincide with the secrecy of the same: in fact, even when the personal data are no longer hidden - for example because they have already been transferred to others to the same subject for different purposes - the interested party can prevent any further use (De Tullio, 2016, p. 653).

In Italy, the right to privacy is configured as an inviolable right, essential for autonomous individual training as well as for authentic social development, being intimately connected to individual freedom and dignity. The main provisions, relating to the protection of personal data, are contained in Legislative Decree no. 30 June 2003, n. 196, called "Code regarding the protection of personal data" (Privacy Code), a provision aimed at bringing together the innumerable provisions of the sector which have occurred over the years and at introducing the most significant innovations of the Guarantor Authority and of the European Directives on the subject of confidentiality of electronic communications. Among the latter, it is necessary to mention the EU Directive n. 95/46, concerning the protection of individuals with regard to the processing of personal data, with the aim of harmonizing the rules on the protection of personal data and guaranteeing the free circulation of data in the European Union, promoting a high level of protection of fundamental rights. This provision was repealed by the General Data Protection Regulation (GDPR: EU Regulation no. 2016/679) aimed at strengthening the confidentiality of private information by implementing the system of responsibilities and security measures to protect information. The legislative decree n. 101 of 10 August 2018 has, subsequently, adapted the Privacy Code to the provisions of the GDPR, followed by the ministerial decree of 15 March 2019, concerning some changes to the Privacy Code regarding the deontological rules in processing for archiving purposes in the public interest or for historical research purposes.

The current meaning assumed by privacy, by individualistic and substantially passive protection of the right to be left alone with the right to full control of their information (Rodotà, 2019, p. 31), is also sanctioned by the Italy Declaration of the Internet Rights - made public on 13 October 2015 during an international conference held at the Sala della Regina in Palazzo Montecitorio. This text, despite being devoid of legal force, binding and prescriptive, performs a significant function of *moral suasion* (Faini, 2019, p. 51) and it represents a fundamental document in guaranteeing each individual the exercise of an active digital citizenship, in the enhancement of a society of dignity, equality, freedom and participation (Rodotà 2004).

PRIVACY AND CONSENT

The traditional debate on privacy becomes very heated when it comes to monetization of data, that is, when it is privacy itself that becomes an economic resource and when it is users who sell it in exchange for services that are only apparently free, it being evident how personal information is related to the rights of the person and raising their economic exploitation pressing ethical and legal issues. "The real problem arises from the lack of awareness that citizens have of how much of their privacy is for sale, of how invasive the personalized advertising built on their clicks is in their lives and how inadequate the

defense that current legislative systems really guarantee is to protect citizens and communities" (Talia, 2018, p. 48). As Margaret Vestager, European Commissioner for Competition pointed out in October 2014, data is the new currency of the Internet and, consequently, cannot be defined as free - a term that refers to the concept of gratuity and freedom - online services obtained through the transfer of personal information. The doubts about the freedom in the granting of consent are further intensified if only one considers the indispensability today of some services in interpersonal communications. "What seems to us a trivial tool for obtaining free access is actually the real asset, the exchange of which supports the underlying commercial transaction. The implicit exchange, for all this free services, is with our attention, with the release of data that will then allow promotions and advertising customized to our needs. To this implicit exchange corresponds an *implicit market*, that of data, about which we still know too little. As is often repeated in these cases, *we are the product*" (Delmastro & Nicita, 2019, p. 24).

An important aspect concerns, then, the difficulty in establishing when and how much the user is aware of the collection of personal data and their processing (Amato Mangiameli, 2019, p. 112), while the computer consent should represent a complete and effective awareness regarding not only the collection of data, but also the problematic nature of maintaining total anonymity, the imprecise determination of how to use the information, the uncertainty about the places and times of their conservation (Palazzani, 2020, pp. 31-32). Furthermore, the acquisition of specific information is not always an indispensable condition for the use of a certain service and this is relevant in the evaluation of IT mechanisms such as *tracking walls* and *devices tracking* which can exclude from a certain service users who refuse to extend consent also provided to it to another service or that act as factors for forcing consent (Zanuzzi, 2017, pp. 115-117). In these cases, the apparently free acceptance of the processing of personal data raises serious questions concerning the protection of personal privacy and freedom of expression, since, in order to "hide", the individual could renounce the choice of content and sites to visit on the Net (Orefice, 2018, pp. 106-107). These widespread practices are also in contrast with art. 4 GDPR, concerning informed consent, since a request that includes non-homogeneous purposes or that prevents or disturbs the use of a service offered online does not appear to comply with the Regulation. The European model, in this sense, would seem to lead to a formalistic application, resolved in the "empty shell" (Passaglia, 2016, p. 347) of the presentation of the information form and in the provision of a consent that is ineffective because it lacks real awareness (De Tullio, 2016, p. 665; Orefice, 2018, p. 142). The lack of full awareness can also concern the existence of second or subsequential uses of one's data, as well as refer to secondary information whose use is prompted by the extraction of significant information from raw data (Tincani, 2016, pp. 24-27) capable of generating different information than to those object of the original treatment and used for purposes other than those expressed by the latter which, if unknown and not expressly authorized by the interested party, would be illegal (Zanuzzi, 2017, pp. 111-12). In particular, in the Internet of Things (Iasselli, 2016, pp. 135-153), there is also a real risk of an unaware activation of the smart device and unconscious transfer of data, with a clear loss of information control and decision-making power over personal informations by the user (Zanuzzi, 2017, p. 110). In this direction, the Opinion 8/2014 of WP29 - recently replaced, as is known, by the European Data Protection Board which constitutes the joint working group of the national supervisory and data protection authorities, that is, an independent advisory body, composed of a representative of the various national authorities, by the guarantor European Data Protection Officer (EDPS), as well as a representative of the Commission - is of great interest which states that, in order for the processing to be considered lawful, the user must remain in the full control of the data for the entire life cycle of the device. With reference to the IoT and the tools capable of implementing invasive individual profiling, which may also concern

sensitive user data, the regulatory uncertainty seems to be accentuated since to the processing of personal data connected to the provision of electronic communication services should be applied the Directive 2002/58 (*ePrivacy Directive*, relating to the processing of personal data and the protection of privacy in the electronic communications) whose provisions - transposed to articles 32 and 32 bis and 121-132 of the Privacy Code - are currently under review as a proposal for a Regulation aimed at their repeal has been presented. In fact, it should be remembered that, on 10 January 2017, the European Commission presented a proposal for a Regulation - a discipline that should introduce specific provisions for electronic communications operators, capturing the added value of big data and metadata of profiling and marketing activities, intended to repeal Directive 2002/58, and to consolidate and strengthen the digital market, ensuring a uniform regulatory framework, guaranteeing a high standard of consumer protection and implementing the protection of confidentiality in electronic communications and international data exchanges (Mensi & Falletta, 2018, pp. 383-84). The Directive 2009/136, also, intervened on the subject, whose recital no. 56 establishes that "when such devices (RFID) are connected to publicly accessible electronic communications networks or use electronic communications services as basic infrastructure, the relevant provisions of Directive 2002/58 / EC should apply". In the current phase, characterized by large margins of uncertainty, it will still be possible to look at the aforementioned Opinion 8/2014 of WP29, the scope of which, in terms of the processing of personal data will remain unchanged, regardless of the direction of the new legislation (Zanuzzi, 2017, p. 102).

Assuming a proactive and not merely reactive perspective, we can refer to the principle of *privacy by design*, expressed by art. 25 of EU Regulation 2016/679, as well as *accountability*, supported by art. 24 of the aforementioned Regulation and referring to the set of measures that the data controller and the data processor must implement to "guarantee and be able to demonstrate that the processing is carried out in accordance with this Regulation", a criterion that arose with specific reference to economic information, but suitable for investing all business operations. The guarantee of privacy by design and the principle of *accountability* is, then, accompanied by respect for *privacy by default*, implemented by art. 25 of the Regulation, which provides that only the personal data necessary for each specific processing purpose are processed by default (Iasselli, 2016, pp. 180-181), expressing an effective protection "against the risk, particularly insidious and present in smart objects, of the use of data by an indefinite number of subjects and for purposes other than that for which they were originally collected" (Pizzetti, 2016, p. 288). Finally, we can add the Recital 78 of the Regulation which provides for the adoption of adequate technical and organizational measures to ensure compliance with the aforementioned provisions, allowing the interested party to control the processing of data and the data controller of prepare and improve their safety features. This discipline will remain central even after the entry into force of the *eRegulation* since the latter, not containing a general regulation of security measures, would, in any case, refer to that contained in Regulation 2016/679 and in the EU Code of Electronic Communications. The challenge is to anonymize users without erasing the economic interest of the collected data (Orefice, 2018, p. 138) and, for this purpose, it appears essential to eliminate any information asymmetries and disparities of position that characterize the data market in the phase of acquisition and fruition of information, in some cases also through a widespread and plural use of Big Data, making the weaker part of the bargaining capable of an effective self-determination (De Tullio, 2016, p. 678).

PRIVACY AND SECURITY

If the consideration of the actual importance of privacy seems to indicate the way of an indispensable regulatory adaptation to the current technological scenario (Palanza, 2016, p. 8), to the confidentiality of information is, however, attributed a secondary consistency when this is to be balanced with different principles of constitutional relevance, first of all national security. In fact, the connection and distinction between surveillance and security must be made explicit, the latter term generally linked to the protection of personal information and equally used in specific situations in which there are general interests whose insurance justifies a less stringent guarantee of privacy (Pascuzzi, 2020, p. 91). For these reasons, data security is currently considered a *dual use good* as it is invoked both in relation to possible intrusions into private life, and in ensuring collective security through emergency legislative measures that exacerbate an otherwise limited "central interference power" in time and space (Perri, 2020, pp. VII-VIII). The numerous legislative initiatives that multiplied after 11 September 2001, the date of the attack on the Twin Towers in New York, aimed at countering international terrorism - such as, for example, in the USA the Patrioct Act of 26 October 2001 or, in the United Kingdom, the Anti-Terrorism, Crime and Security Act, also of 2001 - can interfere with the privacy of citizens. In a context such as the contemporary one, marked by the terrorist threat, as well as by frequent cyber attacks, the need for a balance of the interests involved is particularly felt, as can also be seen from the reference to national security and public security contained in art. 23 of 2016/679 EU Regulation. The massive collection of personal data, as demonstrated by the Datagate case and the consequences it had in relations between the United States and Europe, as well as in those with China, proves how the massive collection of data has strategic implications and highlights how the data control, access and analysis are currently an essential component of the most effective and sometimes unscrupulous intelligence actions (Mensi & Falletta, 2018, p. 325). In such cases, we refer to the extremely delicate area of a possible balance between information security and the risk of its over-control (Palanza, 2016, p. 14), topics also taken into consideration by the EU Directive 2016/680 which regulates the processing of personal data in the areas of prevention, contrast and repression of crimes. From this perspective, the aforementioned Directive seems to fully grasp the link between the protection of personal data and IT security, highlighting the role of technology in assisting the operations of the police and judicial authorities in the fight against internal terrorism and, in general, to crime (Mensi & Falletta, 2018, p. 358). In recent decades, again in order to pursue an effective protection of public security, the instruments aimed at combating money laundering and terrorist financing have also been characterized by a clear shift from the repressive front to the preventive one, through the introduction of insightful financial prophylaxis obligations. In particular, the European Union has changed its front of action and has adapted to the recommendations of the Financial Action Task Force - an intergovernmental organization, set up among the countries participating in the G7, aimed at developing strategies for combating money laundering and financing of terrorism - in the field of "prevention and financial intelligence" by adopting an *accountability* strategy accompanied by a risk-based approach, according to which these financial prophylaxis obligations must be modulated on the level of risk, connected to a country, to a situation or to an operation by verifying the negative impact that the processing could have on the freedoms and rights of the subjects (Balzamo, 2020).

In all cases, the challenge to be taken is represented by harmonize public and private interests and often conflicting needs, such as transparency and confidentiality of information, data protection and global security (Ziccardi, 2017, p. 88), obtaining an adequate balance between non-negotiable rights (Rodotà, 2019, p. 21; De Vivo, 2000, pp. 125-158). In this context, the traditional principles and rules,

that can be inferred from international and national law, often appear inadequate and obsolete, suggesting regulatory schemes that in substance and in the concrete context of application refer to technical and negotiation solutions delegated to private entities (Passaglia, 2016, pp. 331-348).

As can be understood, a central question is how to regulate surveillance technology to derive its greatest and undeniable benefits, without suffering a squeeze of fundamental rights (Perri, 2020).

In this direction, given that the necessary respect for contractual freedom cannot coincide with the absence of an effective reference regulatory framework, it can be understood how the most recent definitions of the right to privacy refer to a dimension that is not yet purely individual but collective, in which the subject of informative self-determination becomes the whole community: the right to individual privacy can currently be protected only if guaranteed towards everyone, as the act of disposing of one can have negative effects also on third parties. It follows that the mass-processing of information goes beyond the antiquated idea of an individual and isolated owner to open to collective dimensions of the right to privacy of personal data, directed to the entire category of data holders as well as to the society that suffers, in every chance, the effects of large-scale decisions (De Tullio, 2016, p. 641). Consequently, the reflections developed in the field of privacy and related to the need to enhance and protect the collective dimension of Big Data also suggest a new way of understanding the law that looks beyond the classic distinction between public and private towards an interaction between the subjects and the Authorities, involved in a mutual protection of the assets discussed.

PRIVACY AND BIG DATA

In the information society, the sharing of data is central and it should be noted that shared knowledge in the public sphere of some types of Big Data can be considered of certain social interest. Indeed, artificial intelligence, in combined action with the Internet of Things, can offer a fundamental contribution to the challenges of the future by improving the lives of individuals in many sectors. This is the case of smart cities where data sharing can help manage traffic more efficiently, contain pollution levels, better regulate the consumption of water, energy and other natural resources as well as increase the level of safety urban security (Longo & Scorza, 2020, 78-80). Data sharing and predictive information analysis models can, then, be profitably involved in modern agricultural management, in the fight against hunger in the world and in the fight against global warming and climate change although, on this point, sixteen machine learning experts, belonging to twenty different organizations, in the document *Tackling the climate change with machine learning* (2019) highlighted how technology is only one of the tools available to improve his conditions of existence, having to support it with effective public policies as well as individual responsibility (Longo & Scorza, 2020, pp. 84-86).

But it is, above all, that of scientific research and medicine the field in which the sharing of information goes hand in hand with the development of research and its results (Faralli, 2019; Palazzani, 2020, pp. 16-21). The diffusion of ICT has, in fact, significantly transformed citizens' approach to the scientific world, opening up to a democratization of scientific knowledge and favoring a *participatory turn* with consequent problems and strengths (Longo & Scorza, 2020, pp. 81-83). The interest in the exploitation of informations, in this sense, can be functional both to economic freedoms and to the implementation of inviolable rights and equality (De Tullio, 2016, p. 644), but, at the same time, it presents many problems concerning both the appropriate configuration of the relationship between an inexperienced patient and the world of medicine, with which one comes into contact mainly by consulting the web,

and the protection of personal data, their economic exploitation, the presence of an effective awareness and freedom in the manifestation of consent to their treatment.

It is evident, in fact, as the massive use of personal data, as well as Big Data, raises pressing unknowns regarding the respect for individual privacy so that, from this perspective, they can be functional both to economic development and to the exercise of authoritarian power, as well as to equality and fundamental rights, in the necessary balancing of conflicting assets and trying to determine if the means used to pursue them are suitable, necessary and adequate (De Tullio, 2016, p. 646).

Indeed the data, individually analyzed, are not particularly significant, but, if examined in large volumes and with the appropriate information technologies, they lead to the delineation of models and trends, capable of producing effective knowledge. In this sense, the pervasiveness of information technologies, mainly the Internet of Things, has increased and facilitated digital surveillance practices, making anyone who uses a computer device connected to the network easily traceable and monitored. In fact, when the competition does not take privacy into account, the individual loses all effective power to bargain and the consequence becomes an incorrect negotiation between entrepreneur and consumer which, for the latter, is resolved in a mere *take or leave* (De Minico, 2019, pp. 109-113), a phenomenon increased by the circumstance that frequently sees the user signing a single contract with the same service provider, transferring huge amounts of information into the hands of a single subject (Palanza, 2016, p. 3). From these hints, the term "personal data" is to be understood in an evolutionary key (OECD guidelines 2013), ie considering as confidential information all personal information which, if connected to other data on the same individual, can produce effects on him; similarly, the concept of privacy should be extended to informations which, even if it escape from the sphere of subjective dominion, help to identify it. In fact, even on the data published on the Internet, for a specific purpose, the user does not renounce his expectation of privacy (Orefice, 2018, p. 105). "The interested party's power of control is not precluded by the fact that certain information is currently in the availability of others. The exercise of this power is entrusted to a right of access that the interested party can exercise against anyone who holds data referable to him directly or indirectly" (Rodotà, 2015, p. 398).

Usually, with Big Data we mean the contents generated by users on the Net, including blogs, photos, videos, behavioral data, social data, geolocation data, demographic data and identification data: contents that allow individual identification or that provide information on typed patterns of individual behavior (Palmirani, 2020, p. 77). Big Data can also be defined by means of the so-called 4Vs, that is, *volume*, as they are present in large quantities; *variety*, as they come from heterogeneous sources; *velocity*, since the data are analyzed through sophisticated algorithms that lead to a decision in real time; *value* assumed by the data (Delmastro & Nicita, 2019, pp. 25-29). It should be noted that most of this data is usually unstructured, as it is acquired and stored according to criteria different from those that oversee the organization of traditional electronic archives: in other words, the peculiarity of Big Data, capable of involving a real *change of paradigm* in the analysis of information (Simoncini & Suweis, 2019, p. 92), is found in their not having been extrapolated from representative samples of the population through complex and expensive processes (Amato Mangiameli, 2019, p. 112), but directly from the whole of the population observed so that, in exploiting every possible correlation, their quantity prevails, in terms of predictive efficacy, over the accuracy of the analysis procedure (Casi, 2018, p. 3), allowing greater decision-making and production of effectiveness (Pascuzzi, 2020, p. 269).

It is evident, in fact, that the data samples must be formed specifically for each single research, while the raw data can be reused several times, for different purposes and in combination with further data sets: in this direction, Big Data allows an analysis of information that is both exploratory and inferential, in

which the machine "learns directly" from the data and where the aggregation of information with the algorithms used in the process is relevant, aimed at reaching a "decision". In this way, Big Data implements the use of the algorithm while, in turn, the use of the algorithm generates new data, and so on (Simoncini & Suweis, 2019, p. 92). It should also be noted that the analysis of Big Data is often accompanied by the examination of Small Data, that is, of the information detected by observing the behavior of users and their routines in the usual context of action (Lindstrom, 2016) and of the Metadata, that is, of the information associated with a Web page, or a part of it, representing its content and reference context in a structured way (Palanza, 2016, p. 7). In any case, by acquiring a meaning and a purpose, the data becomes information which, in turn, being contextualized and organized, will produce knowledge. In this direction, a correct use of Big Data undoubtedly represents a critical factor for companies since huge amounts of data, if not interpreted and used effectively, risk being just as ineffective as the lack of information and to transform data into meaningful information techniques such as Data Mining or the most recent developments Business Analytics are used. In the attribution of meaning to Big Data, we can observe how the predictions appear much more comprehensive than the information consciously released by users. "Big data analytics models make it possible to 'reconstruct' personal data, regardless of their original release, making the traditional classification between personal and non-personal data completely overcome" (Delmastro & Nicita, 2019, p. 36). Consequently, an appropriate consideration of technological evolution seems to lead, as we have seen, to an extensive and evolutionary interpretation of the concept of personal data, also including Big Data and information produced through smart objects. In this regard, it should be noted that the GDPR does not make direct mention of Big Data, thus excluding information collected and crossed on a daily basis, capable of returning information that is sometimes more than sensitive about the individual and capable of profoundly affecting the expression of freedoms. This factor is aggravated by the previously analyzed ineffectiveness and by the formalism of the information for consent which, although structured in accordance with the Regulation, do not seem sufficient to stem the increasing use of data to be placed on the market (Orefice, 2018, p. 117).

Similarly, even the tool of withdrawal of consent, provided for by the law, seems insufficient to adequately protect the individual in the management of personal information, still placing itself in the field of data bargaining making clear the need for a regolatory framework, capable of ensuring an effective and general informative self-determination.

In this regard, while highlighting how the evaluation of the freedom and awareness of consent to processing would concern only personal data, that is, referable to specific interested parties, while Big Data would tend to work on anonymous data, this does not seem a reason to rule out possible damage as Big Data, following appropriate correlations, become easily referable to identifiable people (Della Morte, 2018, p. 161). Above all, the growing use of Big data and the refined interpretation techniques of the same has made it clear how traditional data anonymization techniques were no longer effective in protecting privacy, bringing out the idea of *de-identification* concerning algorithmic techniques aimed at preventing the re-identification of anonymous data. For this purpose, the concept of *k-anonymity* was introduced to indicate such a number of people who share the same attributes and qualities, such as not to allow their identification in a dataset (Longo & Scorza, 2020, pp. 132-133). At the moment, the research is experimenting with alternative solutions, also implemented by Google and Apple, aimed at "dirtying" personal data by making them anonymous from the moment of collection and much attention and interest are also placed in the *federated learning* model which provides that the data remain with whom it generated them by structuring a shared model of information use (Longo & Scorza, 2020, p.135). In any case, it is clear how the ancient forms of protection of data, based on the consent of the

interested party, prove to be insufficient and unsuitable for the changing terrain of Big Data and predictive technologies aimed at anticipating the conduct that entire categories of subjects will presumably assume on the basis of algorithmic projections such that, in a conditions of total darkness regarding the use of personal informations, informed consent becomes rather a non-consent (De Minico, 2019, p. 92). In other words, the lack of transparency of the algorithm's operating criteria not always does allow us to understand the mechanisms behind the profiling, the prediction and standardization calculations. (Palazzani, 2020, p. 33). The algorithmic logic of the predictive type, which informs the process of extraction, collection and storage of Big Data, then, raises unprecedented questions about the possible dangers of algorithmic discrimination of marginalized social groups through self-fulfilling predictions (De Tullio, 2016, p. 662), demonstrating the fact that predictive analyzes can lead to detrimental effects regardless of the error or inaccuracy of the algorithmic forecast (De Minico, 2019, pp. 93-97). In these cases, the risk of autonomy of self-learning algorithms is particulary incisive and opens up from individual law to collective law, from civil liability to social security (Teubner, 2019, p. 14). In this regard, in the debate concerning the possible attributions of responsibility in the field of artificial intelligence, should be noted the current predominance of the traditional paradigm based on deterrence, an approach also adopted by the European institutions (European Parliament, 2020; EU Independent High-Level Expert Group On Artificial Intelligence, 2019), even if increasingly balanced by theories to the contrary (Amato Mangiameli, 2019; De Anna, 2019; Faini, 2019; Marchisio, 2021; Palazzani, 2020; Teubner, 2019).

The traditional conception of responsibility appears, however, inadequate to support the innumerable implications and repercussions on the right to privacy, deriving from the presence of a smart device, in possession of the personal data of a user and able to have this information to deduce others and behave consequently, giving rise to pressing unknowns on how this device should be legally framed as well as on the obligations it should have. Subsequently, given that, according to the provisions of the GDPR, the purposes for which the data are collected and processed could not in any way be changed without requesting a new consent from the interested parties, a computer equipped with AI, in the process of adaptation to the environment and to modify its behavior, it could autonomously change these purposes, making sure that the only solution would be to insert a rule with the power of veto on the decisions of the device, limiting, to a large extent, the purpose for which it was designed. In addition, the GDPR establishes that the processing of personal data can only take place if it is strictly necessary to use a requested service, a criterion so far applied on a rational and legal basis and which, however, could escape control if it were entrusted to the judgment of devices equipped with Artificial Intelligence, able to deduce a lot of information from the starting data, including strictly personal data and even sensitive data that the user would have chosen not to share (www.consulprivacy.it). Definitely, if society attributes new decision-making spaces to autonomous decision-makers, it is obliged to introduce *new* forms of responsibility, detached from mere considerations of efficiency, reduction of transaction costs, utilitarian evaluations, but specifically tailored to the decision-making risk of such autonomous agents (Teubner, 2019, pp. 84-94). In this direction, the debate is very hot and involves the fields of ethics, politics, philosophy and digital law and it is probable that the diffusion of Artificial Intelligence in the daily life will not be possible until many of the issues we have talked about will be resolved.

However, the European legislative framework, while not directly contemplating Big Data, still establishes some fundamental principles in the collection and use of personal information, as can also be seen from the European Parliament resolution of 14 March 2017 on fundamental rights implications of big data and, in the same direction, from recent judgments of the Court of Justice of the European Union which have highlighted the need for effective data protection which should, in principle, prevail over

economic interests, considering privacy as an inviolable and essential right both in the formation of the individual personality and in relational development (De Tullio, 2016, p. 653). An articulated sentence of the German Constitutional Court, dating back to 15 December 1983, is inserted in this direction with which a real theory of informative self-determination is elaborated on the assumption that if on the one hand the individual cannot be called owner exclusive of his own data - which, representing the factual reality, are considered as neutral information - however, has the right to control over the latter, representing the same a manifestation of full personal development, attributing solely to the legislator the balancing of contexts and conditions that allow to limit the right to privacy *(Bundesverfassungsgericht*, 15.12.1983, 1, BvR 209/83) and also the European Guarantor, in various opinions and initiatives, stressed the importance, in the era of Big Data, of a consistent regulatory application, enhancing the protection of personal information and underlining the need to seize the opportunities offered from new technologies, without allowing them to determine the social values of reference. Hence, a dynamic protection of personal data appears indispensable, which, by deconstructing the traditional relationship between the public and private spheres, goes beyond the aspects of personal confidentiality and information protection to open up to innovative forms and practices of digital citizenship (Rodotà, 2019, p. 72).

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Chapter 14
Companies in the Digital Economy:
Between the Enhancement of Intellectual Capital and Cybersecurity Problems

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ABSTRACT

Our society as a whole is facing a rapid and profound transformation due to the progressive development of digital technologies. Keeping up with this "digital world" is not easy and there are many companies that risk losing competitive positions. Successful digital transformation therefore requires businesses to develop a broad range of capabilities—digital and non-digital—to support new business models. On the one hand, therefore, there is digital literacy, relating to the supervision of tools and technologies; on the other hand, digital culture, which has to do with some specific aspects: 1) critical thinking skills, 2) thoughtfulness, 3) transformative capacity, 4) enhancement of intellectual capital, 5) preparation of a corporate policy aimed at cybersecurity. The purpose of the work is to demonstrate how the company is able to reconcile the enhancement of intellectual capital and the problems associated with cybersecurity in the context of the digital economy, demonstrating that it knows how to manage complexity.

INTRODUCTION

The framework in which modern companies operate is volatile, uncertain, complex, and the traditional innovative activities (both product and process related ones), are often insufficient to guarantee a long-lasting success. The need to reconsider the corporate organization due to the COVID-19 pandemic, the tensions on the international markets, the technological transformation, the ethical, social and environmental sustainability, are all phenomena that are seriously putting into question the consolidated cultural and management models. Innovation is, by now, an omnipresent topic in the public and economic debate; however, it is too often referred to as a technological interpretation of products or services. Indeed it is

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important to also improve governance and to develop the enterprise culture needed to create internal and external synergies. To innovate is, first and foremost, to be able to design a process in a way that it is able to profitably respond to changes and that seizes the maximum potential offered by the scientific progress. In this framework, digitalization is a fundamental driver that is changing business models and that has a strong impact on the enterprises' planning and on the managerial competences.

Managers are, therefore, required to be the glue that holds together people and processes, to creatively anticipate the market trends and to integrate, in a versatile manner, their own competences. In this perspective, managers are expected to develop technical and specialized competences (hard skills), but most of all to emphasize the behavioral ones (soft skills) in order to face an innovative process that involves the whole corporate organization in a more effective manner. While managing advanced and promising industrial technologies, it is important to understand that the growth of a company always depends on the ability of both entrepreneurs and managers to combine and integrate assets and skills and to pinpoint the business models that are more suitable to enhance the potential of these innovations.

Therefore, companies, in a perspective of strategic orientation and in a long term vision, must manage to include, within the context of digital economy, the valorization of intellectual capital and the problems linked to cyber security, demonstrating, this way, to be able to manage complexity, while building organizational environments oriented toward innovation.

ENTERPRISES AND DIGITAL TRANSFORMATION

Digital transformation represents a driver for change at all levels and areas of a company (Berman, 2012). The systematic employment of more refined and complex technologies in the company's production processes generates relevant innovation in the organizational structures of the work flow, in the production plants and in the energy sources used (Lardo, 2017).

The historical concept of the enterprise is going through many changes (Ridley, 2016) and a new type of company is affirming itself: the digital company. For enterprises, the main criticality is linked to the choice of enabling technologies on which to invest, and to be integrated in the process, to the purpose of better grasping the many opportunities offered by Industry 4.0.

The modality enterprises are implementing to prepare themselves to adapt to the digital changes in place, has created several levels of digital maturity. Digital maturity is the adaptation of the traditional organization in order to efficiently compete in an environment that is becoming more and more digital; it can be considered an ongoing adaptation process in an evolutional framework (Kane, 2017). The enterprises that do not manage to adapt to this financial change are disappearing, while those that are doing it are remodeling their structure (Shaughnessy, 2015).

It is, by now, clear that our society, as a whole, is facing a quick and profound transformation due to the gradual development of digital technologies, and to their permeating penetration in all the markets (Reis et al., 2018; Ross et al., 2016). All of this is having a notable impact on business models, on organizational processes and on the offer of products and services from companies, which are, in turn, called to display their managerial practice that enable them to govern such complex changes (Matt, Hess, Benlian, 2015). Of course, keeping up with this new "digital world" is not simple and many companies risk to stay behind and lose competitive positions (Hess et al., 2016). A successful digital transformation requires, therefore, that companies develop an ample array of abilities, both digital and analog; to sustain the new business model and to rethink the mechanisms and organizational functioning processes

Table 1. Digital transformation definitions, Source: Reis et al, 2018

Author	Definition
Fitzgerald et al. (2013) McDonald & Rowsell-Jones (2012)	Use of the new digital technologies, such as social media, mobile, analytics or embedded devices, in order to enable major business improvements like enhancing customer experience, streamlining operations or creating new business models. As such, the Digital transformation goes beyond merely digitizing resources and results in value and revenue being created from digital assets.
Solis et al. (2014)	The realignment of, or new investment in, technology and business models to more effectively engage digital customers at every touch point in the customer experience lifecycle.
Collin et al. (2015) Gimpel & Roglinger (2015) Kane et al. (2015)	While digitization commonly describes the mere conversion of analogue into digital information, the terms Digital transformation and digitalization are used interchangeably and refer to a broad concept affecting politics, business, and social issues.
Martin (2008)	Digital transformation is now commonly interpreted as such usage of Information and Communication Technology, when not trivial automation is performed, but fundamentally new capabilities are created in business, public government, and in people's and society life.
Westerman et al. (2011)	Digital transformation is defined as the use of technology to radically improve performance or reach of enterprises.
Stolterman & Fors (2004)	Digital transformation is the changes that digital technology causes or influences in all aspects of human life.

implemented to date (Carcary, Doherty, Conway, 2016). It is not, indeed, sufficient to import more computing tools, but it is important to integrate the "digital" within the DNA of one's own business model (Horlacher, Hess, 2015).

In order to promptly understand what actually is digital transformation, it is useful to refer to a recent study (Reis et al., 2018), that has gone through the most recent and qualified international scientific literature, to the purpose of promoting a possible summary. Through an analysis of the scientific articles appeared on some of the most important specialized magazines, mostly concentrated between 2011 and 2017, the authors have produced a synoptic comparison table of the most recurring and cited definitions (Table 1).

A horizontal reading of these definitions allows the categorization of three distinctive elements of the concept of digital transformation (DT): 1) technologic element: where DT is based on the use of new digital technologies, such as social media, mobile devices, sophisticated data analysis tools; 2) organizational element: DT implies a change in the organizational processes or the creation of new business models; 3) social element: DT is a phenomenon that influences all aspects of human life, such as the customer experience. To summarize, digital transformation can be defined as the use of new digital technologies that makes possible relevant improvements in business and influences all aspects of the client experience (Reis et al., 2018).

It is a growing and irreversible phenomenon. According to recent studies (Kane et al., 2017), today, more than half of the enterprises employs digital technologies in their activities, and a little less than 40% of them believes that a further advancement in terms of digital strategy will be essential in the near future. Indeed, digital transformation attracts business models, without missing any industrial sector, but rather, contributing to the gradual merging of all of them (Fondirigenti, 2018).

Artificial intelligence and big data are dramatically transforming the way to do business today. The World Economic Forum (WEF), in the White Paper "Digital Transformation of Industries" of 2016, highlights five key trends of digitalization from a technological point of view: 1) 1) the internet of me:

loaded personalization of apps and services to the client, whose digital experience becomes a crucial factor ; 2) outcome economy: the possibility to precisely measure more and more results and advantages of the services offered, thanks to evolved sensors and intelligent products (IoT); 3) the platform (r)evolution: mobile connectivity and cloud services that allow the development of global platforms for very contained costs, in favor of an unlimited accessibility; 4) the intelligent enterprise: improvement of the decision-making and innovative processes, thanks to sophisticated analysis models for big data and to the dialogue with intelligent machines; 5) workforce re-imagined: gradual integration of machines and people in workplaces, for example through wearable devices.

What is evident is the urgency to face what is set as a real and widespread problem of "enterprise digital illiteracy", providing enterprises with adequate digital requalification processes, as already clearly highlighted in literature at the beginning of the last decade (Belshaw, 2011).

However, the definition of appropriate intervention strategies on a political, educational and financial level, in order to face the digital competences gap, must forcedly take into account the more ample dynamics that go through the entrepreneurial framework. From this point of view, the report of the research titled "The Future of Jobs" of the World Economic Forum (2018) pinpoints some key areas through which the change of the scene is taking shape: 1) technological advancements: widespread availability of high speed internet connection, artificial intelligence, a more diffuse employment of big data analysis, cloud technologies; 2) increase of the interest of companies in robotics: general growth trends with variable implementation percentage based on specific industrial sectors; 3) flexibility of workplace location; 4) change in the type of employment: 50% of the interviewed enterprises expects, by 2022, an increase in automated activities, which will correspond to a contraction of the human resources employed, despite, based on this transformation, the birth of previously non-existing new professional figures is expected; 5) a renewed man-machine relationship: in 2018, an average 70% of the work activities was conducted by humans; by 2022, a reduction is expected of about 60%, with a parallel increase of the role played by the automated system that spans from 30% to 40%; 6) positive perspectives for the new professional figures; 7) increase in the demand for social and digital competences: increase in the research of figures with statistical, computing, marketing and soft skill (relational competences, social competences, ecc.); 8) priority "reskilling" and "upskilling" processes: by 2022 at least 54% of the employees in the different industrial sectors will need an upgrade of its competences.

The so called Fourth Industrial Revolution, therefore, must be perceived not only as a threat, but also as an opportunity.

It is clear that digital transformation is imposing a change not only in terms of knowledge and ability in a strictly technological environment, but most of all from a cultural and attitudinal point of view.

As observed in the recent Assintel Report (2018), "the efficacy of the digital transformation depends almost entirely on the enhancement and on the centering on "human factors" following the digital automation, that is, the introduction, in a company, of digital environments and tools".

In this perspective, we refer to the ability of the managers to understand reality in the digital perspective, to move with familiarity around the digital environment, and to guide others through the digital transformation (Assintel, 2018). On one side there is the digital literacy, related to the protection of tools and technology, while on the other side there is the digital culture. The "human factor", could, therefore, become a decisive resource to guide enterprises through the complex digital transformation processes, where a management that is able to act as a " leader and a catalyst of resources and energies" is essential in order to face environment that become more and more volatile, ambiguous, complex and uncertain.

THE DIGITAL TRANSFORMATION IN TRADITIONAL ENTERPRISES

Enterprises are substituting their traditional structure with digital experiences alimented by technological progress; the company strategies undertaken need to align the culture and structure of their organization and to implement new technologies so as to satisfy the expectations of their stakeholders (Beronia, 2017).

In order to analyze the impact that the digital transformation has had on the corporate functions, it is appropriate, first of all, to understand the role exercised on the behavior of traditional enterprises. The behavior of the enterprise, intended as an open system that is finalized, overly complex, probabilistic and equipped with particular regulation processes able to influence the external environment, is interpreted in light of an adaptive model compared to the environment (Zanda, 1974). Such model posits a four-stage cycle. It has been observed (Zanda, 2015) that each corporate behaviour originates from a decision-making process and that the whole of the decisions configures the corporate planning. The decision determines the execution, and the latter requires control, the purposes of which are represented by the verification that the action complies with the decision, by the identification of the cause of possible variances, and by the launch of a feedback process in order to allow new planning oriented toward the achievement of corporate objectives.

In such context, the function of Top Management is characterized by a growing complexity, setting as a primary objective that of creating an overall management model able to generate a culture and an environment that favor innovation (Trequattrini, 2008). Once determined, the strategy of employment of such digital tools must be necessarily evaluated during its execution and also afterwards, and, eventually, redefined through the implementation of corrective actions.

Digitalization, therefore, affects also the redefinition of corporate policies in terms of strategy and growth, but most of all it requires a change of the business model in enterprises. The affirmation of Industry 4.0, and the consequent digital transformation of the enterprises, has allowed the design of new valuable proposals on which to redefine such models. Some studies have highlighted that the main impact of technology on the enterprises business models is related to the internal processes (Bagnoli et al., 2018), since the increase in the quantity of data to be managed has determined the rising of new information analysis, sharing and archiving processes.

Such evaluation can be conducted by analyzing the impact that the implementation of such tool has on the managerial areas of an enterprise (Airoldi et al., 2005).

Particularly, for what concerns the influence exercised on production, the technological revolution in place, on one side is opening great opportunities for enterprises regarding the increase in efficiency of the processes (cost reduction, productivity improvement); while on the other it is allowing the reconsideration of the products, the introduction of new pre-sale and post-sale services, and the improvement of the ability to promptly react to the needs of the market (Bagnoli et al., 2018). The implementation of a Business Intelligence system (Watson, 2009) entails advantages of both organizational and strategic nature, since it allows: a) a more efficient and safe company records management; b) an automation of the company's analysis and reporting processes, favoring a prompt evaluation of the position of the enterprise; c) an univocal vision of the management trend and of the criticalities on which to create adaptation and improvement processes.

Thanks to the data analysis, management can accelerate the decision-making processes and make them more focused on the objectives set. The enormous availability of data/information offered by the employment of the new technologies represents an opportunity for both an improved efficiency of the decision-making processes and for the development of knowledge intensive entrepreneurship (Del Vec-

chio et al., 2014; Jin et al., 2015). Therefore, the company managers, presently employed in programming and planning activities, might find themselves, on one side, being replaced by machines, on the other, being supported by them, because of the hardly replicable human features, such as creativity.

The objective of Industry 4.0, of Artificial Intelligence, and of the Digitalization of corporate processes is the integrated management of complex systems; the Operational Technology (OT) is integrated with Information Technology (ICT) and with field sensoristics (IoT) (Giaume, 2018).

Regarding financial management, the enterprises that want to implement a digital transformation strategy and employ a business model founded on digitals, may exploit innovative tools such as the block chain. This system allows transparency and prevents the cancellation and modification of information. Furthermore, through the employment of smart contracts, it is possible to establish the rules and the permits to access the data recorded while reducing the possibility of human errors. This happens because once the information has been entered; the smart contracts will automatically conduct accounting operations. The implementation of the block chain allows the record of all the accounting data on one single platform, avoiding the plurality of company's database software.

A further advantage deriving from the implementation of the block chain may be observed in the management of the supply chain (Fosso Wamba et al., 2020).

The considerations conducted allow us to affirm that, to the purpose of implementing a correct digital transformation process, there will be the need for new organizational figures and digital capabilities (Westerman et al., 2014), higher analytic skills and decision making capabilities. Furthermore, a leadership with a high level of management programming is required.

PUBLIC ADMINISTRATION AND DIGITAL TRANSFORMATION

Starting from the managerial innovations introduced in the spur of the New Public Management (NPM), even the Public Administrations are implementing a progressive digital transformation. The e-government process is, indeed, modifying consolidated customs, traditionally anchored to the bureaucratic model. Indeed, the main limitation of such model is the difficulty in maintaining the organizational database updated (Decastri, 2006), which translates in the inability to provide adequate responses to the needs of the citizens. The digital transformation makes it possible to overcome this limitation. Digital maturity depends on many factors and the literature has recognized several stages (Layne e Jungwoo, 2001), that go from the simple on-line presence to high forms of integration both vertical, involving several government levels, and horizontal, concerning several aspects of the same service (Aiello et al., 2018). Other authors have analyzed the e-government like an intersection between different dimensions (Lee et al., 2014; Manoharan, 2013; Nam, 2014). In particular, three stages have been identified (Rodriguezet al., 2011): the first one implies the mere online presence of the government; the second one provides the supply of services online, allowing the citizens to send or process information, thanks to the vertical integration of the information systems; the third one implies a horizontal integration between agencies or departments that stimulates a higher participation of the citizens (Manoharam e Ingrams, 2018).

Other authors (Coursey e Norris, 2008) have classified the factors that influence the development of the e-government in internal resources (mainly financial and technological ones) and external resources (related to the citizens employing apps and implemented digital solutions). Indeed, taking into account that digitalization does not just entail benefits (Janssen et al., 2012), the literature has identified factors

that have both a positive and incentivizing effect, and barriers (Manoharam e Ingrams, 2018). The first ones are further divided in internal and external factors.

The external factors depend on the degree of political competition and on the citizens employing digital innovations and social media (Wong e Welch, 2004). The implementation, from the citizens, of social media and digital innovations is a determining factor in order to have a public administration that is more open, even though much of it depends from the ease in accessing information (Ahn, 2011; Linders, 2012; Park et al., 2013).

The external factors are based on the efficiency of the workforce, the improvement of which lies on the employment of new technologies and on a more intense cooperation with civil society and no-profit companies, in a view of public governance (Osborne (2014). This leads employees and managers to have a proactive approach, based on the knowledge of the importance of the motivations and the internal strategies (Luna-Reyes e Gil-García, 2011).

The barriers can be of either technologic nature or linked to the difficulty to overcome traditional managerial and organizational logics. Indeed, as it is known, in the public context there is a widespread resistance to change, together with a tendency to reiterate consolidated organizational routines (Becker, 2004).

Finally, it is worth noticing that the quality of the information is one of the key topics identified by eGovRTD2020, a research project financed by the European Commission to analyze the status of the e-government research on an international level. The importance of this topic is based on the need to find, select, evaluate and authenticate the information that is appropriate for a certain use. The real challenge, therefore, is linked to the concrete employment of the information from both the decision-making bodies (politicians and managers) and the citizens and stakeholders in general.

DIGITAL STRATEGY AND INTELLECTUAL CAPITAL

The concept of intellectual capital is not too far from that of knowledge. Teece (1986) clarifies the link between the two words, explaining that intellectual capital is a set of intellectual resources (knowledge and competences), incorporated within individuals, and intellectual assets, locked within products, processes and corporate procedures (codified knowledge), upon which the company exercises property rights.

The intellectual capital, therefore, embraces knowledge, but it also includes other intangible elements able to generate value (Dumay, 2009; Dumay et al, 2017). It has to be intended in its more ample meaning of stock of knowledge both internal (abilities, competences and capabilities), and external knowledge (image, brand, customer satisfaction), thanks to which a company manages to generate value for the stakeholders, through the achievement of sustainable competitive advantages.

Similarly to what has happened for the word “intangible”, even the concept of intellectual capital has been variously defined in literature (Kaufmann e Schneider, 2004; Choong, 2009). Elements that are common within the various definitions are the references to the complex of knowledge, experience, client relation and professional competences which crucially concur in the process of creation of company value, in the link with corporate performance.

The success of the digital strategy is to be attributed to the quality of the entrepreneurial and managerial dimension and to the connected ability to accept change and re design the business model on the basis of some dimensions that, compared to the past, assume a different role. However, it is to be observed that, within the process of strategy formulation, the intangible assets constitute a relevant re

source in determining the company's success. Literature agrees that the intellectual capital, in all its three components, actively contributes to the process of creation of value.

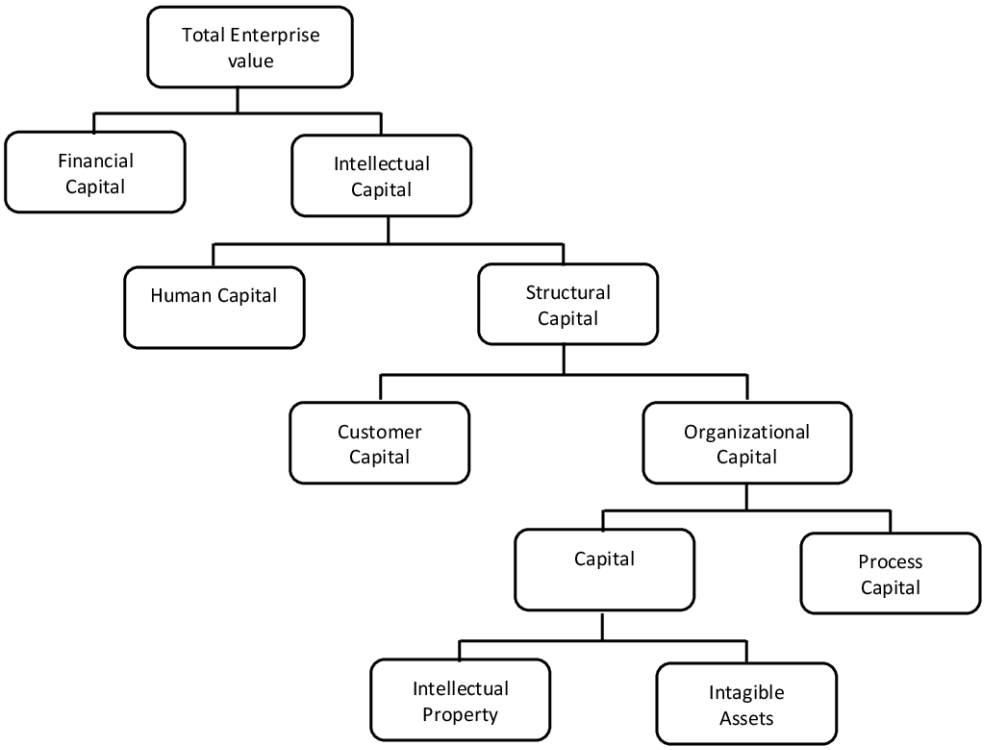
These three components are not independent, but complementary, with the result that the value is not generated directly by the single factors, but by the interaction between them.

1) The human capital is the set of the knowledge and information the enterprise benefits from through its workforce. It refers to the quality of the human resources employed, who contribute to generate further intangible assets and to exploit them in a way that helps improving efficiency, efficacy and innovation (Abramovitz e David, 2000; Galor e Moav, 2004). The human capital is constituted by the formal education received by the workforce (Barney, 1991; Nerdrum e Erikson, 2001) and by the abilities and competences incorporated within the members of the organization (Bontis e Fitzenz, 2002), therefore, it is not a company property.
2) The structural capital includes the mechanisms and the organizational structures that support the workforce and improve their productivity. Practically, it consists in the organizational routines and in the procedures that convert individual knowledge of the human resources in collective corporate knowledge and, therefore, in knowledge that is possible to codify (ex. patents or software) and that the company can use. Through the analysis of the structural capital it is possible to grasp the ability of the company to innovate, the know-how owned, as well as the ability of the management to manage the corporate context.
3) The relational capital is represented by the set of the relations maintained by the company with the stakeholders. Companies need to create a relational and communications system aimed toward third parties so as to be able to timely perceive the changes in the demand, in the financial and technological market, and in procurement. Thanks to the relational capital only, the company can provide products and services that satisfy the needs of the users and realize actions aimed at retaining them. It is important to monitor the client capital, its fidelity, the degree of satisfaction and the company's reputation (Fombrun e Shanley, 1990).

However, even the intellectual capital must be subject to reflection in light of the impact produced by the new digital technologies (Figure 1).

The human capital constitutes the source of innovation and, a fortiori, in the digital era it must be safeguarded and enhanced. The winning business models represent the result of the ideas and values of whomever designs them, and it is for this reason that the knowledge, the competences and the abilities of the human resources bust be strengthened. On this front, first of all, it is important to favor the training activity so that the human resources, at all levels, are able to comprehend, use and address technology in daily activities, contributing to the increase of productivity and efficiency. Moreover, it is worth observing that automation, amongst all digital technologies, entails a human resources reorganization process that is characterized on one side by the reduction of the unskilled labor, and on the other side, by the recruiting of personnel with competences that are more qualified. At the same time, artificial intelligence may bring further benefits by automating heavy and repetitive activities. For example, e-commerce, customer care and offers and promotions broadcasting activities are being managed by chatbots, which is software designed to simulate a conversation with the user at all hours of the day. Such virtual tools are able to activate self-learning processes, to trace interests, preferences, age and tastes of the consumers, becoming, in time, smarter and smarter. The employment of artificial intelligence, helped by machine learning, can contribute to streamline and automate some corporate processes, allowing a review of them

Figure 1. Intellectual capital and smart technologies
Source: pers. elab



in view of ongoing learning. Secondly, simulation technologies, thanks to their ability to elaborate the gathered data in real time, recreating the physical world within a virtual one, can help human resources during the planning and the productive system configuration stages. (Bagnoli et al., 2018).

For what concerns the relational capital, this expresses the value of the relations that the company keeps with the stakeholders, from clients to the remaining company partners, such as suppliers, sponsors and participants. The digital communication tools allow the start of policies of involvement and heed of the clients, to the purpose of implementing a better segmentation of the market, offering a personalized valuable offer. The provision of specific services favors the creation of value, contributing to the improvement of the company's image and reputation.

It is opportune to remember that the trust mechanisms between company and consumers seem to appear more and more ephemeral and less profound (Esposito e Spirito, 2013). Therefore, it becomes more and more difficult to build durable and consolidated relationships with one's own clients, who are more attracted to the valuable proposals of the competitors. At the same time, it is important not to forget that the digital tools allow a better sharing, between buyers, of opinions and experiences, which may compromise the company's credibility.

To rethink one's own offer system in digital key requires the development of new components and models of service able to ensure a digital customer experience that can improve the loyalty level of the customers. To the purpose of improving the customers' experience and the linked valuable proposal, it is necessary to own a different mix of assets, competences and technologies that not always reside within

the same organization. The companies, therefore, must know how to develop networks implementing cooperation models that can be based on partnerships or acquisitions. The digital technologies, therefore, facilitate the development of the relational capital by stimulating the development of some key elements that characterize the new digital business models. The new digital tools also facilitate the relations with other important stakeholders, such as providers and staff members, contributing to the development of the smart supply chain, that is a smart procurement chain that is smarter supply chain, more flexible and fast, able to increase the satisfaction of all the actors involved.

Finally, regarding the structural capital, the reflection must focus primarily on the technology that the company owns and, consequently, on how the new different digital technologies can be used to retrofit the system of activities, (Rüßmann et al., 2015). Secondly, it is necessary to focus on the review of the internal processes and on the management of the databases, referring to the big data technologies, to artificial intelligence and machine learning, to cloud computing, IoT and cyber security. The combined employment of the above mentioned technologies may be about production organizational, and decision-making processes, as well as those responsible for the spread of the knowledge and for the improvement of information flows within the company (Rubino et al., 2017a). The new technologies may play a crucial role in the development of interconnected and automated processes, also granting the review and the improvement of the existing procedures. The structural capital supports the process of accumulation of the value of knowledge, which must be codified and shared within the organization. Therefore, the digital technologies may favor the implementation of processes aimed at achieving corporate objectives through management and control of the IT to the purpose of ensuring the government of the areas that characterize IT Governance system (Rubino e Vitolla, 2012).

THE CONCEPT OF CYBER SECURITY IN A CORPORATE-FINANCIAL PERSPECTIVE

Within the present social and technological context, the cyber security phenomenon has significantly influenced the life and the performance of enterprises. The large scale diffusion of connectivity between people and things, and of personal digital devices, has made society and the enterprise world more exposed to the threats coming from the cyber space. This socio-technological tendency has brought enterprises, institutions and citizens to emphasize practices and issues belonging to the cyber security sector.

Since the beginning, the expression “cyber security” has been often used in the same context as the expression “information security”. However, has highlighted in literature, there exist formal and substantial differences between these two concepts (B. von Solms & von Solms, 2018; R. Von Solms & Van Niekerk, 2013). Such differences reveal themselves some more in the present socio-technological context and digital ecosystem, where the scope in which the cyber security phenomenon exists is expanding. According to the widespread definition provided by ISO/IEC 27001 (2013), information security is finalized to guarantee privacy, integrity and availability of information. The loss of any of these three features determines a violation or security accident of the data that can happen both within a physical and a digital perimeter. Conversely, the concept of, cyber security goes way beyond the boundaries of traditional information security, since its dominion expands over the mere protection of data, including the protection of assets other than information, even individuals (R. Von Solms & Van Niekerk, 2013).

Despite some overlapping amongst the underlying dominions of these two concept, according to von Solms and van Niekerkda (2013) there exist violations, attacks or accidents in cyber security, that do

not fall within the scope of information security, and vice versa. Some examples of this are the cyber terrorism events that do not imply any privacy, integrity or data availability violations (Rantapelkonen & Salminen, 2013); or, more commonly, the DDoS (distributed denial-of-service) attacks, which are finalized to interrupt the normal operational ability of a network infrastructure through the overload of the traffic flow (Kuerbis & Badiei, 2017).

Therefore, according to this distinction, what makes cyber security different than information security resides in the asset that is compromised/protected (data or also other assets) and in its form (physical or digital). The cyber security dominion encompasses any asset based on the Information & Communication Technologies (ICT), while information security has, as a prerogative, the protection of information that can be based also, but not exclusively, on ICT technologies. In a more recent study, however, von Solms and von Solms (2018) define cyber security as a mere part of information security that is especially oriented toward the protection of privacy, integrity and availability of only assets of digital information, from the threats deriving from the internet. Such interpretation finds its fundamentals in the definition provided by ISO/IEC 27032 (2012), which defines cyber security, discerning it from information security for the sole difference of treating exclusively information that reside within the so called cyber space. According to this definition, the cyber security phenomenon is limited to the information that resides within the cyber space only, whereas information security is about the protection of any information (B. von Solms & von Solms, 2018). However, such definition brings with itself some limitations and ontological gaps which reduce the range and dimensions of the phenomenon itself. These limitations reside, primarily, in the definition of cyber space and in its interaction with the physical space, and secondarily in the exclusion of other types of cyber crimes or cyber attacks that do not imply any violation of privacy, integrity, or information availability.

For a long time, the concept of cyber space has been the object of study and attention with the purpose of finding a sufficiently exhaustive definition and a representation that corresponds to the reality of such phenomenon (Rantapelkonen & Salminen, 2013; Strate, 1999). What we do know is that cyber space subtends a reference to the concept of spatiality, despite having an undetermined and almost irrelevant geographical definition, since the concept of space-time itself is redefined upon it (Dodge & Kitchin, 2003). The advancement of the new ICT technologies, the interactions and connections among individuals and devices, has made space and geographical distances, as well as geographical boundaries, redundant. Despite cyber space has not yet found a shared and widely accepted definition, and is usually conceived, within the collective imagination, as an artificial and unreal environment, a sufficiently general and reasonable definition defines it as a set of physical, logical and social layers (Rantapelkonen & Salminen, 2013). Cyber space is indeed constituted by social practices and by the same human interactions, either direct or indirect ones. As explained by Dodge e Kitchin (2003), cyber space originates from the whole of the knots and connections created by individuals that form a network (for example, the internet) through the ICT technologies. This network is ever changing, since it can extend through the entrance and the exit of new individuals. Consequently, cyber space is ontologically undefined in space by nature, so much as to be defined paraspace or non-space (Strate, 1999), multilevel, and continuously mutating. Nevertheless, it is an integral part of and strictly dependent on the social and physical layers. Strate (1999) highlights that cyberspace is defined by "*building blocks*" represented by physical, conceptual and perceptive space. It, however, includes a variety of types cyber space, such as the media space, the aesthetic space, the data space and social and personal space (Strate, 1999). Cyber space can be therefore imagined as a logic parallel layer, dependent on and integrated by the physical and social space. According to this conception, it is not possible to adopt a simplistic definition of cyber space as

a sub-set of physical space and vice versa. Therefore, to base the definition of cyber security on that of cyber space, opens to further interpretations of such phenomenon, enlarging its dominion beyond that of information security. Cyber security, therefore, cannot be considered as part of information security, but as something much more ample that spaces beyond the physical layer that is an integral part to it. This interpretation is also supported by the strict interaction between physical and logical layer, which characterizes some violation and protection practices in cyber security. Evidence shows that, often, the instances of cyber crimes are not exclusively realized through ICT technologies (Gordon & Ford, 2006). These actions can stem from the physical layer and extend to the logical/digital one, and vice versa, being, then, characterized by a significant involvement and a significant responsibility of the human factor (La Torre, Dumay, & Rea, 2018). Following the definition accepted by von Solms and von Solms (2018), it is therefore quite difficult to outline a clear demarcation between what concerns cyber security (related to digital information in the cyber space) and what pertains information security, which concerns, instead, any type of information. A further limitation of the definition provided by the authors (B. von Solms & von Solms, 2018) and by the ISO/IEC 27032 (2012), sits in the reference to violations that impair privacy, integrity and availability of the sole information. Such definition would exclude any other asset and resource, either logical or physical, from the field of cyber security. However, there exist some cyber attacks finalized to impair other assets without any violation of the above mentioned three characteristics of the information. Examples of this are: DDoS attacks and some cyber attacks based on social engineering techniques that place themselves on the demarcation line, which is mostly undefined, between physical and logical dominion (La Torre et al., 2018). On the basis of such argumentations, the cyber security phenomenon cannot be exclusive limited to the sole information and to what exclusively concerns the logical dominion of the ICT.

To summarize, as for the concept of cyber space, that has had a wide range of meanings due to the interpretative polyphony deriving from the different observation perspectives (Strate, 1999), even the concept of cyber security is presently subject to such interpretative diversity.

However, by accepting the definition of cyber space, as the interaction of a multiplicity of layers, even physical and social ones, as well as logical, we can define cyber security as the protection of assets and resources, not only informative ones, that are placed within the physical, social and logical dominion, from events and threats conducted through the non exclusive employment of ICT technologies.

The definition provided here can be better validated and explained if one observes the cyber security phenomenon from an entity-centric perspective (Bahtiyar & Çağlayan, 2014), which contrasts with the information centric approach, used in other definitions presented earlier on. According to this perspective, the cyber security phenomenon is defined and studied around the individual/entity, and, in this particular case, around the corporate entity, and around the knowledge, which reside in different physical and logical layers. In these terms, the corporate system is characterized by a physical perimeter, in which activities are conducted and physical resources are kept, and a logical one, in which logical/digital assets, such as information, are placed. These two layers have strict interdependences and overlapping, albeit with different degrees of intensity and according to the digitalization degree of corporate processes and resources.

From such interdependence and integration, the cyber security phenomenon results to be hardly discernible from the one that can be exclusive scope of the physical layer and of the information security. Cyber security violations may exploit the vulnerability of the logical perimeter (through ICT) to impair assets and functioning of the physical layer. On the contrary, crimes and other activities that exploit the vulnerability of the physical perimeter may damage assets, including information, which reside in the logical layer. According to this perspective, the so called cyber reality of the enterprises is becoming more

and more integrated with their physical operational ability. From this integrated vision, it seems useful to talk about corporate cyber sphere (Goychayev, 2016; Hitchens & Gallagher, 2019), as the perimeter subject to the control of the top management, that, just as the cyber space, is characterized by the union and integration of a multiplicity of layers. The transition from traditional information security to cyber security seems, then, marked and dictated by the widespread of digital assets, by digitalization and by the more and more intense connection between people and things, which is also determined by the spread of the Internet of Things. These circumstances have made it so that the corporate cyber sphere has become more extended and vulnerable compared to the corporate physical boundaries.

THE INFLUENCE OF DIGITAL THREATS ON PROCESSES, RESOURCES AND CORPORATE RESULTS

From the cyber threats companies are exposed to, and their cyber sphere, derive risks and vulnerability for the enterprises. Such threats are different, various, and continuously evolving because of the recurrent innovation of methods and forms which the cyber security attacks are conducted with.

The attacks are, more often than not, conducted by conjugating ICT technologies with traditional fraudulent methods (Campbell, 2019).

Despite the attempt of researchers and professionals to define a taxonomy of cyber risks and cyber crimes, the list of cyber threats for enterprises and individuals is still indefinite to date, and continuously evolving (Clarke, 2016; Gordon & Ford, 2006). The types of damages caused can be classified as: physical or digital damages, financial damages, economic damages, psychological damaged, reputational damages and social damages (Agrafiotis, Nurse, Goldsmith, Creese, & Upton, 2018).

La Torre, Dumay and Rea (2018) offer, in their study, an examination and conceptualization of the effects of the cyber risks on the intellectual capital of the enterprises. The intellectual capital, defined as the set of knowledge and know-how, and as the sum of structural, social and human capital, represents one of the assets that are more exposed to cyber threats. Information, data, and particularly big data, represent, indeed the basis of corporate knowledge. A data breach, such as a privacy, integrity and data availability violation, which can spring from a theft or alteration of data, has effects on the intellectual capital that oftentimes can only subsequently reflect on the economic-financial results of the enterprises. The most common and significant case regarding the damage caused by a data breach is, indeed, the reputational one, which only later realizes itself as less earnings for the victim enterprise (Drinkwater, 2016; La Torre et al., 2018; Ponemon Institute LLC, 2016). The authors identify the different types of effects of the data breach on the three capitals that compose the intellectual capital: social, human and structural capital (La Torre et al., 2018). A breach in the data may reduce the value of the social and relational capital of the enterprise, especially if referred to personal data of customers. In case of theft of commercial or industrial data of the enterprise, instead, a data breach can have a negative influence on the enterprise innovative potential, as well as the competitive value of knowledge enclosed within the structural and human capital (La Torre et al., 2018). The particular case of data sabotage, that substantiates in the modification or cancellation of data, represents, instead, one of the main threats to the reliability of the data upon which the decision-making processes are based and, in case of cancellation of the aforementioned data, to the continuity of the operability of the processes and of the information systems that form the structural capital (La Torre et al., 2018).

The effects of the data breach are, to date, scarcely studied empirically; likewise, the empirical evidence present in literature on the effects of their disclosure on the capital market and on the behavior of the consumers result to be still conflicting (Janakiraman, Lim, & Rishika, 2018; Rosati et al., 2017). What is confirmed is that not all data breaches have the same magnitude. The cost and the related negative effects of a data breach depend on the dimension of the cancelled or stolen data, on the type of data (for example, personal data of the customers, industrial information, and sensitive information) and on the public exposure of the data breach (La Torre et al., 2018).

However, the data breach does not represent the only threat for enterprises within the scope of cyber security. In the corporate cyber sphere there are other assets, as well as data and information, that can be the object of cyber threats. They evolve in time and, in the last few years, new and innovative cyber threats have emerged, like, for example, attacks to the eco system of the crypto currencies, multiple IT attacks based on artificial intelligence and machine learning technologies, that have, has victims, the block chain systems and the automated ecosystems (CYFIRMA, 2020).

With the widespread of IoT technologies, the IoT devices have been exposed and vulnerable to cyber attacks (AON PLC, 2019; Fruhlinger, 2018). This is determined not only by the diffusion of such devices, but most of all by the scarce knowledge of their existence within enterprises and the related risks. Even the circulation of mobile devices, used for both personal purposes and for professional ones, has determined the same significant increase in vulnerability. The BYOD (bring your own device) policies, implemented by many enterprises to reduce the operational costs deriving from the purchase of equipment and devices for their personnel, has created an increasing risk of malware intrusion and data leak (Clarke, 2016; B. von Solms & von Solms, 2018).

Despite such innovations in the ICT technologies and in the employment of these devices, the risks deriving from the traditional category of ransom ware attacks represent, at the moment, the most common IT threat, especially for enterprises (Federal Bureau of Investigation, 2019; ICAEW, 2016; Stroz Friedberg, 2017). With this type of attacks, the data of the victim are encrypted and made unusable, with the purpose of interrupting the normal operability of logical assets, and extort money in exchange for the unblocking of the code. According to some estimates, the ransom ware attacks determine a cost of five million dollars for the enterprises, on average (Fruhlinger, 2018).

Even the phishing and social engineering techniques continue being amongst the most common threats, despite their ample knowledge on a global level (CYFIRMA, 2020; Stroz Friedberg, 2017). Most of the time, such attacks exploit the vulnerability of the human factor, which is deceived by putting pressure on emotional and personal factors, and persuaded to the behavior that is desired by the hacker, such as the inputting of personal information and passwords. The human factor stays, indeed, the most complex and significant vulnerability and threat within the scope of cyber security (Campbell, 2019; La Torre et al., 2018). Personnel knowledge, awareness, self-control and responsibility when faced with the cyber risks, represent the socio-behavioral (not tecnica) vulnerabilities that are more difficult to control within organizations (Campbell, 2019). So, the insider threat, be it intentional or involuntary, represents one of the main worries, not always adequately perceived by the enterprises.

In summary, cyber threats change and evolve in time according to technological innovation, to lifestyles and to work modalities (for example, the BYOD policies and the smart working). They extend way over the mere logical-digital perimeter and can involve assets and vulnerabilities that sit within the physical perimeter. The impacts of such threats on the resource sand on the processes of the enterprises can be diverse and are hard to summarize in simplified records. In order to assess their degree of exposure to the risks of cyber security, enterprises have the need to adopt management systems that are able to

monitor the vulnerabilities of the perimeter of their own assets, both logical-digital and physical ones, and to evaluate the impact of the related threats on the different types of assets.

CONCLUSION

Key words such as "intellectual capital", "digital technologies", and "cyber security" have been at the center of the institutional-political debate for a few years now, especially because of the centrality that they are acquiring regarding the management of services of general interest within the community, under both a political point of view and an corporate-economic one, especially in a frame work of growing scarcity of financial resources and of cultural paradigms, as well as digital, urban and social ones, with a consequent impact in the transformation of corporate-economic paradigms of reference.

In this context, that is permeated with digitalization, the mix between intellectual capital and cyber security issues has companies facing many challenges that impose a new interpretation of traditional paradigms, in terms of corporate management and control, investing in the entity as a whole (roles, responsibilities, activities, processes, human resources, informative reports, controls, etc..) However, the definite perimeter of these keywords does not yet appear as clear and defined, not just under a definitive-semantic point of view, but also in the conceptual roots, especially in the corporate-economic perspective.

The context in which such variables develop is volatile and ever changing, object of a growing dynamism for the technological evolutions that make the comprehension of corporate phenomena quite complex both under an accounting and a managerial point of view.

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Chapter 15
Legal Technology: The New Face of Legal Practice – Polish Perspective

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ABSTRACT

This chapter discusses practical applications of emerging technologies in the context of legal services. The newly established legal technology (legal tech) industry is based on the application of IT services in the legal sector, radically changing the current nature of the lawyer's work. Importantly, the COVID-19 pandemic has significantly accelerated the digitization of individual processes and fundamental aspects of lawyers' work, contributing to the development of legal tech. The first part contains definitions and descriptions of the term 'legal technology' and some related ones, pointing out to the context of the relationship between dynamic technological development, the use of artificial intelligence, and the practice of the profession. The following sections describe the research on the current legal tech scene in Poland, based on integrative literature review. Then follows an analysis of the collected material, looking for the industry's map and an analysis of its specification.

INTRODUCTION

The definition of a framework for the legal tech industry has led to the posting of a new sector of IT services dedicated exclusively to the legal field. As M. Corrales, M. Fenwick and H. Haapio put it, "legal tech is a term that broadly refers to the adoption of innovative technology and software to streamline and enhance legal services. Legal tech companies are generally startups founded with the specific purpose of disrupting the operation of the (traditionally conservative) legal profession" (Corrales, Fenwick, & Haapio, 2019). Similarly sounding is a close notion of 'legal informatics' understood as the "social implications of informatics use, as well as with all the applications of informatics in the field of law, such as the storage and the automatic retrieval of sources of law, the automation in law offices and the judicial

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administration and all the other uses of the computers in law (databases; information systems; educational programs; expert systems, computer-aided legal drafting, etc.)" (Praduroux, de Paiva, & di Caro, 2016).

The legal technology sector (LegalTech) has an increasing influence on the current image of the legal services market also in Poland (Canestrino, Ćwiklicki, Kafel, Wojnarowska, & Magliocca, 2020). A growing number of law firms and legal departments reach for advanced IT systems supporting their work (Kerikmäe, Hoffmann, & Chochia, 2018). Lawyers are starting to use much more advanced solutions than instant messaging or electronic legal information databases, looking for tools that support their work based on automation processes and the use of artificial intelligence (Susskind, 2013).

Legal services covering a range of components such as legal consultancy, representing the client in court and out-of-court proceedings, producing legal documentation as well as other unclassified activities performed by applying specialist legal knowledge are subject to the process of digital transformation (Hartung, Bues, and Halbleib, 2017). Online legal advice, case management systems, electronic arbitration proceedings, or AI-based document analysis are already commonplace in law firms and legal departments across the world (Abramovsky, Griffith, 2005).

The ongoing process automation, increasingly frequent use of artificial intelligence, and advanced systems supporting the work of law firms were present in the market already in the late 1990s (Susskind, 2000). In 2014, however, the dynamic growth of LegalTech service providers was observed, followed by the soaring market investment index, at $3,245,000 in 2018 (Chishti, 2020).

At the same time, professional specializations and services, not known before, began to emerge, intended to connect the needs of the clients – inherent to the practice of pursuing legal professions – with IT experts, able to translate a given challenge into the programming language, creating dedicated tools and systems. New specializations such as legal engineering, or legal design gained importance while the disruptive innovation of the two milieus, legal professionals and programmers, have given rise to new market solutions (Berger-Walliser, Barton, & Haapio, 2017; Goldenfein, & Leiter, 2018).

METHODOLOGY

The innovativeness of the research comes out of the combination of the research methods used and the innovative subject of research, opening new areas of application for management, legal sciences, and computer science.

Meeting the methodological requirement of triangulation and wanting to obtain material using many methods from different sources, I used the following research methods:

- integrative literature review to gather the material
- technology mapping to create a visualization of technology by locating it spatially along with an analysis of the relationships between them
- cluster analysis to identify the whole population of start-ups located in Poland offering their IT systems and tools to the legal services market, and the specificity of the analyzed industry
- McFarlan Application Portfolio Matrix to test organizations' strategy (LegalTech start-ups) and their application portfolio

The set of methods will make it possible to carry out not only a diagnostic but also a prognostic analysis, indicating the potential directions of development of the tested technology.

Table 1. Process of creating a literature database in quantitative terms

Search criteria	EBSCO (15.08.2021)	ProQuest (15.08.2021)
legal technology	1,436	15,275
Poland	14	341
Full text	0	340
Peer review	0	13
Limited to 2018-2020	0	8

Source: own study

IDENTIFICATION OF THE LEGALTECH SECTOR BASED ON INTEGRATIVE LITERATURE REVIEW

Both academia and business are watching the development of new IT services dedicated to the legal sector with curiosity. The results of bibliometric analysis of the content of the EBSCO and ProQuest databases show, respectively, 1,436 and 15,275 publications featuring the phrase "legal technology" (all text) (Okoli, & Schabram, 2010; Wilding, Wagner, Colicchia, & Strozzi, 2012). What can be noticed, 2 main sub-themes that can be selected based on literature analysis are publications on selected LegalTech tools (such as predictive justice tools and neuro-linguistic programming systems) or publications on selected markets (such as Chinese or American) (Richardson, Schultz, & Crawford, 2019; Wang, 2020). When the word 'Poland' was added, however, the number of records was very low. In ProQuest I was able to find only ten, and only eight in the last three years. The whole process of creating a literature database in quantitative terms is presented below, in table 1.

Continuing my search for appropriate sources concerning the LegalTech sector in Poland, I performed a similar analysis in grey literature and the Google Scholar search engine. The phrase 'legal technology' featured in 8,040 records, but only 68 publications cover the word 'Poland' in the last three years (since 2018). The process of building a grey literature database is presented in table 2.

Having carried out an integrative literature review and familiar with, respectively, eight publications found in the ProQuest database and 68 in Google Scholar, I managed to confirm that ultimately a mere eight records included actual references to the Polish LegalTech industry searched for. None of those publications, however, presents the whole picture of the sector, or a list of the tools it uses and their specific features.

Table 2. Process of building a grey literature database

Search criteria	Google Scholar (15.08.2021)
legal technology	8 040
Poland	277
Full text	64/100
Limited to 2018–2020	68

Source: own study

As the integrative literature review resulted in a modest base of academic publications within the keywords used, I became convinced that the search should be extended by adding a review of industry literature which, according to the hypothesis made, is quicker in assessing the current market situation (Adams, Smart, & Huff, 2017). No analysis of the Polish LegalTech industry can be found nor its impact on specific legal services environment. The lack of multilevel studies on the impact of digital transformation on the socially important and professional legal services sector is the reason why this topic is so important. Analyzing the impact of technology on the work of lawyers will allow for a real assessment of the sector, its maturity, and readiness for change, contributing to improving the level of public access to justice and legal services (Campbell, 2012).

IDENTIFICATION OF THE LEGALTECH SECTOR BASED ON INDUSTRY SOURCES

Global Level

One of the first attempts at creating a global catalog of LegalTech enterprises was the still ongoing academic project of Stanford University named CodeX the Stanford Center for the Legal Informatics (Wass, 2017; Waltl, & Vogl, 2018)[1]. At its initial stage in November 2017, the list included 750 firms from across the globe providing LegalTech services. Currently, in November 2020, the number stands at 1,719, including five Polish companies. Such a low number when compared with 48 for France, 122 for the UK, 27 for the Netherlands, or 13 for Belgium lets one suppose that in the case of Poland the catalog may be incomplete, thus a reliable assessment of the Polish LegalTech is not possible on its basis.

Significantly different results can be found in the Legal Complex Legal Pioneer list, with information about Polish 53 startups (Boon, 2017)[2], a number appearing closer to the true picture of the Polish scene.

An interesting source extended in terms of systematization is the Legal Geek Startup Map, featuring over 250 firms exclusively from Europe (Ryan, 2020)[3]. The advanced categorization used by the authors has let them posit eleven areas of activity of start-ups, yet (again) as the list does not allow for filtering them by country of origin despite its extended nature the source does not help identify national scenes.

Another catalog of LegalTech firms is the Dealtech initiative (Chishti, 2020). It is, however, incomplete, including only transactional legal technology tools and not allowing for sorting the companies by country of establishment. Furthermore, the list has not been updated, as evidenced by the most recent post there dating back to 27 June 2018.

A similar attempt at cataloging the sector in question can be also found on Robert J. Ambrogi's site LawSites (Fenwick, Kaal, & Vermeulen, 2017)[4]. At the moment, it lists a mere three Polish companies.

Domestic Level

Looking for a list of LegalTech companies at the domestic level, I have found two industry catalogs.

The first source is maintained by the LegalTech Polska foundation set up in 2017 whose statutory objectives include supporting the dissemination of knowledge about the application of technological tools in the provision of legal advisory services[5]. The foundation keeps a list of technological solutions that may be used by lawyers in Poland[6]. On 15 November 2020, it featured 47 such tools.

The other catalog of firms and tools offering lawyer-dedicated IT services is LegalTech Q&A Sessions powered by Treesk with 27 LegalTech tools[7].

Apart from these two, I have not found in the Polish market any other lists of enterprises from the sector in question.

Integrative Review of Industry Literature

Not having found a list of such sectoral actors, I focused on a review of industry literature, i.e. business reports related to LegalTech in Poland in the last three years (2018–2020) selecting eight such publications. All of them are presented in the table 3. below complete with the description of their topics, specifics of their contents and selected research methods.

The consistent number of (approx. three) domestic reports per annum suggests an unwavering interest in the subject. At the same time, none of the reports refers directly to the offer of the Polish LegalTech sector, focusing mainly on polls involving users of LegalTech tools, i.e. lawyers. The fact that no analysis of the sector is offered is yet another reason why the subject needs to be explored.

MAPPING THE LEGALTECH SECTOR

Technology mapping is an innovative methodological tool aimed at presenting a picture of a given phenomenon, its focal point is the exploration of a selected technology (Koen, 1997; Gupta, Iyer, & Aronson, 2000). Visualization of knowledge about technologies is the first stage of the mapping, which initially concentrates on assessing a given set and at successive stages shows links and potential paths of development (Probert, & Shehabuddeen, 1999; Kurgan, 2013).

I began to operationalize the research problem by introducing the fundamental notions and defining them. In the absence of a single catalog of LegalTech services providers in Poland, it became necessary for me to define such firms, identify them, and include them in the relevant list (Saunders, Sim, Kingstone, Baker, Waterfield, Bartlam, ... & Jinks, 2018). The data collection stage was based on the results of the integrative reviews of academic and industry literature described earlier in the article. I put together all the entities found in global and domestic catalogs of LegalTech firms, adding information from domestic reports, the press, and online content. Then, I added indicators and variables making it possible to remove companies not from the sector analyzed as offering general IT services without specializing in legal services or tools for general process management support without being dedicated to lawyers. Having defined the set of Polish LegalTech start-ups, I could move on to the following step, i.e. analysis of the specific features of that market (Datta, 1996).

Identifying the Polish LegalTech industry, I combined all the information gathered from both academic and industry publications and produced a map of tools offered to the legal sector in the Polish market (Figure 1).

The figure above shows a catalog of the Polish LegalTech industry actors, 42 unique firms offering a total of 48 various IT solutions for lawyers. With a single exception, each of them offers one tool dedicated to lawyers[16].

Table 3. Industry reports on the Polish LegalTech market (2018–2020).

	Report title	Publisher	Year of publication	Research area	Research method
1.	Coronavirus and the legal market. Legal services market[8].	National Bar Council of Attorneys-at-Law	2020	- the impact of the pandemic situation on law firms - analysis of the behavior of clients of law firms - assessment of actions taken by lawyers in times of crisis	- surveys of 600 representatives of law firms a survey conducted in the period 31 March – 16 April 2020
2.	Future Ready Lawyer. Efficiency factors[9].	Wolters Kluwer	2020	- the most important trends - building successful customer-company relationships - transformation of legal departments - technological investments	- surveys of 700 lawyers working in law firms, legal departments and advisory firms in the USA and Great Britain Great Britain, Germany, the Netherlands, Italy, France, Spain, Poland, Belgium and Hungary - a survey conducted in the period 10 – 20 January 2020
3.	Artificial intelligence and new technologies on legal practice[10]	Wolters Kluwer	2019	- new technologies and legal services - overview of major trends in the European context	- a survey carried out among members of the Polish Union of Employers of Legal Professionals - no information as to the number of respondents
4.	Competitive strategies of individual law firms of legal counsels. How to develop your legal practice in a competitive environment?[11]	National Bar Council of Attorneys-at-Law	2019	- competitive strategies of law firms run by legal counsels in Poland - trends and factors of change in the legal services market	- original survey including interviews with 24 lawyers representing various market segments, 20 representatives of individual law firms, 10 producers of software for law firm management, 6 industry experts and analysis of over 100 industry reports, and publications
5.	The Future Ready Lawyer[12]	Wolters Kluwer	2019	- organizational and technological changes in the legal services sector globally, with rare references to the Polish market	- surveys of 700 lawyers from the US and Europe working at law firms, legal departments, and companies providing advisory services - a survey conducted in the period 10 December 2018 – 13 January 2019
6.	Outsourcing of accounting, legal and tax services in companies in Poland[13]	KPMG	2018	- analysis of outsourcing of individual services, including legal, practiced by Polish entrepreneurs	- CATI survey by telephone interviews of 200 respondents – those in charge of accounting and holding CEO and CFO posts
7.	New technologies in lawyers' work and transformation of legal departments[14]	PWC	2018	- analysis of key determinants of change in the legal sector, including technological progress - section of the report devoted to the Polish legal services sector	- the global market – survey carried out by PwC Legal in the UK in 2017 - a survey of corporate legal departments – a survey by PwC Legal in Poland among 60 directors of legal departments in the period April – August 2018
8.	Diagnosis of lawyers' needs of using IT tools in legal services[15]	LegalTech Polska	2018	- diagnosis of lawyers' needs related to using IT tools supporting their work - survey of the Polish market only	- a survey carried out using three methods: expert interview, observation and CAWI quantitative survey (online with 140 respondents) - a survey conducted in the period February – May 2018

Source: own study.

Figure 1. Mapping the Polish LegalTech scene
Source: own study

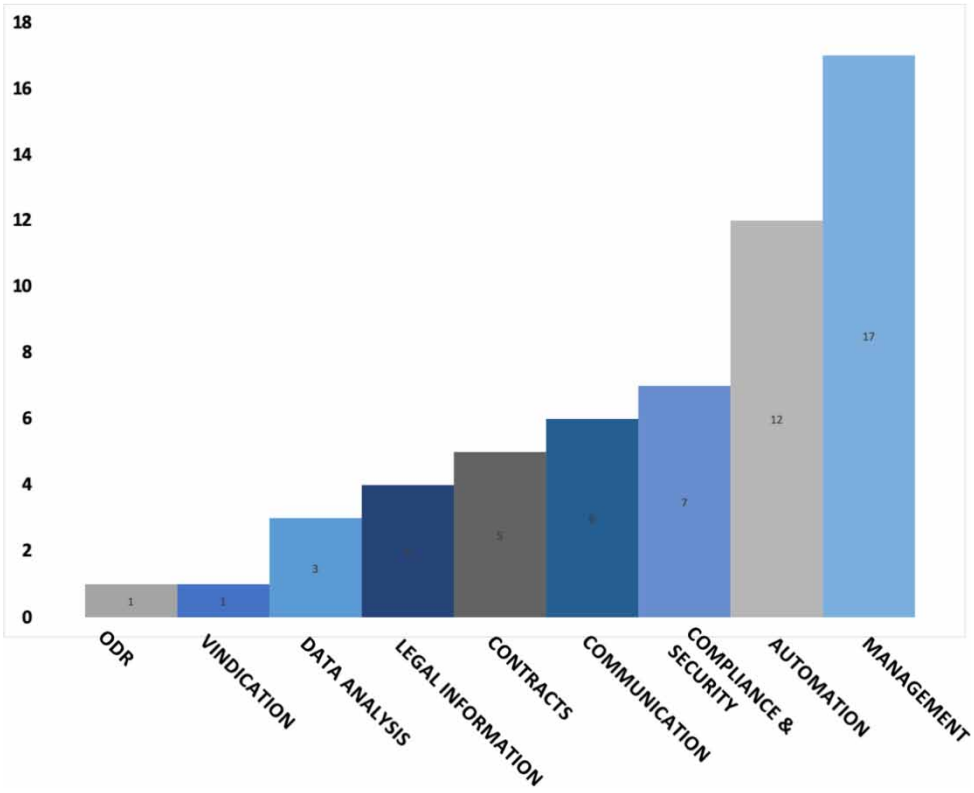
LEGALTECH SEGMENTATION

Based on the map of the Polish LegalTech scene, I moved on to the successive stage, i.e. segmentation of the market in question (Weinstein, 2004). My analysis of the sector began with the classification of the cohort in question (all the tools in the said catalog). Each of the 48 systems was placed in one of nine categories based on the specific nature of the services offered (Mariorty, & Reibstein, 1986).

The analysis of the entire cohort helped me introduce nine thematic categories (Wedel, & Kamakura, 2012):

- Legal Information – a category of tools of legal information systems and know-how dedicated to lawyers
- Data Analysis – a category of tools for analysis of documents, data sets, jurisprudence, and legal doctrine
- Contracts – a category of tools serving the generation of agreements and contracts as well as the signing of documents

Figure 2. Polish LegalTech market segmentation



- Automation – a category of tools automating document generation
- Management – a category of tools serving to boost the efficiency of document and legal department/law firm management, time recording, management of intellectual property rights as well as expert systems and chatbots
- Compliance & Security – a category of tools to ensure compliance and security
- Communication – a category of communication tools in the form of platforms intermediating between lawyers and clients as well as lawyers themselves
- Debt Collection – a category of tools for making the debt collection process more efficient
- ODR – a category of tools being examples of out-of-court (online) dispute resolution platforms

Thanks to the road taken, I have obtained an updated picture of the Polish sector in question suggesting a large number of management and automation solutions and a low number of ones for vindication and online dispute resolution (Figure 2).

Looking at the specific features of the services offered by the cohort examined, I divided the tools based on their different purposes (Peng, Heim, & Mallick, 2014). (Figure 3):

- Internal Tools – solutions dedicated to boosting the efficiency of processes within law firms or corporate legal departments, e.g. contract analysis (TREESK)

- External Tools – solutions aimed at ensuring higher effectiveness of processes played out outside of organizations, such as communication with clients (LEGALCLUSTER TEAMS APP)
- Hybrid Tools – solutions both boosting the efficiency of the organization's internal processes and applicable in the field of relations, contacts, and processes effected with external entities, e.g. chatbots (HUGO.LEGAL)

STRATEGIES OF APPLYING INFORMATION TECHNOLOGIES IN BUILDING THE COMPETITIVE ADVANTAGE OF LAW FIRMS

The essence of the importance of information technology selection in building a company's competitive advantage is well illustrated by the implementation of IT solutions by law firms and corporate legal departments (Rathnam, Johnsen, & Wen, 2005). In order to carry out an in-depth evaluation of the specifics of the Polish LegalTech market, I have analyzed corporate computerization strategies (Applegate, LAustin, & McFarlan, 2006; Cagnin, Keenan, Johnston, Scapolo, & Barré, 2008). Examining how IT impacts organizations, I decided to use McFarlan's strategic grid, which allows for learning about the role of IT systems in building a competitive advantage and selecting an appropriate strategy (Leith, P., & Hoey, 2012).

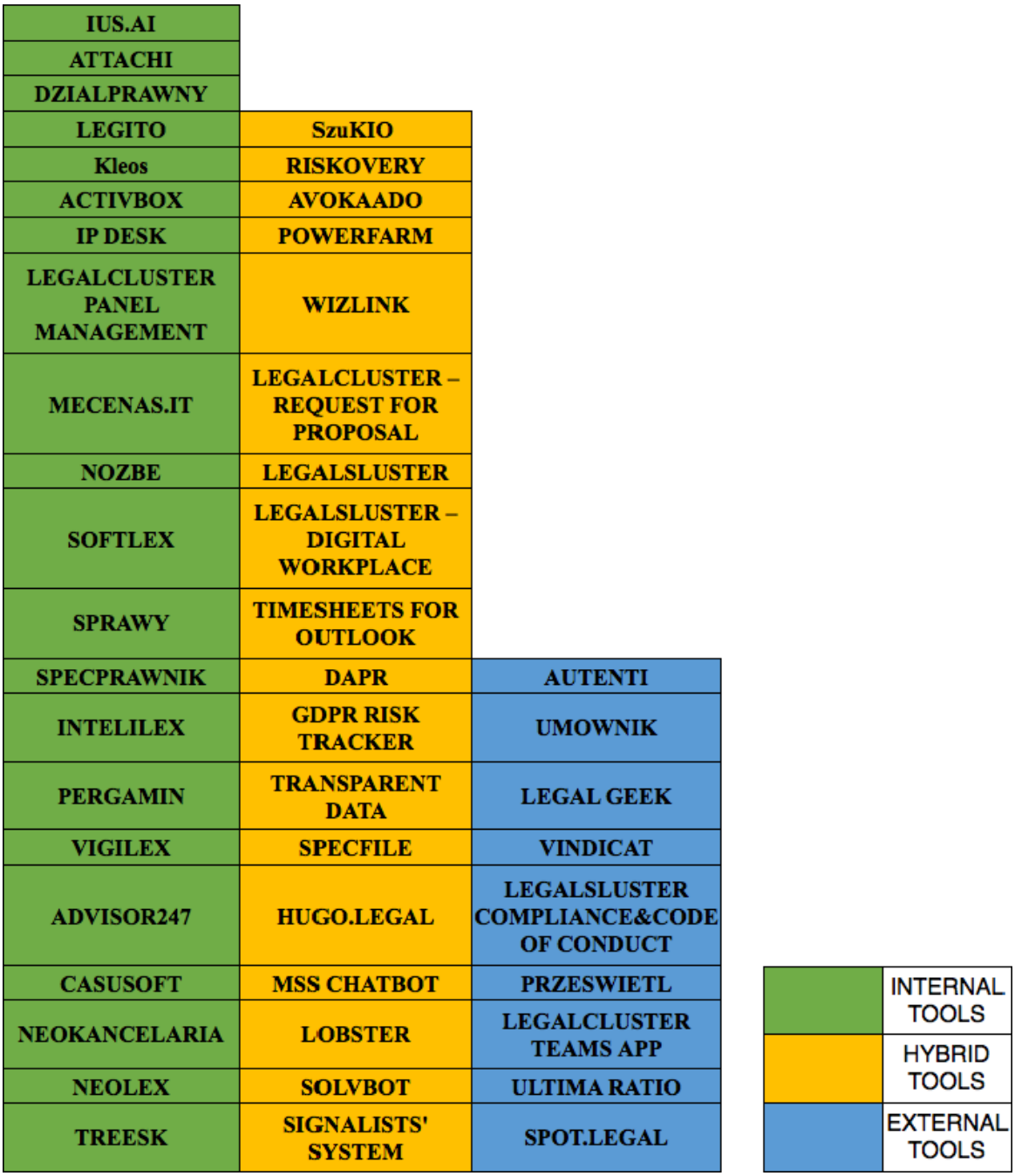
The application portfolio model posited by F.W. McFarlan allows for analyzing the impact of the existing and projected IT systems on the operation of organizations (McFarlan, 1984). The division and classification of applications in terms of their current and future importance help evaluate the current state of the entire sector (McFarlan, & Nolan, 1995).

In the original version of his model, F.W. McFarlan proposed a division into four categories, thus model ways IT can impact organizations: support factory, turnaround, and strategic (Kim, 2015). The matrix allows for assessing the role of IT systems in boosting the effectiveness of an organization's operational activity. Thanks to using the tools, it is possible to make processes more efficient, automate various activities as well as to ensure more effective analysis or faster communication channels. That, in turn, facilitates building competitive advantage of law firms and corporate legal departments, which seeks to ensure a better quality of their services indirectly influence access to justice (Staudt, 2008; Cabral, Chavan, Clarke, & Greacen, 2012).

Given the initial stage of research of the industry in question, I have adopted F.W. McFarlan's premises as well as my terminology to introduce the following four models: operational, tactical, strategic, and experimental (McFarlan, 1984). The strategic grid for the LegalTech market is presented in figure 4.

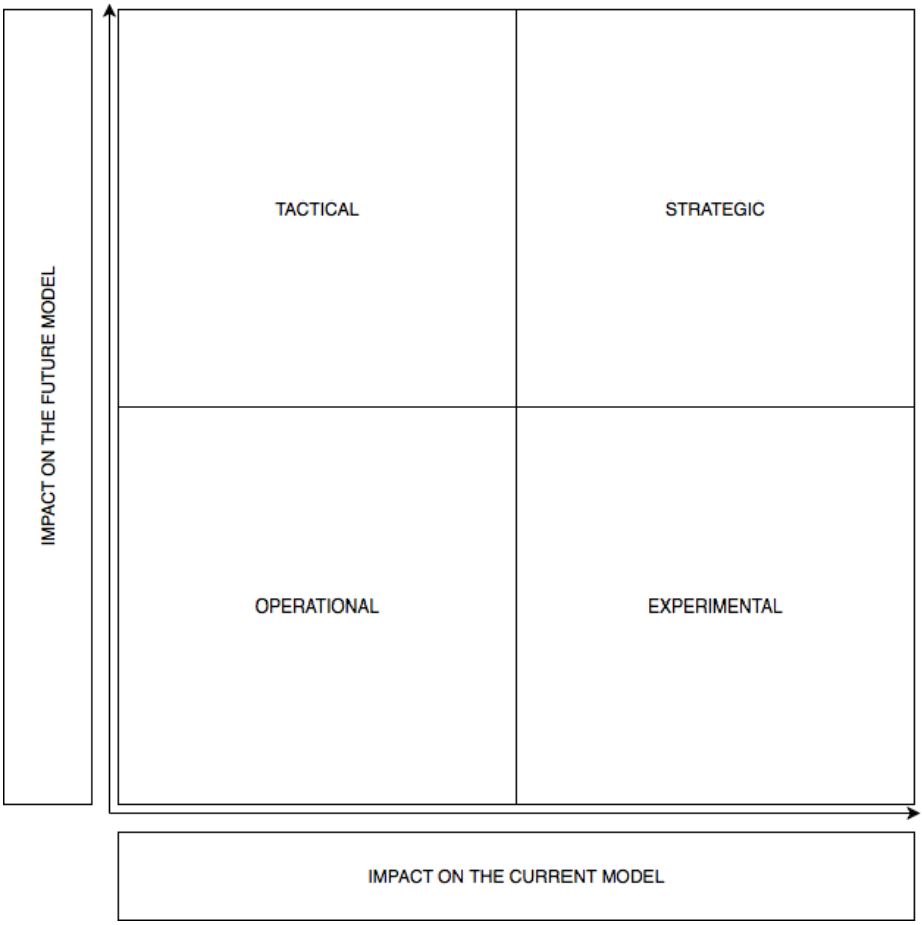
- Operational (O), including tools boosting the efficiency of the current operations of their addressees (law firms and legal departments); this model covers systems supporting ongoing activities as a short-term measure. Such applications do not influence the model of an organization's operation in a significant way yet they do support its automation and indispensable processes. This category includes legal information analysis systems.
- Tactical (T), i.e. tools dedicated to an organization's mid-term profits; in this model, the tools serve more far-reaching goals bringing more efficiency to work at a level higher than the current one. Consequently, such tools bring about changes in vital processes as well as business transformation, hence cost reduction and higher work efficiency. However, the cost of these tools is

Figure 3. Polish LegalTech market categorization



higher than that of operational systems. These applications are highly important now but less in the future, exerting a high impact on an organization's ongoing operations. Tactical applications include intellectual property rights management systems.

Figure 4. Strategic grid for the LegalTech market
Source: elaborated based on McFarlan, F. W., & Nolan, R. L. (1995)



- Strategic (S), i.e. applications vital for attaining success and an organization's competitive advantage; such systems are of key importance for both its ongoing operation and its future. The category of strategic applications includes tools performing risk analysis focused on the honoring of commitments related to the GDPR.
- Experimental (E), i.e. applications of low current and high future significance, some sort of experiment. If successful, they can have major importance for an organization's future operation and advantage. Tools of that level are missing in the Polish market, most probably due to low market demand and general distrust of lawyers as regards experimentation in the field of LegalTech investment. For example, this category can include court ruling prediction systems.

Putting the LegalTech tools available in the Polish market in one of the four categories based on McFarlan's grid allows for assessment of the state of the entire sector as well as its potential (Reynolds, & Yetton, 2015). At the current (preliminary) stage of my research devoted to the industry in question, the division of the tools featuring only three models allows for obtaining information on the kind of applications, their use, and targeting support of ongoing activities and communication (SpecPrawnik.pl),

simple automation (LEGITO) as well as management of individual processes of law firms and corporate legal departments (MECENAS IT) (Figure 5).

The picture obtained indicates a dominant role of operational tools adding efficiency to law firms' current operations, yet not being tools of a strictly tactical or strategic nature targeting mid-and long-term goals. Tools serving the acquisition of legal information (IUS.AI), simple data analysis (TREESK), or contract generation (AUTENTI) are uncomplicated examples of how IT systems are used in the field examined. It is just such solutions that are mainly offered in the Polish market, which testifies to low demand for advanced strategic tools. Furthermore, the absence of any examples that could be classified as experimental tools shows that the market in question is not ready for revolutionary or technologically advanced tools using artificial intelligence.

CONCLUSION

The paper aims to examine the Polish legal industry by creating a technology map that allows identifying IT solutions that have an impact on the legal services market and entities (organizations) operating on it. Moreover, the commencement of the first national research of the Polish LegalTech industry in a significant period of transformation will be a reference point to the following years, allowing for a real assessment of its development dynamics.

The lack of an in-depth analysis of the newly created industry - LegalTech, which dynamically changes the existing legal services industry, is the most important reason for the need to conduct in-depth research (Gowder, 2018). The context of the company's operations, which leads to future recognition, gives a chance to create it properly. The adoption of technology solutions in the LegalTech sector should be seen as a positive indicator of legal services delivery improvement. Both industries, LegalTech, and the legal services market need to cooperate on multidimensional levels, understanding their professions' specificity, needs, business models, distribution systems, competition market, as well as the possibilities and limitations of the technology (Daheim, & Uerz, 2006; Daheim 2009).

The appropriate selection of the strategy for the use of information technologies in building a company's competitive advantage will help individual organizations achieve their business goals. The acquired knowledge will allow law firms and legal departments to better prepare for the upcoming changes in the Polish legal services market. At the same time, the research results will be an up-to-date source for the LegalTech industry itself, adapting its offer to the specificity of the Polish legal services sector (Pocs, 2012).

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Figure 5. Strategic models of the LegalTech sector
Source: own study.

	LEGAL INFORMATION	DATA ANALYSIS	CONTRACTS	AUTOMATION	MANAGEMENT	COMPLIANCE & SECURITY	COMMUNICATION	VINDICATION	ODR
IUS.AI	O								
SzuKIO	O								
RISKOVERY		T							
AUTENTI			O	O					
AVOKAADO				O, T					
UMOWNIK			O, T						
ATTACHI				O					
DZIALPRAWNY					O, T				
LEGAL GEEK				O					
LEGITO			O	O					
POWERFARM				O, T	O, T				
WIZLINK				O, T					
VINDICAT								O, T	
Kleos					O, T, S				
LEGALCLUSTER – REQUEST FOR PROPOSAL					O, T				
ACTIVBOX							O		
IP DESK					O, T				
LEGALCLUSTER PANEL MANAGEMENT					O, T				
MECENAS.IT					O				
LEGALSLUSTER					O, T				
NOZBE					O, T				
SOFTLEX					O, T, S				
LEGALSLUSTER – DIGITAL WORKPLACE					O, T				
SPRAWY					O, T, S				
TIMESHEETS FOR OUTLOOK					O				
DAPR						O, T, S			
GDPR RISK TRACKER						O, T			
LEGALSLUSTER COMPLIANCE&CODE OF CONDUCT						O, T			
PRZESWIETL						O, T			
TRANSPARENT DATA						O, T			
SPECPRAWNIK							O		
LEGALCLUSTER TEAMS APP							O, T		
SPECFILE						O			
ULTIMA RATIO									O
HUGO.ILEGAL				O, T			O, T		
MSS CHATBOT			O	O					
INTELILEX				O					
LOBSTER					O				
PERGAMIN				O					
SOLVBOT				O, T					
SPOT.LEGAL							O, T		
SIGNALISTS' SYSTEM						T			
VIGILEX	O, T								
ADVISOR247					O, T, S				
CASUSOFT					O				
NEOKANCELARIA					O				
NEOLEX	O								
TREESK		O							

	INTERNAL TOOLS
	HYBRID TOOLS
	EXTERNAL TOOLS

O	OPERATIONAL
T	TACTICAL
S	STRATEGIC
P	EXPERIMENTAL

Applegate, L. M., Austin, R. D., & McFarlan, F. W. (2006). *Corporate information strategy and management*. McGraw-Hill/Irwin Custom Publishing.

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ENDNOTES

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4 The webside of LawSites: https://www.lawsitesblog.com.
5 The website of the LegalTech Polska foundation: https://legaltechpolska.pl.
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Chapter 16
The Digital Resurgence of Prisons

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ABSTRACT

The aim of this research is first of all to analyze the importance within the prison reality of the right to affectivity and sexuality of prisoners to be understood as a set of human and personal relationships intertwined with external figures, family members, but also educators, psychologists, religious, and school and university teachers. The pandemic has made it possible to show the importance of distance learning as a means of supporting, if not even replacing traditional distance learning in person. The target audience will undoubtedly have to be made up of all prisoners, regardless of the title of the crime or the circuit to which they belong in order to access specific sites. The recognition of the internet as a right may subsequently be restricted in the face of certain offences, but this is diametrically opposed to the ban on all access to the internet. The difficulty or even in many cases the impossibility of access lies in the inertia of the legislator.

THE THORNY QUESTION OF PRISON AFFECTIVITY BEFORE COVID-19

The penalty for imprisonment in prison is characterized by deprivation, not only of freedom of movement, but also of human relations and personal relationships, which have emotional and psychological consequences (Sykes, 1958). Prison and affectivity seem two irreconcilable words because the prison world, by its nature, is a place of sensory and emotional deprivation. Affectivity, in turn, is a broader concept than sexuality, because it includes the parental or friendly relationship; while sexual intimacy can be understood as an extrinsic personality extrinsic with the spouse, with the cohabiting partner more uxorio or in other types of affective relationship, but both are interpenetrating to remain frozen in the timeless dimension of prison. Even today, the only connection between inmates and the outside world is guaranteed by the prison system through interviews with family members, granting special favor to the latter (art. 18 Op.), or through the granting of premium permits (art. 30, ter Op.) which, with Law 653/86, have been perfected to cultivate effective, cultural or working interests outside prison (Ceraudo,

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1999). In this regard, it should be noted that the bonus permits are only a partial response to the need for prisoners to continue to have affective relationships, even of a sexual nature, and that they are used only by a limited number of convicts (Judgment, Corte Cost., 19 December 2012, No. 301). For the rest, there is a great legislative silence on the issue of prison affectivity, which is in line with the demand for more severe penalties from criminal populism. The recent proxy law of 23 June 2017, no. 103, had provided in Article 85, letter n, the recognition of the right to affectivity of persons detained and interned, but the proxy has not been implemented, except for Article 19 of Legislative Decree 121 of 2018, which recognized the right to affectivity of minors.

This provision could open up significant gaps in the field of affectivity of adult prisoners, since a constitutional legitimacy judgment could be envisaged to support the unequal treatment of adult prisoners (Ruotolo, 2019). Opening the prison to affection, to sexuality is an attempt to humanize detention and to share feelings with family members (Gordon & Mc Connell, 1999; Milazzo & Zammitti, 2012), who are innocent because they are not involved in the judicial process, or with known partners in prison. It also means eliminating the phenomenon of so-called "white marriages" (to which are added the recent "civil unions" between gay couples) in prison, which are celebrated but not consumed, but also facilitating motherhood. The social identity of individual prisoners would benefit from a law regulating the permissions of love, which is, therefore, sensitive to an irrepressible human feeling. If we consider that the treatment process, following the changes introduced with art. 11, c.1, letter f), of Legislative Decree no. 123 of 2 October 2018, to art. 15 Op. 15 provides that it should be carried out by facilitating appropriate contacts with the outside world and relations with the family, we can well understand how, once the sentence has been served, it favors an adequate emotional and social integration of the prisoner (DAP, 2013).

On the contrary, there are psycho-physical imbalances on the part of the narrow-minded, but also an increase in the probability of recidivism of the crime, affective relationships being a vital support for those who are serving their sentences. It has been shown that the negative consequences of imprisonment are greatly facilitated in 31 out of 47 of the States belonging to the Council of Europe and in numerous international prisons, where the emotional bond is kept alive through interviews, telephone and postal correspondence, which keep the prisoner in balance, define and identify him (Sampson, Laub & Wimer, 2006). Also, in terms of prison organization, the issue of the right to affectivity could have positive effects. In fact, a recent Dap circular of 24.04.2010, n. 0377644, on "New interventions to reduce the discomfort deriving from the condition of deprivation of liberty and to prevent self-aggressive phenomena", shows how it is necessary to create spaces inside the prison, suitable to enhance moments of affectivity or at least for the simple daily life. This circular in itself is insufficient because there is a need for national legislation that offers an opportunity for change, even if we must find that it is not easy to introduce affectivity and sexuality in prison, when there is an obligation of "visual inspection" in relation to visual interviews (art. 18, c.2 Op.). The Constitutional Court also intervened on this issue and, with sentence no. 301 of December 19, 2012, declared the inadmissibility of the question of constitutional legitimacy of Art. 18, c.2 Op. The reason rests on the visual control of the custodial staff on the interviews of inmates and internees - thus indirectly preventing them from having intimate emotional relationships, including sexual relationships with their spouse or with a person linked to them by a stable cohabitation relationship - pursuing general purposes of protection of order and security, but also of crime prevention. Acknowledging, the same Court, that an ablative intervention aimed at eliminating sight control would exceed the aim pursued, and, on the other hand, insufficient to achieve it, entrusting the solution of the problem to the discretion of the legislature, which, in order to protect the right to sexuality, must weigh

up the needs of order and security in prisons, as well as the different solutions that would derive from this issue (Grieco, 2013). Even if the ruling of the Consulta is contrary, the foreclosure in question to the exercise of the right to affectivity and sexuality is contrary to the principle of equality and would achieve treatment contrary to the sense of humanity because sexual abstinence would not facilitate the normal development of sexuality but would lead to abnormal sexual relationships such as induced or transient homosexuality. In this regard, it should be remembered that respect for the 'hard core' of inviolable human rights, which cannot be annulled at all, has been affirmed not only by the Constitutional Court in general, but also specifically by certain recommendations of the Council of Europe and in certain acts of the European Union (Talini, 2015). The EDU Court itself delivered two judgments (*Dickson* v *United Kingdom*, judgment of 4 December 2007; *Aliev* v *Ukraine*, judgment of 29 July 2003) in which it recognized that Articles 8(1) and 12 of the ECHR exclude a mandatory requirement for European States to allow sexual relations in prisons, but at the same time it welcomed a reform of this institution. The current political situation of general uncertainty would, however, only lengthen the legislative inertia, which is also justified, on the one hand, by ethical reasons, as it would seem reprehensible to allow moments of emotional "escape" to those who have committed crimes against society; on the other hand, by concrete economic reasons which are reflected in the growing overcrowding in prisons which prevents the design of "love rooms" by engineers involved in prison construction. Finally, we cannot fail to take into account the violation of the right to health, since sexual abstinence would lead to the intensification of risky relationships and the concomitant reduction of health defenses, in no way facilitating the development of sexuality with harmful stressful physical and psychological repercussions (Grieco, 2013). In conclusion, it is necessary to follow the logic of balancing the needs of security and social order with those of the person's treatment, when the former must be considered justified with respect to the latter.

In light of what has been said, with the advent of the Covid-19 pandemic, the right to affectivity of prisoners has been completely cancelled as an inviolable right pursuant to Art. 2 of the Constitution, not because of a concrete danger for the security and prevention of crimes, but because of some health measures adopted in prisons.

THE WEAKENING OF THE RIGHT TO INFORMATION AND COMMUNICATION IN ITALIAN PRISONS BECAUSE OF PUBLIC ORDER AND SECURITY

The path taken by freedom of information and communication was also very particular, especially during the pre-Covid-19 phase. The Constitution provides in Articles 15 and 21 general guarantees that in the absence of specific legislative provisions would extend to the liberalization of the Internet and e-mail to all prisoners. The absence of rules prohibiting or allowing access to the Internet by prisoners is not supported by the "open case" constitutional clauses, but by the "normal" freedom to be informed. Since the Internet has a cross-border nature, i.e. it concerns supranational systems, it is necessary to use the conventionally compliant interpretation (Pollicino, 2015). In this regard, if we look at the Strasbourg Court, we can see that the Internet is a useful tool for fulfilling the re-educational function of the penalty, which, although not recognized in the European Convention, is only recognized in case law and correlated with the prohibition of inhuman and degrading treatment. The right to access the Internet, if it does not constitute a fundamental right of the person (Azzariti, 2001), necessarily relates to re-educational punishment and treatment in accordance with human dignity. The ruling of the Constitutional Court in connection with re-education states in Sentence 313 of 1990 that this constitutes a genuine right of

the detained person and that the penalty must be in conformity with re-education, as it belongs "to the heritage of European legal culture".

The right to work, to defense, to education, but also to work and, more generally, to the full development of the human person, which all together make up re-education, must be balanced with other provisions concerning the prevention of offences.

The order and security that underpin the sentence of imprisonment not only involves those sentenced to the high security regime under Art. 41 bis Op, but also all the others who have suffered de facto a strong compression (Pugiotto, 2014). It should be pointed out that access restrictions are not imposed on persons as prisoners but would be necessary to prevent bad use of the Internet (Galliani, 2017). Also, from the judgment *Kalda* v. *Estonia*, Second Chamber, 19 January 2016 (Rec. 17429/10), there is no real right for prisoners to access the Internet, but rather it is "perceived" as a right composed of restrictions placed on the prisoner, on the access to some sites, rather than others, moreover institutional ones, which could constitute interference by public authorities. Therefore, some institutional sites would have the "license" of security to which the prisoners who intend to carry out research of a normative type could have access, without suffering any restriction in spite of others which, instead, would only be within the reach of free persons.

The feeble justification in support of the Internet has taken into account the limitations due to security reasons, but from an exclusively securitarian point of view, even reading a paper newspaper could jeopardize the internal security of the prison. In support of the applicant's arguments, the rapid spread of the Internet within States as a right prevailed. This European jurisprudence, confirmed shortly afterwards in the *Jankovskis* case, could improve the Italian prison situation, characterized by sporadic Internet access and various limitations placed on the network infrastructure that allowed to push the individual user exclusively towards the "white list", i.e. those sites for which he was authorized or at most towards timid experiments of video interviews via Skype.

At the legislative level, the first circular of the Department of Prison Administration implementing the principle of information and communication that introduced innovations on the use of personal computers in prisons was GDap 0366755 of 2.11.2015, entitled "Possibility of Internet access by prisoners"[1]. The circular is not very far from a practice, especially when one considers the inability to condition the decisions of a judge (Galliani, 2017), allowed computers to be used in the accommodation rooms and common activities rooms, while internet access could be used from the locations where the prisoners' reintegration projects, such as libraries, took place. The circular also points out that the video call is to be equated with interviews, while it refers to art. 18 Op. e 37 Re the number (maximum 6 video interviews per month) and the duration (for a maximum of one hour) of audio-visual connections, as well as the methods of control (in specially designated rooms and possibly equipped with a telephone line, to allow the operator making the connection to communicate quickly with family members in case of problems that prevent the connection itself). Visual control is also maintained during interviews by video call, because they will have to take place under the visual control of prison police personnel, from a remote location, so that the images that appear on the computer monitor can be clearly displayed, but not the auditory control. From a first observation it is possible to understand how access to the Internet is made possible not to all the restricted, but only to prisoners and inmates belonging to the medium security circuit who wish to get in touch with family members and/or cohabitants. The extension of technological means to high security had occurred only by the director on a case by case, basis evaluating the benefits with respect to treatment activities or to guarantee them the right to education through the University Prison Poles. The limitations introduced are so specific that in order to ensure "the whole" prison population

a plan to extend telephone calls and spread the use of Skype, to meet the need that all inmates have the right to be constantly informed about the state of health of their loved ones, we will have to wait for the Covid-19 pandemic. In summary, one can see a watermark of a right to access the Internet, even though this right is very relative and subject to numerous limitations.

Shortly before the coronavirus through the circular Dap 0031246-2019, there was a greater openness to some computerized means such as Skype for business, aimed at making video calls by prisoners and interned with family members and/or cohabitants, but also to use computers in the cell and connect to the Internet for study, training and professional updating. If we consider, instead, the average age of prisoners: 18.9% are between 18 and 29 years of age; 28.5% are between 30 and 39 years of age; the percentage drops slightly for the 40-50 age group (26.7%); finally, it drops to 24.2% for the 50-69 age group (DAP, 2019). The data confirm that, compared to 10 years ago, prisoners aged between forty and sixty-nine have become the majority of the prison population and that technology could make them digitally illiterate. The population of prisoners, in addition to being older after an arrest and decrease due to the *Torreggiani* judgment of the ECHR in 2013, has started to increase again, since people in prison have on average longer sentences than in the past. This has also been confirmed by the data published by ISTAT, concerning the number of people convicted of a crime in Italy with an irrevocable sentence of imprisonment in the 2008-2017 interval, from 146,368 in 2008 to 104,615 in 2017, but the decrease is due to the decrease in shorter sentences, while the heavier ones have even increased[2]. These numbers, when read from a health emergency perspective, raised a strong alarm, also because the older and sicker population was more exposed to the risks of contagion. Almost unexpectedly, however, there was a shift from a population of about 61,000 prisoners - which corresponded to considerable crowding rates, which in some prisons reached 200% - to 53,387 presences (of which 2,213 women and 17,572 foreigners), compared to a regulatory capacity that on 31 May was 50,472 places (DAP, 2020). The drop of at least 8,000 prisoners during the first phase of the health emergency (from the end of February to the end of May) is partly attributable to the change in the cultural climate or the change linked to the fear of contagion in crowded prisons, which prompted many magistrates and operators to take alternative measures to reduce the number of prisoners (Scandurra, 2020). On the other hand, on the other hand, the containment had resulted from the Government's measures that had prohibited talks with family members, suspended the premium permits and the semi-freedom regime, motivated by the need to avoid the risk of coronavirus infection inside the prisons. At first, the Prime Minister's Decree of 1 March 2020 was aimed at the so-called "red zone", and then with Decree Law no. 11 of 8 March 2020 (Italy's Care Decree) to the whole country. The provision proved to be late with respect to the epidemiological spread and would confirm a superficial attitude on the part of the Government, since the prison police officers themselves and the volunteers working in the prison have had constant exchanges with the outside world and should be subjected to daily health checks, just as it was necessary to monitor them together with all the inmates (especially those present in the prison facilities of the Northern Regions) in order to have total control over the entire prison population to whom the necessary medical supplies (masks and disinfectants) should be provided (Chiola, 2021). Fortunately, although the Covid-19 ended up arriving in Italian prisons, the impact was quite limited.

THE USE OF INFORMATION TECHNOLOGY TO SUPPORT THE RE-EDUCATIONAL PATHWAYS OF INDIVIDUAL PRISONERS

What we have personally experienced since the end of February 2020 cannot be compared to the great discomfort and stress experienced by those who live in closed places, as they are intended to deprive those in them of their freedom. The precautionary suspension of interviews with family members, premium permits and the semi-freedom regime, which was followed by the interruption of school and university activities in prisons, risked, in a situation of health and social emergency, to aggravate even more the precariousness of the Italian prison system. Fear of contagion, associated with miscommunication - which tended to present the measures that were about to be adopted as totally preclusive of any possibility of contact with the outside world or continuation of the paths taken - has acted as a detonator within the prison population, causing protests and in some institutions even deaths. What happened during the night at the turn of March 8th and 9th, due to the epidemiological spread, cannot be traced back at all to the riots of the 1980s in which prisoners practiced a permanent and widespread micro-conflict to try to obtain better indoor living conditions, but also indoor and outdoor social spaces. The reasons for this revolt, which spread in the following days with numerous chain protests, involving 49 prison institutions in different ways, are undoubtedly related to the freezing of prison benefits and alternative measures, but also to the long-standing issue of prison overcrowding. After calming the riots and calming the souls of the inmates, who in fact felt totally segregated, an attempt has been made to maintain valuable contacts with family members through remote interviews and e-mail, but also through the Dap circular of 12 March 2020, to provide educational continuity by increasing telephone contacts and educational interviews[3]. The serious health crisis that has in fact "cut the bridges" of prisons with society has forced the prison administration to modernize the management of the prison population through a major effort of technological adaptation that until now had been used by a few virtuous prisons. Therefore, in order not to recreate the situations that triggered the riots of early March and to avoid the total isolation of prisons, implementations were made quickly and on a large scale. Shortly after the circular of the General Directorate for School Regulations and the evaluation of the national education system of the Ministry of Education (m_pi. AODGOSV.U.0004739 of March 20, 2020) stressed the need to promote, in an extraordinary and emergency way, the right to adult education in institutions of prevention and punishment through distance learning. The re-educational path of the restricted, however, was strongly affected by the prolonged period of quarantine from society - slowing down, if not even hindering - the social reintegration of offenders. During the pandemic, the detention pathways of the inmates were mutilated not only by the presence of family members, but also by the presence of educators, psychologists, social workers and teachers with whom to confront and exchange opinions. Up to that time, some legislative experiments on the use of the internet and other forms of communication that passed through the net, not to mention "intimate conversations" with one's spouse - which facilitated the social reintegration of the offender and at the same time reconciled with the custodial needs of the prisoner - had been undertaken in some prisons.

The Government, following the diffusion of the coronavirus, was forced to adopt emergency measures which also affected the prison life of the prisoners. The Ministry of Justice had anticipated with a circular letter the decree law[4], with which it intended to "suspend from 2 to 31 March 2020, interviews with relatives or other persons to whom convicted, interned and accused persons are entitled, which will be carried out remotely, using, where possible, equipment and connections available to the prison and juvenile administration or by telephone correspondence, which may be authorized beyond the limits

of the regulations in force". It should be noted that the provision of the decree-law concerning prisons and penal institutions for minors concerned prisoners located in the prisons in Lombardy and Veneto in which the municipalities of the so-called "red zone" were located and not all the other restricted institutions in the national territory, unless persons resident or exercising their work, production or function in the municipalities listed in Annex 1 to the Prime Ministerial Decree of 1 March 2020 participate in the interviews. This information has most likely been misinterpreted by prisoners who, frightened by reports in the media about the spread of the coronavirus, felt that the epidemic was now uncontrollable. In addition to fear for oneself, dictated in a highly overcrowded context, fear for loved ones has been added, which has contributed to ignite the riots and create collective panic. Beyond the fears about the particularly widespread nature of the epidemic and the increase in the number of cases on the national territory, the reasons that led the detainees to protest against the government's decision are based on the prohibition of interviews with family members, the suspension of premium permits and the semi-freedom regime, motivated by the need to avoid the risk of coronavirus infection inside the prisons. The Government extended this suspension to all Italian prisons with Decree-Law no. 11 of 8 March 2020, differentiating the duration of the suspension of direct interviews, until 22 March, compared to that of the premium permits and the semi-freedom regime, which was even extended until 31 May[5]. The Prison Administration has favoured "where possible" remote connection "by means of equipment and connections or by telephone correspondence" in order to guarantee prisoners the maintenance, albeit in a limited way, of emotional ties and not only.

Decree Law no. 11 of March 8, 2020, no. 11, provided for derogations from the prison system aimed at increasing telephone contacts, which have been implemented in different measures adopted by the various penitentiaries. At the same time, audiovisual links have become the main means of replacing family members who are unable to enter the institutions (Cantone, 2020). According to data from the Antigone Observatory, it appears that between the beginning of 2018 and the end of 2019, more extensive use had begun to be made of the video calling tool via the Skype platform. What happened with the Covid-19 was a "rush to rearmament" by the prison administration to avert the danger of new prison riots and to guarantee the interview of prisoners with their families, which had been suspended for a period that could extend beyond the three months set by the decree-law. This gave rise to the problem of the entry of technology into prisons, which until then had been a problem of poor implementation.

THE DIGITAL DIVIDE IS REFLECTED IN PRISON EDUCATION

During the emergency caused by the coronavirus, including in prisons as well as in schools and universities, there were significant communication and teaching problems. Compared to schools and universities, distance learning in prisons suffered abrupt suspension of lessons in the first few months and then it was difficult to spread evenly because few inmates had access to the Internet, i.e. they could make free video calls and streaming lessons. The digital divide, which also marks the experience of many students and teachers who have been able to do or follow distance learning, discounting slow connections, obsolete tools or simply their absence, in prison translates into the less eligibility of the prison condition compared to the external one (Anastasia, 2020). This is a further discrimination that is not linked to the absence of the instruments or their obsolescence, but to the status of prisoner that makes him refractory to technology and forces him to live on the margins of a technological world that evolves at an accelerated pace, just like the Native Americans who were forced to live in the "Indian reserves". The few inmates who

had computer skills before their entry into prison are deprived of those few resources and digital skills acquired externally. The punishment of imprisonment would therefore be even more degrading in a poor, if not lacking in stimulus and information technology.

The right to education can be put into practice thanks to the availability of the directorates of the individual institutions and Prap managers, but also thanks to the sensitivity of individual teachers or groups of teachers. But little would be the expedition of books and didactic material, if it were not supported by the collaboration of all the teachers and prison staff in the collective effort to create video links with the teachers in order to guarantee a presence and continuity of teaching to the student-prisoners. Videoconferences constitute a cultural revolution of enormous value, because they provide fundamental technological tools for the future of the people locked up, who cannot remain digitally "fasting", but must be exposed to technological innovations from outside. If we do not want reintegration to become more difficult every day in a society, technologies should increasingly be placed at the center of the lives of individual inmates.

The fragility and weakness of the social law of education can be seen in terms of positive norms of law, since a right that is fully enforceable through more precise norms has not been regulated, but only those that implement the generic provisions of the penitentiary system that envisaged a simple concession to study in prison.

There has been a repetition in some Regions and in many penitentiary institutions where this opportunity has not yet been offered (Prina, 2016) even though, it is worth remembering, the Prison Administration has organized itself through the instrument of circulars and opinions. In real life the rights of prisoners - which could be summarized in the right to formal equality, personal freedom, health, religious freedom, family, correspondence, housing, freedom of conscience, personal identity and privacy - compared to the enjoyment by free persons, have a different expansive capacity that depends greatly on the state of detention. Prison, in fact, for reasons of control and security, can compress these rights, even though there must always remain an inalienable residue of freedom which is all the more precious because it is the last area in which the individual's personality can expand (Court of Justice ruling no. 349 of 1993). The right to education within the prison, which has come to be affirmed as a social right, must also be guaranteed with full respect for the freedom of self-determination of prisoners. Schools, as well as universities, have become an indispensable element of re-educational treatment within prisons, to be offered as an opportunity to the individual temporarily detained, with a view to his or her reintegration into society, through positive actions that help him or her to redefine his or her life project and to take responsibility towards himself or herself and society (Circular of the Ministry of Education no. 253 of 1993). If the right to treatment is fully grounded in Article 27 of the Constitution, which establishes the principle that the penalty must aim at the re-education of the convicted person, it is necessary to start from the assumption that the re-education must be accepted voluntarily by the prisoner inside the penitentiary (Cassazione Section I, 24 March 1982, *Balido*, in Penitentiary Review and Criminology 1983, 872; Cassazione Section I, 29 March 1985, *La Rosa*, in Cassazione penale 1986, 1178 ff.). Analyzing education as the main element of the treatment, we would note that Article 34 of the Constitution recognizes everyone to attend school and the most capable and deserving, even if without means, the right to reach the highest grades of studies. From this we can easily understand that the study must be open to all regardless of any indication regarding the personal condition of the aspiring student. The right to education within the prison needs concrete actions for its guarantee (provision of ad hoc classrooms, computers and books to be made available, etc.) which are a benefit for some prisoners, subject to the needs of security and treatment, which do not always make it easy to implement (Sbraccia & Vianello, 2018). This right was

achieved through teaching in prison to recover a school path, interrupted or abandoned in the past, but in cases where inmates had difficulties with traditional pedagogical approaches, e-learning was even experimented with (Diana, 2013). Given that in-presence teaching, as well as knowledge of the prisoner as a person in his or her human dimension, is indispensable for a more satisfactory educational path with prisoners, the method of distance teaching has proved to be decisive in introducing innovative teaching tools, but also in promoting context surveys to improve the prisoner's knowledge.

With the health emergency, the same positive action to ensure the education of prisoners must be supported by technology, the necessary equipment, technical staff trained in new technologies and a budget dedicated to the purchase of the most suitable tools. While it has been demonstrated that the IT infrastructure is insufficient to cover the vast prison world, efforts must be made to prevent virtual teaching from coming into conflict with video calls, as it has recently become an indispensable and auxiliary tool for talks between prisoners and their families via Skype. The right to education is inevitably subordinate to the right to affectivity, so the necessary way must be sought to combine the two rights linked to the restricted rather than making them optional.

Online education, even before the Covid-19, has grown progressively in an attempt to find alternative ways to maintain the centrality of education in prisons. At first for university exams that could be managed "at a distance", then gradually until the coronavirus period, there was a strong need to maintain a form of exchange between teachers and students. The second decision of the Court of Strasbourg, *Jankovskis* v. *Lithuania*, Fourth Chamber, 17 January 2017 (Rec. 21575/08), unlike the case previously mentioned *Kalda*, does not refer to re-education but to prison education. The crux of the matter is not so much access to the Internet as the right to information and university education. Since the prison administration had denied that both were present, claiming that the education could be carried out without the use of the Internet, the applicant prisoner, in the light of Article 10 Conv. claimed that the prohibition on access to the Internet was not explicit but implicit because it was derived from the same condition of prisoner. As in the previous case, Article 10 Conv. cannot be interpreted as imposing a general obligation on States to guarantee prisoners access to the internet or specific internet sites. The courts of the Court interpret the ban on the use of mobile phones as being identical to the ban on access to the internet in order to prevent possible offences. In summary, according to the ECHR, the re-socialization of the prisoner and, consequently, his social reintegration also depend on the information from which the appellant wishes to draw and which is continuously updated on the website in question, thereby demonstrating the link between the re-educational function of the sentence and access to the internet by means of the right to education. The Court recognizes, as in the previous case, that the internet must increasingly be understood as a right and States must commit themselves to public policies aimed at achieving universal access through the internet. As in *Kalda*, the EDU Court is in favor of recognizing the infringement suffered by the applicant, without granting any financial compensation, albeit unanimously.

The pandemic has made it possible to show the importance of distance learning as a means of support or even a replacement for traditional distance learning in person. This was done with a view to providing an on-demand service, i.e. creating personalized courses for the individual prisoner. In this new perspective the tool would allow many professional figures, teachers and scholars to "enter" the prison bringing a new breath of knowledge, regardless of where they belong. In fact, with this modality it could be hypothesized the creation of virtual libraries in a short time that contain webinars available to the restricted ones who, in addition to enjoying an assorted documentary repertoire, could use a material even more responsive to their interests. Not to mention assisting students to study - as a substitute for visits by means of distance learning tools - which would solve many problems linked to different

economic issues, such as the cost of mobility of teaching staff, or the cost of moving to other prisons. On the other hand, it should be reported that technology can divide rather than unite because in many cases it may be impossible to attend the courses (not even through technological supports or video-recorded lessons, most invoked as an opportunity for improvement for the current situation) or, also, to benefit from short common sessions aimed at the preparation of the exam that can be carried out only in some sections, in fact, and on subjects where there is the availability of the teacher.

The wish is that all school and university students in the penitentiaries can have free access to the e-mail services, but also to the recorded video lectures, to the tasks assigned and to all those teaching operations to be carried out which are usually addressed to the student. At the same time, this prison technology should not preclude human relationships that have been too restricted, but should take on an ancillary role towards them, if not overcoming them to ensure greater openness of the prison towards society.

CAN TECHNOLOGY ACTUALLY REPLACE PERSONAL CONTACTS?

Today it is imperative to remove fears related to technologies applied to prison institutions. We need to move quickly from a position of disinterest and distrust, to an active position aimed at the forced adoption, but necessary due to the health emergency, of experimental technological tools aimed at expanding the potential of treatment projects activated in collaboration with the world of business, private social and local authorities.

The parallel between "physical" and "virtual" contact made on-line divides not only the doctrine but the public opinion itself, which has split on the need to continue also for phase 3 of the health emergency with smart-working, distance teaching and everything that concerns the exploitation of technological means. The increase in work results and profits has not always been compensated by the use of an instrument that would tend to individualize and excessively separate the individual from the social context. The prison world is made up of emotions, exchange of cultures, information and people, its closure, even if facing a virtual window for the few lucky users, would imply a return to the institution, that is, to a closed and impenetrable system. The compulsory direction that has been taken by many prisons has been technology oriented. Some external private companies, in order to facilitate this process of conversion, have distinguished themselves through a solidarity intervention aimed at remedying the lack of means, such as Tim who donated 1600 iPhones (equipped with 100 giga of internet) to the DAP and PRAP, which then distributed them to the prisons in the area of competence, while Cisco has installed free of charge platforms for remote connection or finally, Unidata has provided free fiber connectivity in the Roman institutes of Regina Coeli and Rebibbia NC. These external collaborations have contributed greatly to creating skills useful for the reintegration of prisoners into society, but also to introduce a training plan aimed at prisoners and all employees of the Ministry of Justice.

Even before the coronavirus, the digital divide already operated a separation by the individual Prap and the directorates between the prisons that adopt platforms (Skype, Skype for business, Whatsapp, Webex, Cisco and Google Duo) and the others that are refractory to new technologies. The new circular of 21 March, no. 0096018/2020, waives the limits set by the previous circular, admitting video interviews and telephone calls that exceeded the limits set by Article 39 of Presidential Decree 230/2000[6]. To this end, it should be remembered that during the health emergency, telematic interviews have played a role not only for the benefit of Italian inmates, but also to guarantee the right to affectivity of foreign

inmates, who for health reasons (they are seriously ill) or economic reasons (due to excessive physical travel costs) are unable to visit their families outside Italy.

Analyzing the latest data presented by the DAP, (2019), we can deduce that 19,888 foreigners are present in prison, which, as we have written before, corresponds to about one third of the entire prison population (32.7%), of which 18.4% comes from Morocco (3,651), 12.1% from Albania (2,402), 12% from Romania (2,386), 10.2% from Tunisia (2,020) and finally 8.4% from Nigeria (1665). In essence, the foreigners constitute 36.5% among the prisoners awaiting the first trial, while among those definitively convicted, the foreigners are 31.5% of the total. This would demonstrate a wide use of pre-trial detention of foreigners, especially at the first stage of the proceedings; but that in turn, the possibility of alternative measures to imprisonment is diminished (Gonnella, 2019). Finally, the percentage of foreigners who serve life imprisonment is very low (6.2%) compared to those who suffer a lower sentence of one year (47%) and who otherwise, could have access to measures outside prison.

Here, then, is the need to overcome the taboo of technological means inside prisons for the use and consumption of foreigners, as well as Italian prisoners, which will create a more inclusive and multi-ethnic society.

When the emergency phase will end, it will be essential to preserve if not enhance the technological tools to maintain emotional contacts with distant relatives, increasing telephone interviews, making them daily rather than weekly and enhancing them, where possible, with Skype interviews. The target audience will undoubtedly have to be made up of all prisoners, regardless of the title of the crime or the circuit to which they belong in order to access specific sites. The Gordian crux of the problem will be the choice by the judges to take decisions that deviate from the approach adopted by the circular or rely on conventionally oriented interpretation, using the decisions of the EDU Court. The Internet should not be seen as a concession but something more if it is to turn into subjective legal situations. The recognition of the Internet as a right may subsequently be restricted for certain offences, but the opposite is true when everyone is prohibited from accessing the Internet. The difficulty or even in many cases the impossibility of access lies in the inertia of the legislator. As a result of the coronavirus, it will be essential to take advantage of the spread of the IT tool to implement the treatment possibilities already provided for in our system, such as the study or professionalization of the work of prisoners. Undoubtedly, visual interviews will be difficult to replace Skype interviews, because no technology is worth as much as a hug or a deep look. But, as we have mentioned before, the costs linked to the mobility of relatives, especially foreigners, or who are in serious health conditions that preclude travel, can be a valid remedy to consider prisoners even more equal to free people.

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ENDNOTES

1 The circular of the Department of Public Administration of 2015, on the one hand, aims to enhance the innovative experiences of telework, training and distance education, already carried out in some Institutes, giving new life to the relationship between the prison and the territory in all its significant expressions that support the participation of prisoners in social and family life. On the other hand, it provides some indications concerning "experiences already underway and those in the process of being carried out"

2 Sentences under 5 years, which were 96.2% in 2017, decreased by 30% from 143,783 to 100,661; longer sentences increased by 53% from 2,585 to 3,954.

3 The Circular Dap 0084702.U of 12 March 2020 provides for the holding of degree exams, university exams and educational interviews between teachers and students detained, both belonging to the Media Sicurezza and AS3 circuits, through videoconferencing and/0 via Skype

4 Decree-Law no. 9 of 2 March 2020, Article 10, paragraph 14, states that from 2 March "until 31 March 2020, interviews with relatives or other persons to whom convicted, interned and accused persons are entitled shall be carried out remotely, using, where possible, equipment and connections available to the prison and juvenile administration or by telephone correspondence". The marquee offered by the Civil Protection has only been installed in some prisons and as of 29 February 2020.

5 Legislative Decree no. 11 of 8 March 2020, (published in the Official Gazette General Series no. 60 of 8.03.2020) in art. 2, point 8 "suspends talks with relatives or other persons to whom convicted, interned and accused persons are entitled pursuant to art. 18 Op, 37 of Presidential Decree no. 230 of 30 June 2000 and 19 of Legislative Decree no. 121 of 2 October 2018, are carried out remotely, where possible, by means of equipment and connections available to the penitentiary and juvenile administration or by telephone correspondence, which may be authorised beyond the limits set out in Article 39, paragraph 2, of the aforesaid Presidential Decree no. 230 of 2000 and Article 19, paragraph 1 of Legislative Decree no. 121 of 2018"; Article 2, point 9 "extended the suspension of the granting of bonus permits pursuant to Article 30-ter, Op., of the semi-freedom regime pursuant to Article 48, Op. and Legislative Decree no. 121 of 2 October 2018 in the period between the date of entry into force of this Decree-Law and 31 May 2020"

6 Video calls are assimilated to interviews, their duration is set on average between twenty and thirty minutes, with the aim of guaranteeing service to all prisoners, for a number of weekly calls

that varies according to the capacity of the institution and the availability of equipment, space and personnel

Chapter 17
Ecclesiastical Laws and Digital Publishing:
The New Frontiers of Promulgation in Canon Law

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ABSTRACT

Technological evolution has redefined spaces and methods of communication also within the Catholic Church. The speed of information exchange, the possibility of reaching a large number of recipients, and the absence of costs represent the advantages of online communication. The diffusion of information and communication technology (ICT) involved also the publication of canon laws and it asks about the possibility of using the internet as a way of promulgating the law. The characteristics of the network make it possible to know the text faster than the printed one and its diffusion does not meet space limits, since the published norm reaches every territory, thus becoming binding. The restrictions imposed by the COVID-19 pandemic have further favored the spread of instruments of digital communication. In this perspective, online promulgation could constitute a solution to the limits of canonical legislative governance, allowing the diffusion of legal texts, the relative knowledge, and obligation.

THE CATHOLIC CHURCH AND NEW MEDIA: FROM PRINTING TO DIGITAL TECHNOLOGY

The powerful outbreak of technological innovation has determined a deep paradigm shift in people's life (Harari, 2018), involving all social areas (Fuccillo, 2021; Pacillo, 2021; Bennato, 2020; Fioravanti, 2019; Cipriani, Et Al. 2018; Mazzocchi, et al., 2017; Virone, 2012; Ciotti & Roncaglia, 2010; Di Donato, 2009; Bauman, 2008) .

Such dynamics has involved also religious matters (Fuccillo, 2019; Vitullo, 2014), causing a series of effects on religious rights (Silvestri, 2010; Pedullà, 2012).

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Within the confessional landscape, the Catholic Church makes use with increasing frequency of the new social communication tools, through which it actively operates in a series of areas connected to the *munus docendi* and also *munus regendi*, among which, for example, the diplomatic activity of the Holy See (Valentan. 2019).

In addition to the establishment of diocesan and parish websites[1], there has been also a significant growth in the creation of blogs dedicated to debates on faith[2], of portals such as *Pope2You*, founded in 2009 by the Pontifical Council for Social Communication to foster communication between the Pope Benedict XVI and the youth around the world (Ambrosi, 2011). On this matter, another example could be the association *WeCa Web Cattolici*, which offers the expertise of its members for Catholic-inspired websites, promoting the training of Catholic webmasters and fostering a constructive synergy among the new communication tools; *LifePoint Church*, a so-called multisite church, with a central location serving as a production centre for Church activities and for content to be distributed to various websites by video or webcast (Vitullo, 2019).

The Catholic Church has therefore understood that the use of digital tools can guarantee a more effective preservation of its functions (Perlasca, 2020) and an increase of its authority also on the web (Soukup, 2017). Thanks to the creation of institutional sites, the faithful have the opportunity to consult official documents of the Pontifical Council for Legislative Texts and in general the Canon Law (www.delegumtextibus.va) (Coccopalmerio, 2014), the Code of Canon Law of 1917 (cdirittocanonico1917.it / online.htm), as well as the current law and the documents of the Magisterium (www.vatican.va), together with those produced by the other Dicasteries of the Roman Curia.

Further important is also the creation of websites by the Diocesan and Interdiocesan Ecclesiastical Courts, in which a series of useful information is published for those who want to start a cause of matrimonial nullity.

The use of the Internet has produced particularly significant effects also for the particular canon law, as diocesan, parish and Episcopal Conference sites allow the faithful to know the relevant legislation Giraudo, 2018). Precisely about it, the initiative promoted by the Italian Episcopal Conference is significant as it has led to the creation of a special section of its institutional website (http://repertoriogiuridico.chiesacattolica.it), within which the Italian Dioceses can publish their own particular legislation, making it known to the communities concerned and to the professionals.

Cann. 822-832 of Canon Law do not regulate the use of digital technologies (Chirico, 2012). Within the general framework of social communication tools, the Magisterium has always paid constant attention to the technological evolution (Scasso, 2008) as an instrument of communication and proclamation (Marchetti, 2009), although been aware of the dangers connected to it (Eilers & Giannatelli, 1996).

Since the introduction of the press, the potential of social communication tools were limited by the fear of spreading heretical books. The Code of 1917 incorporated the interventions published up to that moment, providing for rigorous forms of ecclesiastical control over the books (Title XXIII, Book III "*De previa censura librorum eorumque prohibitione*", cann. 1384-1405). The innovations of social communication tools were by no means considered suitable for promotion of peoples' evangelization (Comotti, 2013).

The advent of cinema also led Pope Pius XI to promulgate, at first, the Encyclical Letter *Divini Illius Magistri* on 31st December 1929 and later the Encyclical Letter *Vigilanti Cura* on 29th June 1936, to define wether a film could be judged suitable for everyone, lawful films with reservations and harmful and nasty films, also giving to Diocesan Revision Commissions the task of periodically publishing bulletins to classify films. There is therefore a change of perspective: the Pope calls for respect for the

rules, so that "*the cinema is no longer a place of corruption, but rather transforms itself into a precious instrument of education and elevation of humanity*" (Pius XII, 1955).

A substantially different approach was shown towards the radio, which, despite being considered "*a further opportunity for moral and religious shipwreck*" (Pius XI, 1929), was seen as a useful tool for spreading the Catholic thought (Scasso, 2008).

The position of the Church towards the new social communication tools certainly becomes positive when Pius XII defines television as "*a wonderful means offered by science and technology to humanity*" (Pius XII, 1957). In this regard, Pius XII reiterated his own orientation in the Encyclical Letter *Miranda Prorsus*, published on 8th September 1957, where he defined cinema, radio and television as «*wonderful technical inventions that contribute, directly or through an artistic expression, to the diffusion of ideas and offer to the multitude, in an easily assimilable way, images, news and teachings, as food for thought even in the hours of leisure and rest*» (Pius XII, 1957).

A decisively open perspective came with the Decree *Inter Mirifica* on the social communication tools, published on 4th December 1963 (Fazio, 1998). In fact, the Council Fathers looked with extreme positivity at «*those marvelous technical inventions* (...) *which concerned the human and spiritual faculties and offered new possibilities to communicate more easily all sorts of news, ideas, teachings*» (Second Vatican Council, 1963).

The following Pontifical Magisterium has established a sort of continuity with the thoughts of the Second Vatican Council. Centrality of man, service of people, dialogue with the world, ecclesial communion and new evangelization are the key ideas on which the Popes have built their orientation.

The innovations offered by *online* have pushed the Catholic Church to question the usefulness of these new communication tools.

In fact, new media facilitate a kind of fast communication, suitable for reaching a large number of recipients at the same time and almost free of costs. In this perspective of positive evaluation of the web, the current *Codex Juris Canonici* encourages the use of "social communication tools" (can. 822 § 1). The Magisterium promotes a close connection between these tools and the mission of proclaiming the Gospel to all peoples (Pontifical Commission for Social Communication, 2002), between their use and the exercise of the power of the pastors of the Church, between communication and communion "*towards which all true communication must aim to*" (Pontifical Commission for Social Communication, 1971; Annicchiarico, 2017; Palmero, 2017; Tridente & Mastroianni, 2016; Scaringella, 2015; Pasqualetti & Alvati, 2014).

In this sense, Giovanni Paolo II claimed that «*The first Areopagus of the modern age is the world of communications, which is unifying humanity and turning it into what is known as a "global village"* (…) *Involvement in the mass media, however, is not meant merely to strengthen the preaching of the Gospel* (…) *it is not enough to use the media simply to spread the Christian message and the Church's authentic teaching. It is also necessary to integrate that message into the "new culture" created by modern communications*» (John Paul II, 1990). The use of new media is therefore "*an integral part of the Church's mission in the third millennium*" (John Paul II, 2005).

With the establishment in 2015 of the Secretariat for Communication (Francis, 2015), Francis entrusted the new Dicastery with all the competences relating to the technological relations of the Holy See. Francis is aware of the fact that the virtual world means opportunities to create new bonds, to feel close and to be more supportive of each other, because «*It is not enough to be passers by on the digital highways, simply "connected"; connections need to grow into true encounters* (…) *the digital world can be an environment rich in humanity; a network not of wires but of people*» (Francis, 2014).

In particular, the web represents «*a social communication tool*, *a gift from God that illuminates humanity's long journey* (…) *the media are cultural factors that contribute to the transmission of information and teachings*» (Francis, 2019). Furthermore he reiterates that «*technological innovations must be used in such a way as to contribute to the service of humanity and the protection of our common home instead of the exact opposite, as unfortunately some estimates foresee*» (Francis, 2018).

The potential offered by new media and the related dangers are also presented on the occasion of the modification of the Directory of the Catholic Church, approved on 23rd March 2020, which reserves a chapter for the digital world. In fact, it is believed that the forms of digital communication offer greater possibilities, as they are open to interaction. In some geographical and cultural contexts where Christians feel isolated, «*social networks can strengthen the sense of their effective unity with the universal community of believers*» (Pontifical Council for the promotion of the new evangelization, 2020) .

The Church is requested to update its ways of proclaiming the Gospel to the language of the new generations, inviting them to create a new sense of community and belonging, which includes and does not end in what they experience online, although being aware of the fact that «*the digital connection is not enough to build bridges and it is not able to unite humanity*» (Francis, 2020).

THE INSTITUTION OF PROMULGATION OF THE CANON LAW: FROM THE PROMULGATIO LEGIS OF THE ROMANIST TRADITION TO THE CODEX JURIS CANONICI 1917

Promulgation of canonical laws is among the legal institutions which are mostly involved in the use of new media (d'Arienzo, 2019).

The historical evolution of the institution demonstrates the ductility of this tool with regard to the technical innovations. Its use is in direct connection with the principle of knowledge and knowability of the regulatory acts.

The *promulgatio legis* of the Roman law provided for the presentation of the draft law to the people, so that they could learn of it and eventually approve it. At the end of the discussion (Grosso, 1965) the promulgation proceeded both in the form of oral announcement and in the publication on whitewashed wooden boards (Landucci, 1896). The publication of the law was therefore not necessary, as its approval allowed *ipso iure* the entry into force of the regulatory text.

A clearer definition of the institute comes with the Gratian's Decree. In fact, the formula "*leges instituitur cum promulgantur*" (c. 3, D. IV) showed that the promulgation constituted an additional element compared to the essential elements of the law (Pellegrino, 1990). It not only did complete the genetic process of the law, but it also allowed to refine the same law by making it known to the recipients. This orientation was fully implemented by the canon law (Brugnotto, 2019).

Gratian IX's decretals clearly defined the moment when the law text became binding. The *editio legis* phase was distinguished from the *publica promulgatio* one: the former referred to the moment of the normative production, the latter to the entry into force of the norm (Ferme, 2014). However, the *Liber Extra* was subject to conflicting interpretations about the coincidence of the two phases: on the one hand da un lato it was believed that they coincided and the law became binding only with promulgation; on the other hand, they referred to two different legal notions and both concurred to perfect the law (Pellegrino, 1982). At the same time, it wondered whether the published law had been binding only in Rome or also in the provinces and dioceses; whether immediately or after some time.

According to the procedure that was consolidated in the canon law from the Middle Ages, it was considered sufficient to read the papal laws in public places by the cursors of the Pope with subsequent affixing of legislative texts at the doors of basilicas (Espinós Bonmatí, 2005). This method acquired legal certainty with the publication of the *Regulae Cancelleriae*, as the legislative body regulating the dispatch of letters granting privileges, delegations, handouts and benefits (Erdö, 1999).

The uncertainties related to the oral aspect were overcome by the introduction of the press. This contributed to a better definition of the publication of a written text, even if the attempts to regulate the promulgation were hampered by the difficulty of distinguishing it from publication.

An important historical precedent is represented by the Decree *Tametsi*, approved by the Council of Trent on 11th November 1563. It constitutes a concrete example of the difficulties arising from the uncertain methods of publication (Creusen, 1948). The Tridentine Fathers established that the Decree had to be published in every parish (Bernasconi, 1914), without prescribing which norm would have found application in case of omitted publication for negligence, ignorance or error of the parish priest or the Bishop. The publication of Decree *Tametsi* was up therefore to every single Bishop, who was also obliged to instruct all the parishes belonging to its jurisdiction (Gasparri, 1932). That created some confusion about its application (Gismondi, 1953). Also in this case, the need to regulate this important phase of the legislative production activity by the competent ecclesiastical authorities was felt as necessary.

The Apostolic Constitution *Promulgandi* on 29th September 1908, by Pius X, regulated the matter of the promulgation of the canonical laws. In fact, the *Acta Apostolicae Sedis* were instituted. They were the official gazette of the Holy See, which ensured the official publication of legislative texts. It was only from this point on that there was a period of *vacatio legis* before the law came into force.

This structure finds full confirmation in the *Pious-Benedictine Code*. In fact, cann. 8 and 9 stated that the laws were established when they were enacted and the promulgation happened through the publication in the official commentary of the *AAS*, if not stated otherwise. In such perspective the prevailing doctrine asserted the coincidence between promulgation and publication. In this way the law became binding (Blat, 1919; Bargilliat, 1923; Wernz & Vidal, 1925; Ojetti, 1927; Del Giudice, 1927; Azara, 1928; Lijdsman, 1929; Vermeersch & Creusen, 1934; Ciprotti, 1943; Conte a Coronata, 1948).

THE PROMULGATION OF LAWS IN THE CURRENT CODEX JURIS CANONICI

The dispositions in matter of promulgation in the Pio-Benedictine Code have been entirely brought back in the current Code (cann. 7-8) (De Paolis & D'Auria, 2014; Chiappetta, 2011), speeding up the doctrine to ulteriorly reflect upon the possible distinction between promulgation and publication of a law (Massignani, 2019; Coccopalmerio, 2016).

The can. 7 recognises the institutive moment of the law in its promulgation (Pellegrino, 1983), that it is the action through which the legislative authority gives notice of a regulation as binding to the community.

The coincidence between the two phases would exist, if we were to consider the promulgation with an exclusively supplementary purpose, not constitutive, of the law. In fact, it would limit itself to transposing a legislative act that is already perfect. If, on the other hand, we look at the mandatory nature of the law with respect to a community and its reception by the recipients, the promulgation is considered as the act that perfects the law. This makes it possible to distinguish this phase from the subsequent one of the publication.

However, the provision of the can. 7 defines the coincidence between the two phases, where a law is finalised and made binding in the phase of promulgation (De Paolis & D'Auria, 2014; Valdrini, 2013). For this reason, the promulgation constitutes a "necessary element to the law so that it has binding legal force" (Heinzmann, 2002), supporting the principle of certainty of the law in the legal system of the Catholic Church (Minelli, 2017).

On matter, it found that

La tendenza a far coincidere, in concreto, il momento finale dell'iter di formazione della legge (promulgazione) con quello della sua pubblicazione è una caratteristica dell'ordinamento canonico. Il diritto della chiesa sembra voler collegare, in tal modo, un aspetto, come quello della promulgazione – cui è in genere attribuito dagli altri diritti un valore prevalentemente formale – al soddisfacimento di una esigenza sostanziale: la partecipazione dei destinatari della legge, se non alla formulazione delle sue disposizioni, quanto meno alla sua diffusione, che può realizzarsi solo quando, con la pubblicazione, esse sono rese conoscibili da parte di tutti (Berlingò, 1995).

The can. 8 § 1 also states that «*Universal ecclesiastical laws are promulgated by publication in the official gazette of the Acta Apostolicae Sedis* (…) *and they come into force only on the expiry of three months from the date appearing on the particular issue of Acta* (…)».

Through publication, ecclesiastical laws come into force and the recipients learn about it (Pellegrino, 2004; Dalla Torre & Boni, 2009; Sabbarese, 2015).

Therefore, the regulatory act must be known in order for it to produce binding effects, placing itself in direct connection also with can. 15 *C.J.C.* (Palumbo, 2012), which establishes that:

1. Ignorance or error concerning invalidating or incapacitating laws does not prevent the effect of those laws, unless it is expressly provided otherwise (§ 1);
2. Ignorance or error about a law, a penalty, a fact concerning oneself, or a notorious fact concerning another are not presumed. They are presumed about a fact concerning another which is not notorious, until the contrary is proved (§ 2).

In the penal field, moreover, the universal legislator, as confirmed by the Apostolic Constitution *Pascite Gregem Dei* (Francis, 2021), with wich Pope Francis reformed Book VI of Code of Canon Law and which will come into force on 8 December, with regard to the excusing and attenuating circumstances, sanctioned that:

1. No one is liable to a penalty who, when violating a law or precept, was, without fault, ignorant of violating the law or precept, and that inadvertence and error are equivalent to ignorance (can. 1323, n. 2 *C.J.C.*) (Pighin, 2014);
2. The perpretrator of a violation is not exempted from penalty, but the penalty prescribed in the law or precept must be diminished, or a penance substituted in its place, if the offence was committed by one who erroneously, but culpably, thought that some one of the circumstances existed which are mentioned in can. 1323, n. 4 o 5 (can. 1324, n. 8 *C.J.C.*), and by one who through no personal fault was unaware that a penalty was attached to the law or precept (can. 1324, n. 9 *C.J.C.*) (De Paolis & Cito, 2000; Calabrese, 2006).

Ignorance which is crass or supine or affected can never be taken into account when applying the provisions of cann. 1323 and 1324 (can. 1325 *C.J.C.*) (Papale, 2012). The presence of these rules, which mitigate the principle *ignorantia legis non excusat*, applied strictly in the civil sphere, is based on the supreme lex of the legal order of the Catholic Church, which is substantiated in the *salus animarum* (can. 1756 *C.I.C.*) (Pellegrino, 2004).

In the context of the legislative production activity by the ecclesiastical authority, there have been cases in which the universal legislator has determined methods of promulgation that have in fact triggered a series of uncertainties of application, as in the case of Apostolic Letters in the form of m.p. *Mitis Iudex Dominus Iesus* and *Mitis et Misericors Iesus*, concerning the reform of the causes for declaration of nullity of canonical marriage (Arroba Conde, 2015; Andriano, 2016; Boni, 2016a; Boni, 2016b; Boni, 2016c; Canonico, 2016; Del Pozzo, 2016; Moneta, 2016, Musselli, 2016; Nunez Gonzalez, 2016; Sabbarese, 2016; Sabbarese & Santoro, 2016; Warnink, 2016; Arroba Conde & Izzi, 2017; Belfiore, 2017; Canonico, 2017; Franceschi & Ortiz, 2017; Boni 2018a; Boni, 2018b; Boni, 2018c).

In the case of the Agreement between the Holy See and the People's Republic of China on the appointment of Bishops, signed on 22th september 2018, and subsequently renewed for a further period of experimentation, it has been established that the relative rules enter into force without proceeding with the relative promulgation, in order to guarantee their secrecy (Giovagnoli & Giunipero, 2019).

The widespread use of the web has opened up the possibility of using digital technology as a tool for the publication of canonical laws, significantly involving the legislative production activity in both universal and particular and own field (Demastro & Nicita, 2019).

THE ONLINE PUBLISHING OF THE CANON LAW AND THE EPISCOPAL CONFERENCES' INITIATIVES

The part of can. 8 § 1 "*unless in particular cases a different way of promulgating has been establishes*" regulates the possibility of relying on alternative methods of promulgation of the canon law.

Among these, the promulgation on L'Osservatore Romano is more and more frequent. The motu proprio *Quaerit semper* by Benedict XVI on 30th August 2011, promulgated in the newspaper on 28th September 2011 represents an important exemple. The unequivocal indication by Benedict XVI of this method of promulgation has overcome the objection that such a publication could have a mere informative and non-binding purpose.

The spread of *Information and Communication Technology* (ICT) in the Catholic Church (Arasa et al., 2010) has also involved the publication of canonical laws and it questions about the possibility of relying on the Internet as a method of promulgation of the law (Perri, 2020). Advantages of the digital tool are several (Losano, 2020): getting to know the text in a faster way compared to the printed one; this tool does not meet space limits, since the law published on the Internet reaches each territory, thus becoming binding.

In fact, the Internet has characteristics that could well overcome the problems inherent in the traditional methods of publication: delays in the printed text, differences between the date of promulgation and the date of publication in the file of *Acta*, uncertainties about the text of the published law, possibility to simultaneously publish the texts in the authorized translations.

In fact, on several occasions it has happened that the legislative text was published in the *AAS*, after the three months of *vacatio legis* provided for by the universal Legislator have already elapsed. This

fostered doubts about the entry into force of the law. A further problem is the discrepancy between the promulgated text and the one published in the press (Montini, 2017). In this perspective, the promulgation by online publication could guarantee the time of entry into force of the law and its content, since it is impossible to have two paper copies, sometimes different, of the same legal provision.

It is necessary to evidence however that the mere publication of a pdf file on an institutional website of the Catholic Church does not mean a real promulgation by means of online publication. For this to happen legally, the way in which it is published must offer certainty as to the binding nature of the law, its addressees and the stability of its content. The use of certified digital publishing and the *upload* on institutional sites (www.vatican.va) could represent a valid opportunity to use the Internet as a platform for promulgating the canon law (Giraudo, 2019).

This form of publication would also be a good opportunity for particular canon law. The greater freedom granted for the publication of particular laws, which "*are promulgated in the manner determined by the legislator*" (can. 8 § 2), could allow a diocesan Bishop or an Episcopal Conference (can. 455 § 3) to choose promulgation by online publication to oblige their faithful.

In the field of particular law, various initiatives have been registered regarding digital publication. The Belgian Episcopal Conference identifies on its website (www.cathobel.be) a section dedicated to legislation complementary to the Code of Canon Law; it also dedicates another section in the provisions of particular law, specifying however that the publication of this legislation is in addition to the paper publication in the journal of the *Centre Interdiocésan de Contact*. However, this form of publication has an informative purpose only, as it reproduces the text promulgated in the official paper review, even though the Belgian Episcopal Conference has asked the Holy See the *recognitio* of the digital promulgation of its particular laws.

Similarly, the website www.usccb.org of the U.S. Episcopal Conference allows the user to consult the specific laws in relation to the item of interest. In this case, the limit of the digital instrument could be structural: in fact the legislation is reported under the section 'Canon Law', which is a sub-section of the main menu and it refers to the page where the Conference decrees are published with the date of approval, publication and entry into force. However, the Bishops of the United States have provided that their regulatory provisions, after obtaining the due *recognitio* of the Holy See, enter into force one month after publication on the official website (Giraudo, 2018).

In this context, the Italian Episcopal Conference has also introduced a special section of its institutional website (http://repertoriogiuridico.chiesacattolica.it), within which the Italian Dioceses have the right to publish their particular legislation, in order to make it known to both the faithful and insiders. This database dedicated to particular canon law also represents an important opportunity for scientific research dedicated to this particular sector of canon law, whose sources are sometimes not easy to find.

The C.E.I. also used online publication for the promulgation of the General Decree *Disposizioni per la tutela del diritto alla buona fama e alla riservatezza* on 31st May 2018 (C.E.I., 2018). The part of art. 16 § 3 of Statute C.E.I. "*salva diversa applicazione*" allowed to deliberate on an alternative method of publication. The articles 26 of the Decree General regulates that "*la promulgazione del Decreto ha luogo con la pubblicazione del relativo decreto di promulgazione del Presidente della C.E.I. sul sito web della Conferenza Episcopale Italiana*" (www.chiesacattolica.it).

Also in this case some criticalities were highlighted (Ganarin, 2019; Pujol, 2019; Giraudo, 2020; Mosconi, 2020; Tosoni, 2020), because the legislative text was also published in the *Notiziario of the Italian Episcopal Conference*, legitimizing doubts about the legal value of the related digital publication. In addition, the file containing the text does not certify the authenticity of the document, nor the date of

publication on the E.C.I. website. The same pdf is created on May 25th, 2018 but modified on June 8th and this creates confusion about the entry into force of the legislation and its correspondence to the text approved in the Assembly (Giraudo, 2019).

These difficulties arise from the absence of ad hoc regulation, currently linked to the publication on *AAS* of universal law (can. 8 § 1) (Mosconi, 2018). The reform of the subject is therefore felt as urgent, in order to offer *christifideles* a more effective protection of their rights (Valenzi, 2020).

THE NEW DIGITAL FRONTIERS OF PROMULGATION: POTENTIALITIES AND GRAY AREAS

The hypothesis of a legislative promulgation by digital publication presents a series of advantages while not lacking some grey areas that in fact question the legislative activity as a «prudential art of government» (Baura, 2007).

The ability to reach a wide audience of recipients, with a speed that makes the printed paper obsolete, enhances the choice of digital documents. They do not need a physical support that contains them and this makes them usable to everyone from anywhere in the world (Filder, 2000), placing themselves in direct connection with the character of universality that distinguishes the legal system of the Catholic Church.

In this perspective, promulgation through online publication would be an advantage for the Dioceses of mission lands, which may encounter difficulties in the application of legislative texts linked to delays due to the circulation of the printed text. Furthermore, The dematerialization of canonical documents is also in line with the dissemination of integral environmental protection, placed at the center of Francis's Magisterium (Francis, 2015), in order to in ragione del possible considerable paper savings.

The restrictions imposed by the Covid 19 pandemic have further facilitated the spread of digital communication tools (Fuccillo et al., 2020; Santoro & Fusco, 2020). With this in mind, online promulgation could be a solution to the limits of legislative canonical *governance*, allowing the rapid dissemination of legislative texts, their knowledge and entry into force.

It could also provide a good solution to the issue of the date of promulgation following that of publication in *AAS*. Already under the Code 1917 there were problems in this sense (Del Giudice, 1927): the discrepancy between the date of promulgation and the date of publication favored the doctrinal orientation according to which the law legally existed even in the time interval between the two moments (Gillet, 1928).

This allowed to affirm that promulgation and publication were distinct phases of the genetic procedure of the law and each produced specific juridical effects (Pellegrino, 1984). The problem is present, since often publication in paper form of the file of *Acta* takes place more than three months after the date of promulgation, questioning the actual obligatory of the legal text, after the period of *vacatio*. This clearly reflects a legal uncertainty for the faithful, who do not know or know late of a law that is already binding on them (Montini, 2012). This problema has been overcome by setting up a section on the official website of the Holy See dedicated to the digital publication of the *AAS.* A clear solution of the problematic situation connected to the promulgation of the ecclesiastical laws has not determined, as however emerged in the case of Apostolic Letters m.p. *Mitis Iudex Dominus Iesus* and *Mitis et misericors Iesus* about the reform of causes of declaration of canonical marriage nullity (Boni, 2018c).

Equally it can be said for m.p. *De concordia Inter Codices* (Sabbarese, 2017) whose text has been published on 31st May 2016, together with Francis's decision about the publication on *L'Osservatore*

Romano and in the official commentary of the *AAS*. The publication in the press, however, took place on 16th September 2016, while that in *Acta* in June 2016 issue, then published in October 2017. The publication dyscrasia is emphasized from the uncertainty of the entrance in vigor of the law, which specifies nothing about it. It may therefore be considered binding, three months after publication in *Acta*, as required by the can. 8 § 1, or that it is binding, taking into the course of *vacatio legis* from the promulgation on L'Osservatore Romano (Rhode, 2019).

This also applies to the Apostolic Constitution *Pascite Gregem Dei* on 23rd May 2021, reforming Book VI of the Code of Canon Law. In fact, Francis established that:

in order that all may have full and ready access to the provisions in question, I decree that this revision of Book VI of the Code of Canon Law be promulgated by publication in L'Osservatore Romano, entering into force beginning on 8 December 2021, and that it be inserted thereafter in the Official Commentary Acta Apostolicae Sedis.

A revision of the canonical discipline on the subject could therefore solve this problem, expressly allowing among the methods of publication also the use of institutional websites, whose characteristics of speed and immediacy, combined with the potential of digital documents (digital signature, access credentials), could guarantee the authenticity of the legal text.

However, some problems may exist in relation to the authenticity of the file, especially regarding the possibility of intentionally making changes to the pdf file, with repercussions on the certainty about the legal text, the authority that issued it, the date of subscription and its entry into force (Giraudo, 2019).

It is therefore necessary to guarantee the authenticity of the published act and this brings out significant problems, as a website which is not "safe" and "protected" may not be suitable to issue a law (Baura, 2013). For this reason it is necessary to use not editable files, that guarantee the correspondence between the published text and that one prmulgated in paper copies.

The aid of digital signatures, like already experimented and allowed by some civil orderings (Mercatali, 2006; Costanzo, 2007; Giovannini et al. 2012; Faini & Pietropaoli, 2017), can represent a possible suitable solution to the substantial justice, in terms of legal secutiry of the faithful who have the right to know with certainty the current legislation, the authority that issues it and if it acts in relation to their competences (Baura, 2013).

Similar problems arise also for the injuction in extraordinary form of singular administrative acts. The question is whether the click on a link uploaded by the competent ecclesiastical authority can be valid as a refinement of the notification and allow the administrative act to produce its legal effects against the user/intimated (Mosconi, 2001). Probably, accompanying that form of publication with individual login credentials and using the digital signature to subscribe to the document would guarantee the authenticity of the same and certainty in relation to the rituality of the notification. A greater use of Certified Mail, as already recorded in the practice of some Ecclesiastical Interdiocesan Courts[3], can represent a suitable solution able to combine speed and certainty of notification.

An intervention by the legislator to reform the matter would therefore be desirable. The prevision in the can. 8 § 1, about a certain institutional website on which to promulgate the laws, enacted would allow the formal perfection of act (Montini, 2017) and the faithful-user would be guaranteed in terms of supervision and control by the competent authority (Migliavacca, 2018), without taking the risk that alterations of the file or unreliability websites could make uncertain a text that binds all the baptized, a certain faithful or group of faithful.

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ENDNOTES

1 The complete list of the parish, diocesan, associative and religious groups' and orders' websites can be consulted at www.siticattolici.it.

2 The reference is to the creation of blogs at www.parrocchiando.it/forum or www.vivonuovo.it. The creation of the website www.chiciseparera.chiesacattolica.it, on 12th March 2020, is also considerable. It aims at allowing the use of pastoral material, as well as offering contributions for reflection and study and to advertise the so-called good practices implemented at the diocesan level.

3 In this regard, the practice in use at the Parthenopean Interdiocesan Ecclesiastical Court and of Appeal, as well as at the Interdiocesan Ecclesiastical Court of Benevento deserves note.

Chapter 18
Technology and Innovation: Considerations on Digital Religious Celebrations During and After COVID-19

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ABSTRACT

During the first phase of the pandemic up to today, many religious activities, particularly liturgical celebrations, have been suspended, interrupted, re-organized. Drastic measures and choices were needed, always balanced with constitutional principles. In this social and historical contest, Facebook and similar digital platforms seem to have turned into liturgical spaces. Every kind of celebration is transmitted through them: "domestic" liturgies are held, retreat houses are switching to online activities, spiritual assistance is offered through a computer screen, and so on. The scientific contribution aims to highlight the problems and issues that have come to determine and present the practices used within the confessional systems. Also, a recent research on the subject, promoted by the Giustino Fortunato University, offers reflections that can favor a better relationship between the needs of worship, pastoral, and confessional regulations on the subject of sacraments and celebrations.

THE PANDEMIC AND THE DAMAGE OCCURRED TO THE RIGHT OF COMMUNITY RELIGIOUS FREEDOM

It is undeniable that the pandemic, caused by the widespread outbreak of the Sars-CoV-2 virus, has overturned life on all levels for all humanity; in just a few days, the routine of all, their stance toward others, their ways to relate, have changed dramatically, with restrictive consequence on the exercise of the most "normal" daily actions, which were forbidden or limited. The lockdown, in Italy (starting from March 2020) has imposed strict measures, especially in relation to the compression and to the limitation of constitutionally relevant essential rights and freedom types (Prisco-Abbondante, 2020; Pacillo, 2020c), one of them being the right to religious freedom (Licastro, 2020; Palumbo, 2021; Milani, 2021) – which is, by itself a not easily compressible right, being it a more ample type of freedom which sees the free-

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dom of assembly, association, and thought expression as necessary additions (Palumbo, 2019b) that actualize behaviors and rituals strictly linked to the fact of being a community of observant people, with the consequence of having churches and places of worship not easily accessible, of being unable to participate in religious and ritual functions or to administer and access the sacraments and also of having funerals suspended. (Palumbo, 2020a; Palumbo, 2020b). Such manifestations of the exercise of religious freedom have been "forbidden" (Fuccillo-Abu Salem-Decimo, 2020) in view of the need to limit gatherings in order to guarantee public freedom, which derives from the more ample protection of the right to health for everyone. In this context of emergency change, a great quantity of government regulations meant to try and contain the spreading of the deceitful virus have been persistently and restrictively inserted, and have been reasonably criticized (Alicino, 2020; Cavino, 2020; Luciano, 2020). Following the pandemic's exceptional state of emergency declared by the World Health Organization, the *extra ordinem* interventions of the Government have been legitimized. The State of emergency has definitely demanded a quick response, and the imperative for high velocity, which has marked the phases of the emergency, has triggered, under a procedural and substantial profile, some "stretches" for sure, but not an authoritative deviation of the system. The main perplexities have emerged from the indisputable fact that the fundamental rights of the citizens have been "compromised" by the provisions (DPCM), that, despite founded in primary force acts, on the basis of which the Prime Minister has been able to adopt special provisions to contrast the pandemic on the National territory, in their material impact consist of lesser acts in the sources system. After the first phase of the pandemic and the heavy restrictions imposed by the Government, which were also applied to the religious community, the limitation in terms of attending Churches, Mosques, Synagogues and other places of worship has been interpreted by the law as a short circuit in the interorganizational dynamics and, particularly, in relation to the principle of pactional bilaterality that marks the constitutional system of the relations between State and religions (Santoro-Fusco, 2020; D'Arienzo, 2020a; D'Arienzo, 2020b). Therefore, the measures adopted, by influencing the ritual activities of religious confessions, particularly those of the Catholic Church, that is, the center of the faith of the ecclesiastical community, (the essential community dimension of which has been overlooked), and that is founded on the ecclesiological character of the liturgy, have created, in the catholic frame work, a debate regarding the theological limitations of a *sine populo* Eucharistic celebration and, from a constitutional-legal point of view, in a more ample view, the doubt of an invasion of the order of competence of the religious confession, which is granted by the Constitution as intangible, being here ignored the bilateral obligation derived from the concordat agreements that solemnly recognize the Church itself (and other religious confessions, too), the freedom of public exercise of the worship. The Catholic Church, in a view of responsibility and full cooperation with the civil authorities, has accepted the suspension of religious celebrations, including funerals (Consorti, 2020a; Consorti, 2020b) and has introduced control measures meant to avoid the participation of the worshippers to religious celebrations and functions. Following the declarations of the Italian Bishops regarding the fact that the <<The Italian Church suffers but does its part for the protection of public health, without hiding the awareness of a strongly restrictive passage, the acceptance of which, has encountered sufferings and difficulties for pastors, priests and worshippers>>, the Italian Episcopal Conference has absorbed the application provisions of the control measures provided for by the government. In general, churches have remained open to the private worship and priests have continued their liturgical celebrations on their own or with other presbyters. Many parish realities have equipped themselves straight away in order to grant the distance "participation" of the worshippers to the celebrations through streaming systems launched by many social media or online platforms. The modalities regard-

ing the participation of the worshippers to the Easter ceremony and to the celebration of weddings (but not to any other sacrament such as baptisms, confirmations, penance and sacred ordinations) have been clarified by the Ministry of Foreign Affairs, with a Note dated 28 March 2020, which specified that the access to churches (which; therefore, remained open) could happen in the closest place of worship and only on occasion of certain transfers to be proved by work needs, that is, by situations of need. The church (intended as place of worship) has, therefore, always remained open during the lockdown, in order to welcome the worshippers that wanted to pray in a personal manner, and the restrictions have remained in place until encouraging epidemiological data were declared which stated a regression of the viral infection. The lockdown of celebrations, as stated above, has favored the employment of the new technological means, for the Eucharistic celebrations and other religious functions, realizing and concretizing a new reality, never experienced before, offering the solution of the connection in streaming, which had puzzled both single worshippers and members of the church community, and that had raised many questions, and still does, in relation to the topic of digital celebrations. The issue has also interested many religious confessions, bringing the community to live in a much unexpected way some "strong" moments of the religious experience, such as Easter and Christmas for the Catholics, Easter and Christmas for the Orthodox, the Commemoration of the Death of Jesus Christ for the Jehovah's witnesses, and the Ramadan. For Orthodox Jews it was not possible to use online streaming for the liturgies, being them required to meet, but subsidies have been granted for the Pesach celebration, the preparation of the house and the educational material for the children. However, the digital tools, when admitted, have helped the Italian Jewish community keeping united despite the restrictions and the impossibility to meet, particularly on significant occasions, such as the Israel's Independence Day. Technology has allowed the overcoming of local boundaries and the possibility to organize conversations, lessons and in-depth studies, reaching hundreds of worshippers connected simultaneously and a circulation that would have been impossible in a physical meeting. Even Imams, not being able to pronounce their sermon during the Friday prayer, have used the internet to hold their lessons, to be closet o the worshippers, to inform them, renovate their faith and encourage them. The need to adopt new control measures during the SARS-CoV-2 epidemiologic emergency, after having overcome the so called phase 1 of the lockdown, in relation to liturgical celebrations, has determined a quicker restart, albeit a few disputes, of funeral rituals and, subsequently, with the sharing of some protocols with each of the interested religious confessions, of the celebrations with the participation of the worshippers (Decimo, 2020; Lo Giacco, 2020, Macrì, 2020a), in line with the rest of Europe. All the religions, during this not so short period of "eclipse" of the principle of pactional bilaterality, have been united by a profound sense of community and by the need to not disperse it, even through the employment of digital communication tools, sharing the challenge of keeping the worshippers united, albeit through "artificial" forms of participation.

A SURVEY ON THE EXERCISE OF THE WORSHIP DURING LOCKDOWN

The survey on the topic of "Religious freedom and faith in times of Covid-19" has placed itself in this framework, and it has been conducted with the aim of analyzing the reaction of the worshippers/citizens to the "new" experience of faith lived through the phase 1/lockdown of the health emergency crisis caused by the outbreak of the Covid-19 virus, with special reference to the restrictions to the religious freedom right and to the celebrations of the Catholic Church broadcasted digitally. The survey has been

promoted by the "Giustino Fortunato" university, in cooperation with the Department of Law of the University of Campania "Luigi Vanvitelli" and with the Department of Canon Law of the Pontifical Theological School of Southern Italy, Saint Thomas Aquinas section (Pontificia Facoltà Teologica dell'Italia Meridionale - Sez. San Tommaso d'Aquino) and the research group was composed by the teachers Paolo Palumbo (Coordinator), Raffaele Santoro, Elvira Martini, Antonio Foderaro, Edoardo Scognamiglio e Salvatore Forte. The participation to the survey was great, and the survey has been the absolute first to investigate social-legal issues linked to the religious phenomenon in times of lockdown, and it has registered a total of 4.032 people interviewed. The sample was made mostly of women (70%), and the most represented status was "married with children" (54, 44%), followed by "unmarried laic" (25, 89%); more than 50% of the people interviewed declared that they have a direct pastoral commitment and place themselves in the 51-70 years old and up age bracket; and they have a college degree or a post college specialization. About 70% of the participants declared themselves to be intensively practicing Catholics. Such massive participation is to be interpreted as an unmistakable sign of the need, expressed by the People of God, to be involved in the public debate, and it represents the opportunity for a scientific reflection on the consequences of the changes in the way they experience the catholic religion and on the risks regarding the influence of this on the religious freedom and on the undermining of a healthy cooperation between State and Catholic Church. The survey was developed through the placement of tests (fifteen) developed in three specific areas: the area of the relations between State and Church, the sacramental area and the area related to the risk of "viralization" (as Pope Francis has defined it) of the experience of faith, due to the multiplying of celebrations and religious activities broadcasted online. The results of the survey (https://issuu.com/profpaolopalumbo/docs/indagine) have given an interesting glimpse on the evaluation conducted on the provisions that have limited, during the lockdown, the participation to the worship life. Most of the participants felt that the provisions were the expression of a rightful cooperation between State and Catholic Church (33, 06%), while 25,83% of them thought that they were right and necessary measure that the Government had to adopt, that is, some rightful and understandable limitation of the religious rights as they were inspired to duties of personal and social responsibility (19,65%). Of all the consequences of the provisions adopted by the Government, the one that was less understood by the people interviewed was the prohibition to participate to funerals (49,34%), followed, albeit by an ample difference, by the intervention, in some cases, of law enforcement in places of worship (11,82%). The deprivation of the worship life that was mostly suffered by the people interviewed has been that of the Holy Communion (32,38%), followed by the thought of not being able to receive a proper funeral in case of death (29,16%) and of not being able to attend Mass in the church (20,02%). There was a lot of confusion on the topic of the access to places of worship, for personal prayers, during Phase 1. If 37, 5% of the sample deemed it to be rightfully allowed, provided that the distance of one meter be observed and that the place of worship be the closet to home 33, 73% of the sample thought it was always forbidden. A relevant data is the one regarding the fact that during Phase 1, 65,20% of the sample never went to church for a personal prayer. Not being allowed to participate in religious functions in the church, 48,24% of the participants to the survey declared that they followed the functions on television or social media channels, or that they incremented personal and family prayer at home (31,70%). Comparing the data to those of the period prior to the current health emergency, spiritual life seems to have increased for 24, 08% of the people interviewed or slightly increased for 19,17% of them (those who have observed a decrease amount to 7,61%). With respect to the perception of the emergency period, 53,55% of the sample thinks that, in this challenge, God has wanted to make people rediscover the beauty of things and the essential values, and that only God can save us during

these times of crisis (31,82%). The answers to the question: *"I think that in these times the Church and the priests must..."*: were various. For 27,17% of the sample, the fact that the clergy has dedicated itself to enliven the means of communication with religious functions is positive, while 12,35% would have preferred a higher dedication to acts of charity with donations, a practical commitment to finding solutions in order to restore religious functions in the church with the people attending them (14,70%) and a higher closeness to the parishioners that were locked in the house or hospitalized (17,08%) or to the marginalized and the poor (15,19%). The positive data on the technology meant to promote the participation to religious functions (Sufficiently – 30,75% – quite a lot – 30,21% – very much – 26,22%) has been the confirmation of the centrality held by the means of digital broadcasting during Phase1. The fact that the functions/activities aired on TV or on social media that have favored the communion amongst worshippers and the fact of feeling like a "Church" (69,35%) is considered a positive fact, and only 11,71% of the sample has thought that the sense of community and the concreteness of the religious celebrations has been lost. The digital tools mostly used to participate in religious functions are: TV (47,28%), Facebook (26,96%) and You Tube (11,12%); however, there have been some flaws in the celebrations, that have been observed by the worshippers, particularly, a sense of discomfort and detachment toward the celebration (14,69%) and, most of all, the difficulty in participating with the involvement of the body (standing up/sitting down) (21,59%). The perception of the people interviewed in relation to the future modalities of participation to religious functions once the health emergency crisis is over are quite significant: 74,21% of them hopes that everything will go back to normal and a direct and community familiarity with the Lord will be restored; for 19,35% of them, the social media and the digital channels for the broadcasting of religious functions should be used even after the emergency is over, maybe after having better regulated the phenomenon of the celebrations on TV and on online platforms (5,73%). In general, it is thought that the "lockdown of faith" has been an experience that, in time, will be useful to the purpose of reinforcing the faith of everyone (34, 62%) so that many, that did not attend parish communities, will feel the need to participate in the community activities and functions of the parish (25, 27%), but also to reinforce the allegiance between State and Catholic Church in pursuing social interest (12, 35%). On the other hand, some problematic profiles have been observed by those who think that the worshippers, despite keeping their faith, will experience it from now in a personal and intimate way, no longer feeling the need to participate in sacraments or in community functions (14, 71%). Only for a very small percentage of the sample will the solutions adopted during lockdown lead to a "loss" in faith (2, 83%) turning it into a solely "virtual" experience (1, 98%), in which the way to participate in the liturgical life will be "re-established". Behind the word "participate", indeed, are two distinct and irreducible, but also indissoluble concepts: "be a part of" and "take part in". Because of the baptism we already are "part of" and we are in it together, since, together, we constitute the Church, but at the same time, each one with its own peculiarities, is called to also "take part in it". In times of lockdown, the worshipper has felt part of the "ecclesiastic us" that has always brought together the People of God, despite the completely new circumstances, through unusual channels and, most of all, with different dynamics compared to the usual ones; an important role, in this frame work, has been that of the social and digital communication means, social networks in particular, which the Church itself has promoted in view of a correct social communication and that are now been questioned by the law as well regarding their contribution to the post Covid liturgical and sacramental life.

DIGITAL CELEBRATIONS: IS THERE A LEGAL REGULATION?

Due to the persisting restrictions, after one year from the beginning of the pandemic, it is useful to wonder, regarding the specific subject of the exercise of the worship, whether or not it is time to start a serious reflection regarding the theological premises and the regulation of digital celebrations. Since one year ago, the web is imposing itself as a new "liturgical space" (Guzzo, 2020) and the worship life has been transferred from the liturgical rooms to the virtual ones (rooms/channels) or to social media pages. This has been certainly determined by the pandemic event, but today, in a unquestionably different epidemiologic situation and with the possibility to restore the physical participation in religious functions, the phenomenon does not seem to come to a halt, and priests and bishops do not seem willing to renounce to this way of broadcasting the evangelic message, which has pinpointed new forms of proclamation and has made it possible to envisage the creation, in the future, of actual hybrid parish communities (Muroni, 2021; Belli-Gallo, 2021). After one year from the restart of the celebrations with the people, we can surely affirm that the recommendation in the Protocol dated May 2020 was disregarded in the part in which it invited to certainly favor the broadcasting of celebrations in streaming, but only for those who were unable to attend the Eucharistic celebration. A large part of catholic worshippers, instead, remained linked to the digital fruition of the celebrations, by now used to virtual forms of worship. It is certainly true that the pandemic has induced a recovery of the traditions and of the forms of personal prayers, it has lead to a return to the medieval custom of assisting to the Eucharist from a distance without actually receiving it, it has inverted the physical reception of the communion with the practice of the spiritual communion in use in the XVIII and XIX centuries, it has incremented the importance of the local Church, making the concept of the proclamation prevail on the sacramental one. However, the general direction to follow in the future has already been dictated by the Pope during a homily in April 2020, in which he clearly stated the value of the community familiarity with the Lord:

A familiarity without community, a familiarity without bread, a familiarity without the Church, without the people, without the sacraments, is dangerous. It can become, let's say, a gnostic familiarity, a familiarity for me by myself, detached from the people of God. The apostles's familiarity with the Lord is always a community familiarity. It always takes place at the table, a sign of the community. It was always with the Sacrament, always with the Bread. I say this because someone made me reflect on the danger that we are living in this moment, this pandemic that has made us all communicate, even religiously, through the means of communication. Even this Mass, we are all communicants, but not together, we are spiritually together. The people gathered are few. There is a large number of people: we are together, but not together. The Sacrament too: today you receive the Eucharist, but the people linked up with us, only spiritual communion. And this is not the Church: this is the Church in a difficult situation, which the Lord permits, but the ideal of the Church is always with the people and with the Sacraments. Always… The Church, the sacraments, the people of God are concrete. It is true that in this moment we must provide this familiarity with God in this way, but so as to come out of the tunnel, not to stay inside it. And this is the familiarity of the apostles: not gnostic, not virtual, not selfish, for each one of us, but a concrete familiarity, in the people. Familiarity with the Lord in everyday life, familiarity with the Lord in the sacraments, in the midst of the people of God. They went on a journey of maturation in their familiarity with the Lord. Let us learn how to do this as well. From the very first moment, they understood that familiarity was different to what they had imagined, and they arrived at this. They knew that there was the Lord, and they shared everything: the community, sacraments, the Lord, peace, feasting.

Following this approach, the Congregation for Divine Worship and the Discipline of the Sacraments, in September 2020 has made clear, in a letter addressed to the Presidents of the Episcopal Conferences that:

Per quanto i mezzi di comunicazione svolgano un apprezzato servizio verso gli ammalati e coloro che sono impossibilitati a recarsi in chiesa, e hanno prestato un grande servizio nella trasmissione della Santa Messa nel tempo nel quale non c'era la possibilità di celebrare comunitariamente, nessuna trasmissione è equiparabile alla partecipazione personale o può sostituirla. Anzi queste trasmissioni, da sole, rischiano di allontanarci da un incontro personale e intimo con il Dio incarnato che si è consegnato a noi non in modo virtuale, ma realmente, dicendo: «Chi mangia la mia carne e beve il mio sangue rimane in me e io in lui» (Gv 6, 56). Questo contatto fisico con il Signore è vitale, indispensabile, insostituibile. Una volta individuati e adottati gli accorgimenti concretamente esperibili per ridurre al minimo il contagio del virus, è necessario che tutti riprendano il loro posto nell'assemblea dei fratelli, riscoprano l'insostituibile preziosità e bellezza della celebrazione, richiamino e attraggano con il contagio dell'entusiasmo i fratelli e le sorelle scoraggiati, im- pauriti, da troppo tempo assenti o distratti

[Although the media provide a valuable service to the sick and those unable to come to church, and they have done a great service in transmitting the Holy Mass at a time when there was no possibility of celebrating in community, no transmission is equivalent to personal participation or can replace it. On the contrary, these broadcasts alone risk distancing us from a personal and intimate encounter with the incarnate God who handed himself over to us not in a virtual way, but in a real way, saying: "Whoever eats my flesh and drinks my blood remains in me and I in him" (Jn 6:56). This physical contact with the Lord is vital, indispensable, irreplaceable. Once the practical measures that can be taken to reduce the contagion of the virus to a minimum have been identified and adopted, it is necessary for everyone to resume their place in the assembly of the brothers and sisters, to rediscover the irreplaceable preciousness and beauty of the celebration, and to attract with the contagion of enthusiasm discouraged, frightened brothers and sisters who have been absent or distracted for too long.]

Nevertheless, even for Easter 2021, as for the previous one, the Note of the Congregation for Divine Worship and the Discipline of the Sacraments suggested to ease and privilege the broadcasting of the celebrations, particularly those held by the bishop, encouraging the worshippers that were unable to attend their Church to follow the diocesan celebrations as a sign of unity, recognizing that *«the use of social media greatly helped pastors to offer support and closeness to their communities during the pandemic»*. Despite the practice highlights the indisputable data of the centrality assumed by the digital media in the liturgical and sacramental area, such experience remains, in light of the reminded quotes, contradictory. The TV or web live coverage have eased the unity of the community and the overview of the digital Masses without people strikes and makes us wonder: everywhere, with any evidence, the impossible has been made possible in order to make sure the weekday and holiday Masses could be guaranteed to the people that, on one hand are not physically there, but on the other hand are very much present with their expectation to find the Eucharistic liturgy, via television or web. The pandemic has allowed people to discover a Catholic Church that is more social, and also small realities have adapted themselves to this situation, bringing the "digital" in churches. Parishes and Dioceses have rediscovered their social channels, that were often already present, but not active, and some of them have even offered guidelines and video tutorials with some practical advice for the success of live streaming celebrations. Such documents are especially useful because, on the basis of the experience gained during these times,

they shed light on some criticalities of the digital celebrations and, consequently, they highlight the need for a regulation, through a "criterion" that can homogeneously discipline the phenomenon at last. Of course, amongst the criticalities there are issues that are not necessarily technical (framing, audio, equipment, style, technology and platforms) but also regulatory, mostly linked to the "live" streaming and to the right to privacy of the attendees, considered that, with the filming of the celebration where the people are present, the functions are clearly attended by the worshippers. In this respect it is certainly appropriate, for example, that whenever accessing a sacred place, the worshipper be informed that the celebration is going to be broadcasted in live streaming, or that particular attention be given to children that are not accompanied by a parent, and also that the regulations on protection of cultural heritage and work, in the cases in which the entity has at least one employee, be observed. It is certainly appropriate, as the Social Communication Office of the C.E.I. reminds us in a document dated March 2020, to recreate, during broadcasts in live streaming, an "assembly view", but it is necessary that it does meet the requirements of the right to privacy of the participant worshippers, especially on occasion of the streaming of First Holy Communion, Confirmation, Wedding and Funeral celebrations. All the guidelines recall the attention on the attitude of the priest, whom must not indulge in useless virtuosities or in the research of consensus. Finally, many documents refer to the need, or better, the urgency of a specific training on the value and the employment of digital environments (Ammendola, 2021), feeling all the inadequacy of the Directorate on social communications dated 2004, in which is impossible to find indications regarding these new issues. The in-depth study on the role of digital media in the liturgy and in the worship life is placed in the path of the recent teachings on the social communication tools, where interest, goodwill, and prudential attitude cross each other, as well summarized in *La Chiesa e Internet (the Church and the Internet)*, a document dated 22 February 2002, of the Pontificial Council for Social Communications, circulated at the same time as *Etica in Internet (Ethics in the Internet)*, which considers the means of communication as the result of the scientific historical process thanks to which humanity moves forward in the discovery of the resources and of the value enclosed in Creation, convinced of the fact that such means are, as the II Vatican Council had already affirmed in the declaration *Inter mirifica*, *«marvelous technical inventions»* that, albeit doing already a lot to satisfy the human needs, may still do more. It took the Church decades to adapt to the mass communication experience first, and to information technology after, following the widespread of electric technologies in communication, and we can now maybe say we have reached a turning point of the adaptation to the digital experience. Indeed, the employment of the Internet by religious confessions has been quite broad for a while, and many religious groups, in order to widespread the knowledge of their doctrine use digital tools, religious apps (Santoro-Gravino, 2020), up to reach the "edge" experiences of virtual religious communities, (Campbell, 2012; Helland, 2005) animated by robot ministers (Mindar, the first robotic Buddhist priest), the worshippers of which meet only in 2.0 churches (VR Church, the first virtual reality church). And so we reach the most profound end central issue, which also influences the contribution that the Law can give to this phenomenon and it is the one related to the theological value of digital celebrations. Can the in streaming celebration be compared to the one conducted in the church? In other words, are they interchangeable? Do the worshippers assist to the celebration in streaming or do they participate in it? How to train them to face to face celebrations, albeit mediated by means of communication, that do not exclude the involvement of the body, through those forms that the physical involvement to the celebration requires to express and to live as a conscious, full, active and fructuous participation? What type of community is forming in the virtual space? Can the Internet be a space in which the sacramental grace is spread as it became a means of evangelization? These questions are more than licit, especially during

these times, in which the liturgical space and the essence of the assembly of the worshippers itself are relativized, and become more fluid, open, digital. We can certainly agree that: the liturgy may not overlook the flesh, and there is no sacramental and liturgical celebration that excludes a necessary materiality; the assembly is created in the meeting and in the summons, and the ritual is a complex experience of corporeality, the sacrament event always occurs in the ritual. Although it is desirable that the digital environment does not substitute the physical one, it is also true that the house of the community assembly has a secondary role, a character of service compared to the assembly itself. The ecclesiastical community is called, nowadays, to fully comprehend the place that the digital reality occupies in our societies and cultures (Palumbo, 2019a; Sintobin, 2020). We will have to take into account that the people still believe that everything that is "digital" is actually "virtual", but it is suitable and necessary to wonder whether or not the real world really contrasts with the digital environment, since the enculturation of the liturgy and the sacraments in the digital experience is determining itself in a moment in which the mediation of the internet is an integral part of the existence of people. The disquisitions of those who would want to keep the digital contribution out of the worship and liturgical-sacramental life are out of space and time. Continuing to use the digital tools and to stream celebrations is, by now, part of a reforming identity process for the Church itself, and the spiritual and liturgical experience, as well as theology and canon law (Pacillo, 2019; Pacillo, 2020a), must always understand the reach of this digital revolution of faith, finding solutions for proper adaptations. The places of the physical encounter change, and so do those with the divine entity (Fuccillo, 2019). Pope Francis, in the apostolic exhortation *Christus vivit,* talking to an audience of young people, shows a lucid knowledge, clarifying (n. 86) that it is no longer about "using" the means of communication, but about living a widely digitalized culture that has profound impacts on the notion of time and space, on the perception of self, of the others and of the world, on the way we communicate, learn, inform ourselves, relate to others…and to God?

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Chapter 19
"Don't Google It": The Effects of Google's Ads Dominance for Users and Competitors

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ABSTRACT

Through the analysis of some recent competition authority investigations as well as conduct adopted by Google on the online advertising platform Google Ads, the chapter provides insights on some commercial practices opted for by the giants of web marketing with the purpose to deepen the future legal and market challenges. In conclusion, this study aims to contribute to the current debate and the attempt to find remedies that offer appropriate protection to advertisers and consumers as well as granting support to the lawmakers, who in turn have a duty to carefully regulate the search giant.

INTRODUCTION

The advancement of the state of the art, the continuous evolution of the Net and the rapid development of *web marketing* require contemporary scholars to reflect deeply on the characteristics of business around the web (Gustin, 2019)[1]. It is well known that *web marketing* is based on increasingly sophisticated algorithms and functionally has strong repercussions also on the market and on competition between companies. This situation has been emphasized primarily in this particular time linked to the global health crisis triggered by the *Covid-19* pandemic, in which the web is playing a central role in the purchase by web of products and services (Hughes, B. C., 2020, p. 400).

Practically, *Google*, *Facebook*, *Instagram* very often in addition to having the function of a mere search engine or, as in the case of the latter, of social network, have - as will become clear later - also the potential to generate real business models (Telman, 2015, p. 728)[2].

In fact, the competitive advantage over other media is their ability to generate advertisements, the so-called "sponsored links", which are closely linked to the organic results of searches and algorithms, therefore, helping businessess to find customers. In this context, there is no shortage of those who ad-

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vocate the controversial principle of the neutrality of internet research, even going so far as to qualify it as a "public good"[3].

Having acknowledged this, today a tool through which it is possible to generate real business models is Google *AdWords* - now called "*Google Ads*" - which is a powerful service that has strong repercussions not only on the market but also on competition between business (Tan, 2010, p. 474). In practice, *Google Adwords* is a performance marketing program, that is a tool through which the advertiser, or the one who promotes his company, pays a service to have precise results that are traceable and measurable. *AdWords* is an auction-based system for search results advertising that allows advertisers to bid on keywords. In short, it is an online advertising positioning service and represents the main source of profit for the Google group: already in 2013, thanks to this service, it had revenues of over 50 billion dollars.

Unlike advertising on mass media or social networks, with *Google Ads* the advertiser does not pay for the simple display of the advertisement by the user, but it will pay for the service only if the user takes an action that is to "click" on the advertisement to learn more about the advertised product or service. This system is based on *pay per click* (ppc) or on that formula that requires a disbursement from the advertiser, only if a user actually clicks on the ad. This system represents the core product being sold (Newman, 2014, 412).

It is clear that the advantages connected to this tool are many and quite seductive for companies that aspire to maximize profit and adequate visibility[4] even beyond national borders and, conversely, to acquire a competitive advantage on the market (Tan, 2010, p. 500[5]; Visco Comandini, 2013, p. 551[6]).

It follows that, to date, for many entrepreneurs it is no longer possible to conduct business without online advertising because of "web window" which is increasingly assuming an important role in determining the advertiser's market strength not only because it allows them to acquire new customers but also in order to consolidate its commercial reputation (Montanari, 2012, p. 147).

From this perspective, Google, not only for its competence and foresight but also because it represents the most visited site in the world, has monopolized *Search Engine Marketing* (hereinafter referred to as SEM), i.e. those platforms that represent an essential, if not indispensable, tool for companies that want to operate - especially after the current global pandemic crisis - in the new era of globalization (Zuboff, 2019, p. 19. Rodigues, 2019, p. 37).

On the basis of this argument, let me briefly note why Google has a strong influence on the market and maybe has also unlawful monopolization. *In primis*, it seems to me to reflect that in common jargon, the expression "Google it" is used more and more often; otherwise it is not common to use expressions that refer to other search engines, such as "Do you yahoo it?" (Hoppner, 2017, p. 208. Mays, 2015, pp. 747 – 748[7]). In fact, with the expression "Google it", nowadays, in the common jargon we mean "find something on the internet" (Witt, 2019, p. 366[8]).

Beyond the meaning of these expressions, the aforementioned makes it easy to understand how conditioning a choice or commercial operation by Google is for all internet users. Therefore, also for *Google Ads* advertisers by now, as far as will be said first, "subjects" of his unilateral choices: Among other things, it is well known that Google has a search algorithm whose operating characteristics are covered by trade secrets. This suggests that *Google Ads*' market share absorbs all other "competing" companies as advertisers prefer to promote their products or services on *Google Ads* rather than the almost unknown *Bing Ads.* This is a similar platform used by *Yahoo!*, actually the only potential Google "competitor" (Gerardin et all, 2020, p. 20. Newman, 2014, p. 415[9]).

In fact, if on the one hand the "competitors" of *Google Ads* have much more competitive prices, on the other hand they have an extremely reduced range of action and customer interaction compared to

that of Google (Visco Comandini, 2013, p. 564). In practice, Google makes the difference compared to other "competitors" because it dominates the search tools sector as it is qualified by users as "The search engine". Hence the purely commercial reason why almost all advertisers prefer to advertise on *Google Ads* (Langford, 2013, p. 1574[10]).

Indeed, this assumption is also confirmed in some sector studies (Mays, 2015, p. 727), according to which *Yahoo!* and its tools are much less used than those of *Google* and, among other things, are commonly used mainly in the USA market compared to the European one.

On this premise, it seems quite obvious that there is an abuse of dominant position or better a control of the market by Google. It is somewhat similar to the U.S. concept of "monopolization". Effectively, there is nothing wrong with dominance as such; what causes a problem is the adoption by a dominant player of predatory or exclusionary business tactics. When a dominant firm attempts to exclude potential competitors or to eliminate existing competition, the Tribunal could be called upon to intervene in order to try to avoid bias for users and competitors.

One argument for this is that most recently several European jurisdictions are currently considering an overhaul of their competition policy approach towards dominant firms (the so called GAFA – Google, Amazon, Facebook, and Apple) in the digital economy[11]. A common theme is that competition authorities or newly created digital markets agencies could be given the power to regulate dominant companies with a gatekeeper status[12] as a consequence allow an adequate users protection. In this view, policymakers in various jurisdictions have specified the criteria for identifying the firms, or gatekeepers, that are to be subject to regulation (Falce, 2021, p. 3 ss.; Mani, 2021, passim). In this perspective, the EU recently published a proposed regulation of tech firms, the Digital Markets Act (DMA)[13] starting from the premise that technologies have developed so much and digital services have become such a part of citizen daily lives that there is a duty to protect the best interests of European consumers, protect the use of their data as well as create a level playing field for big, small and medium businesses.

After this overview, I would like to say that the purpose of this work is not to conclude on wheter Google has committed any infrigement of competition rules or contractual *bona fide* principles. The task of this article is much more modest it is only to draw attention to some of the conduct that has been investigated and highlight other conduct that could be sanctioned by courts especially after the abovementioned forthcoming EU regulation. As a result, some observations could be proposed that may be helpful for the customers, competitors and Google consequently avoiding so much attention on its practices.

THE USA JUSTICE DEPARTMENT ANTITRUST LAWSUIT

Firstly, it appears important to point out that the US Department of Justice (DOJ) and 11 state attorney generals (it is important to points out that to these 11 state attorneys general more States could join later) filed a lawsuit against Google LLC on October 20 2020 under Section 2 of the Sherman Act[14]. In particular, Justice officials accused the Silicon Valley company of abusing its position by achieving monopoly power for its flagship search engine and related adsvertising business.

Overall, a company violates Section 2 of the Sherman Act when it acquires or maintains "monopoly power" in a relevant market by "exclusionary" conduct. "Monopoly power" is the power of a company with a large market share to exclude competition or keep prices above competitive levels in a relevant market. "Exclusionary conduct" is conduct that would not make business sense but for its elimination or weakening of competition. Importantly, what is illegal is acquiring or maintaining a dominant position

by engaging in conduct that keeps rivals out of the market to the detriment of consumers, and where the dominant company could not get away with such business behaviour but for its dominant position.

In practice, Section 2 of the Sherman Antitrust Act makes it unlawful to "monopolize" commerce. However, the statute does not define that key term, leaving the courts to flesh out its content. In unpacking this language, the Supreme Court has explained that the mere possession of monopoly power is not illegal[15]. Instead, a firm violates Section 2 only if it has monopoly and engages in exclusionary conduct to achieve, maintain, or enhance that power by the control of prices and excluding competition.

On the contrary, Google has long defended itself against charges of monopoly by stressing that its products are free and that no one has to use them. Actually, consumers pay a real price for the search engine. There's a real cost for consumer, also in terms of privacy, attention and data. It may not be dollars and cents. But it's that price we should be concerned about.

However, this lawsuit certainly represents the government's most significant challenge to a tech company's market power since *Microsoft* litigation that began about thirty years ago. The result on which may reshape the way consumers use the internet[16].

Broadly, the USA authorities in its 57 pages complaint alleges that the tech giant is a "monopoly gatekeeper for the internet" that has used "pernicious" anticompetitive tactics to maintain and extend its monopoly power in the markets for "general search services", "search advertising" and "general search text advertising". In fact, according to the complaint, Google occupies dominant shares of each market: around 88 percent of "general search services" and over 70 percent of "search advertising" and "general search text advertising". From this perspective it is important to point out that a company may be considered to hold a "monopoly" position if it has a market share of 65-70 percent in the U.S. and a share of around 50 percent or more in the EU. More generally, recent studies estimate Google's share of Web searches in the EU at over 88 percent and around 67 percent in the U.S. Google's share of Web advertising dollars is even higher. Google's dominance means that it plausibly can be labeled as a "monopoly" (Miller, *FederArb.com*).

The long-awaited case, filed in Washington DC, alleges that Google unfairly acts as a gatekeeper to the web through a series of anticompetitive business agreements with companies that control various "search access points" - specifically, mobile device manufacturers, wireless carriers, and browser developers. In particular the Justice Department alleged that Google uses billions of dollars collected from advertisments on its platform to pay for mobile-phone manufactures, carriers and browsers, like Apple Inc.'s *Safari*, in order to mantain Google as their preset, default search engine, thereby creating a self-reinforcing cycle of dominance. A central point is that the DOJ contends that the challenged agreements seriously impede the ability of rival search engines to meaningfully compete with Google. As a consequence, Google has used the relevant agreements to "lock up" several "search distribution channels".

As the Government points out Google's search application is preloaded, and cannot be deleted, on mobile phones running its *Android* operating system[17]. Pratically, according to the Justice officials, the company pays billions each year to "secure default status for its general search engine and, in many cases, to specifically prohibit Google's counterparties from dealing with Google's competitors", the suit states, in a move that has "foreclosed competition for internet search" (Lianos – Motchenkova, 2013, p. 429[18]). Quite definitely, Google's alleged anticompetitive practices are "especially pernicious because they deny rivals scale to compete effectively" and thwart potential innovation, asserted the suit[19]. Finally, the Justice Department alleges that Google's scale advantage as a search engine, creates a similar competitive defence in advertising markets, where advertisers seek the search engines with the most users and most accurate algorithms.

On the basis of this argument, the complaint also claims that Google is positioning itself to dominate the next generation of seach distribution channels-smart watches, smart speakers, smart TVs, and other "Internet of Things" (IoT) devices. Google is allegedly pursuing this goal by interpreting its anti-forking agreements with *Android* device manufacturers to cover these new products[20].

On this premise, since monopolization cases are incredibly fact-intensive, it is objectively difficult to confidently predict how the court will evaluate the "conduct" element of the DOJ's case without a factual record. But several features of the lawsuit stand out even at this early stage.

In this contest, the document prepared by the Congressional Research Service (CRS), clarifies certain technical aspects. Practically, according to this document, in order to prove *Google de facto* monopoly power at the key distribution channels it could be important to start from the European Commision antitrust action. They found, that in 2018, 95 per cent of all search queries on *Android* devices-where Google Search was preinstalled-were made via Google Search[21]. In contrast, less than 25 per cent of all queries on *Windows* Moblie devices -where *Bing* not Google services was pre-installed - were made via Google. It is clear that similar evidence would likely buttress the DOJ's arguments on the competitive effects of default status.

In addition, according to the abovementioned document, another argument that could support the DOJ lawsuit is that Google's alleged conduct does resemble certain categories of behaviour that are familiar in monopolization doctrine. Google's "pre-installation" agreements are a form of "tying" arrangement in which Google has conditioned the availability of certain products (the *Google Play store*, other *Google apps*, and *certain APIs*) on the pre-installation of Google Search. In the EC's 2018 antitrust action, Google unsuccessfully argued that its *Android* "ties" were procompetitive because the revenue Google derived from them allowed it to license *Android* to device makers for free.

It is well known that this last aspect is certainly controversial and it is contested in both the case law and academic literature.

Finally, the DOJ could have difficulty in proving that the cooperation between Google and other Big Tech such as *Apple* have harmed consumers by reducing the quality of general search engines. For example, Google's organic search employs a meritbased algorithm that can easily be used to identify better candidates to populate its local search boxes, enabling the creation of an alternative version of the search engine results page. In this regard, the fact that Google's own algorithm would provide better results suggests that Google is making a strategic choice to display their own content, rather than choosing results that consumers would prefer. Shortly, Google's utility can be understood as a reduction of search frictions by helping to create a match between users and their preferred goods or services (Shross, 2013, p. 49).

The lesson to be learned from this analysis is that it is not simple to prove if Google had anticompetitive behaviour and if it really had created harm to consumers. It remains true, however, that Google search results are not generated objectively and are not independent of the preferences of those companies that are in cooperation (direct or indirect) with Google. Overall, the shortcomings on objectivity could be the manipulation of the search results that create harm not only to *GoogleAds* "competitors" but above all on the quality of the products and services that *GoogleAds* offers to the consumers.

THE ITALIAN ANTITRUST INVESTIGATION

Competition authorities are increasingly scrutinizing Google not only in the USA but around the globe[22]. In this context, the aim of this paragraph is to focus on the last and recent antitrust probe from the Italian

Autorità Garante della Concorrenza e del Mercato (AGCOM), into the Google's "discriminatory" use of data, for "display advertising" which covers the banners, videos and rich media adverts appearing on websites[23]. The Italian Competition Authority is probing whether Google, controlled by Alphabet Inc., might have violated Article 102 of the Treaty on the Functioning of the European Union (Nazzini, 2011, passim), preventing rivals from competing effectively, as well as, adversely affecting consumers[24].

The point, however, is that the inquiry stems from a complaint filed by the country's main trade association in the digital-ads sector, the *Interactive Advertising Bureau Italia* (IAB). According to a note published by the watchdog, IAB Italia argues that Google used a set of unfair practices to exclude competitors from that market, with the ultimate effect of "depriving advertisers and publishers of the possibility to choose their commercial interlocutors and contractual counterparts." In practice, the complaint homes in on the matter of user profiling, namely the collection of data regarding the behaviour and tastes of potential customers in order to better define targets to be reached with ads. In this respect, IAB alleges that over the last years, Google has put in place three specific practices — "all part of a single and complex exclusionary strategy" — to undermine its competitors' targeting ability.

In order to capture these concerns, I think it is important also to point out the opinion of Newman (2014) that rightly assumes: "[…] Google acts as an advertising agency delivering ads not only on its own sites, but also to a wide range of affiliates and other content providers. For advertisers seeking the product Google sells, namely ads tailored to targeted behavioural characteristics of online users, there is no economically viable competition to Google that has the same one-stop reach" (Newman, 2014, p. 407).

Starting from this complaint the Italian authorities suspects the Sylicon Valley company of using the vast amounts of data it collects through its various services to prevent rivals in the digital advertising market from competing effectively[25]. The tech giant is alleged to have used tracking elements that allowed its ad broker services "to achieve a targeting capability that some equally efficient competitors are unable to replicate'' the authority maintained.

Per the AGCOM, online advertising in Italy was worth more than € 3.3 billion in 2019, representing 22% of the resources of the media sector — with such sales accounting for the second most important source of revenue in the sector. This circumstance proves the strong influence of the online advertising and, as noted above, of *Google Ads*.

More importantly, through the cookies inserted together with banners, pop-up, *tags* or other forms of advertising messages visible during the consultation of a website[26], it is possible for advertisers, agencies and advertising intermediaries to acquire relevant data for the user's consumption choice and as a consequence personalize the subsequent ad. campaigns as well as orienting the positioning of messages on the content of interest of the individual user[27].

In addition to this considerable data, Google would have multiple tools that allow them to reconstruct, in a detailed manner, the users profile to which advertising messages should be directed. These are, the *Android* mobile operating system, installed on most smartphones used in Italy, the browser for *Chrome* mobile devices, the browser for *Chrome* personal computers, the mapping and navigation services *Google Maps* / *Waze*, and of all other services provided through Google ID (*Gmail, Googledrive, docs, sheet, Youtube, Google Wallet, GoogleCalendar*, etc.)[28].

To establish ideas for purposes of exploring this point, imagine first that Google for the registration on *Gmail* asks to the user personal data details such as mobile number, country of registration, etc. In addition, other services supplied by Google ID (*Drive, Docs, Sheets, You Tube*) allow them to have other data as the web activities, including the use of smartphones or other internet devices and the time, etc. That means, without a doubt, that this data can help Google target the users towards specific advertisi-

ments (Clarizia, 2020, p. 691). More generally, Google does not deliver the results that would best serve consumers, but instead alters those results to serve its own competitive interests (Patterson, 2013, p. 8[29]).

It is not surpising, therefore, that Google has a wealth of data at its disposition — a matter not lost on the Italian authority. In fact, as the Italian Authority point outs the company has "multiple tools that allow it to reconstruct, in a detailed way, the profile of the subjects to whom the advertising messages are addressed", in particular through personal data or interests.

The abovementioned has been an effort to illustrate that Google's internal services – by collecting data by multiple services — can know whether a user has seen a given advert, and so can improve their ability to track." The authority notes this in its opening decision. It seemes to me to reflect that the targeting power or better *targhettizzazione* is key to success in the industry because it allows the identification of all the best potential customers using the filters mechanism (Telman, 2015, p.746) or at the same time elevate with specific algorithms the search ranking of a Google affiliated website because it is Google affiliated (Ratliff, J. D. & Rubinfeld, 2014, p. 239). Effectively, some authors assume that search engines have become the gatekeepers of information: in fact, they direct us toward what they think is relevant and away from what they do not think is relevant (Woan, 2013, p. 303).

More important, althought Article 102 does not define "dominant position" (Nazzini, 2015, p. 301 ss.), according to the Italian authority Google has a dominant position on the market and other company competitors don't have this strong power to target users to a specific advertiser.

In this contest, according to AGCOM by the reduction of competition in the intermediation of digital advertising, it might reduce the resources allocated to website producers and publishers, thereby impoverishing the quality of content directed to end customers. In addition, it also points out that a lack of "effective competition based on merits" could discourage the development of innovative new adtech and ad techniques that are less intrusive for consumers. Practically, Google's dominance of the digital ad. space could be damaging both to publishers and Internet users, and holding back the development of genuinely privacy-preserving adtech.

Finally, the analysis also proves that althought this targeting of the costomers could have many issues on the inappropiate use of big data from another source this targeting compels the advertiser to use Google services, such as *Adwords*, rather than Google competitors in order to attract more consumers. In fact, the display advertising mechanism that allow Google to know the data and the interests of the users is blocked from the Google competitors.

GOOGLE STANDARD CONTRACT: CASE STUDY

Starting from these premises, in order to better understand the strong influence of *GoogleAds* on the market and on competition between companies, it seems appropriate to consider a recent practice used by Google.

As seen above, many companies, especially those operating in international territories, have since the early years of the new century decided to try to expand their customer base using *Google Ads*. Therefore, advertisers have accepted Google's terms and conditions by adhering to the standard contract which, among other things, at the art. 12 states: "*Google may make non-material changes to these Terms at any time without notice.*".

In this context, Google in 2017, taking advertisers from all over the world by surprise, with the following "tweet" (see fig. 1) unilaterally modified all the economic conditions of the contracts stipulated

Figure 1.

before the aforementioned date, establishing that advertisers, from that time, could have spent up to double the average daily budget.

In practice, Google justifies this change in the contractual conditions, representing that an "over-publication" would benefit the advertiser, as he would have the ability to spend up to double the minimum daily budget established. In reality, this mechanism, which only apparently would seem to meet the advertiser's needs, creates an additional and unjustified profit for Google to the detriment of the advertiser.

These observations are founded under two different profiles. On one hand, in the event that the advertiser will not be able to deactivate this new "over-publication" mechanism that was unilaterally imposed by the strong contractor (Google) to the detriment of the weak one (advertiser). One argument for this is that this condition could be seen as an arbitrary and illegitimate "appropriation" rather than one of an attitude in "cooperation" by Google.

On the other hand, the risk is that the advertiser will spend that monthly budget, which he usually set up to the aforementioned unilateral change, long before the end of the month and, therefore, in order to guarantee the presence of his sponsored link he will be obliged to pay further sums. A concrete example could allow a framing of the whole issue: if on 1 December the advertiser has a monthly budget of 100 and the "peaks" of traffic will reach the maximum during 7 and 8 December, there will be a concrete risk that from December 9, the entire monthly budget will already be used up (Passarelli, 2020, p. 541). The consequence is that the advertiser in order to ensure the continuity of the advertisements from the 9 December onwards will be obliged to increase the monthly budget previously set. This circumstance, if on the one hand it involves serious inconvenience to the advertising strategies of advertisers based on the continuity of the advertisements for a certain period of time, if on the other hand it translates into a further unjustified profit for Google which, with a unilateral act, has imposed on the advertisers an increase in the monthly budget in order to guarantee the continuity of the advertising of their products / services.

Following on a central point is that long term contracts should allow for an adjustment of the relationship and, therefore, an agreement that is always current and functional to the best and mutual satisfaction of the parties (Macario, 1996, p. 3 ss.). In fact, the contractual conditions frequently recognize one of the parties the right to modify the conditions governing the relationship while the other party - usually the one that adheres to the contract - is willing to accept the *ius variandi*, trusting that the counterpart will respect fiduciary bond, adhering to the principle of objective *bona fide*.

In order to capture these concerns, it is important to highlight the anti-competitive effects of *ius variandi*, that is a potestative right of a party to intervene unilaterally on the contract, both in the USA

and Italian systems. It is well known that with the civil legal system reacts with deep mistrust to this instrument not only because it enshrines the well know principle *pacta sunt servanda* but also because it risks to create bias to the weaker party of the contract (Caldarelli, 2021, p. 38). On the basis of this classical doctrine the phenomenon of the unilateral adjustement of the contracts is treated in the U.S.A. system with caution being provided certain limitations to the enforceability of change of terms clauses. On this point it is important to point out that modern contract law theory contrasts with the classical doctrine this believes that the latter it is not equipped to face the challenge posed by a change from a deal to a relationship in long-term contracts.

From the last discussion, a few conclusions can be drawn: long term contract should allow a clause that change the term of the contract but it is central that the role of the courts as well as antitrust institutions that can guarantee with tools of private law and antitrust (Meli, 2008, p. 43 ss.) a stronger protection for the weaker party of the contract in order to avoid that a clause empowers one party to unileterally amend the original terms clause. In fact, a substantive judicial review could declare the nullity of a contractual clause that constitutes an abuse of economic dependence (Patti, 2019, p. 581).

On this premise, the hypothesis now outlined finds its main expression in the case in question. In fact, the business model adopted by *Google Ads* and the abusiveness/illegitimacy of the practice used, is further confirmed, as far as will be said, in the mere reading of the standard contract to which the advertiser is obliged to adhere. In particular, what is assumed can be seen from the mere reading of the aforementioned clause indicated in art. 12 of the general terms and conditions, where essentially Google reserves the right to make changes to the terms of the contract at any time.

Beyond the practical considerations of the case in question, it probably appears easier, in order to better frame the whole question. Therefore, firstly note that the concept of *ius variandi* by the principal is not in itself unlawful, but it becomes so if in its evaluation this has not been exercised correctly or without a just cause or if one of the parties take advantage of his dominace position on the market. In summary, negotiation autonomy finds its main limit in the merit of the interest pursued and in compliance with the mandatory rules[30].

Starting from this assumption, it is clear that the clause in question is unfair because it has violated the so called "Safeguard obligation" or the legal obligation on each party to behave loyally and to safeguard the other's usefulness to the extent that this does not involve an appreciable sacrifice on its behalf. In order to guarantee a better classification of the violation of the canons of *bona fide* by Google, it seems appropriate to remember here that Bianca effectively draws the contours of the principle of good faith in the execution of the contract (Bianca, 1984, p. 472), ruling that this is divided into two fundamental canons of conduct: on the one hand the fairness of conduct whose constitutional basis is in the principle of solidarity (Article 2 of the Constitution) and which finds application above all in the interpretation of the contract; on the other hand, however, the obligation to safeguard, which requires each party to act without prejudice to the interests of the other. It follows that the obligation of good faith is such, as it is instrumental to the achievement of the contractual economic results and to the realization of the interest of the counterpart (Uda, 2005, 457).

The foregoing considerations allow me to support the assumption that the obligations of fairness and good faith must be qualified as a rule of governance operating in the executive phase of the relationship (Scarpello, 2010, p. 141) so as to allow the judge to have recourse to a wide power in order to adapt the negotiation regulation valuating all the circumstances (Alpa, 2002, p. 611) especially if it is in relation to a *de facto* monopoly as the one of Google in search advertising.

In support of these considerations the U.K.'s Competition and Markets Authority — which has conducted a market study into digital advertising has recently observed that:

Google has significant market power in search advertising. It accounts for over 90% of search advertising revenues and faces limited competitive constraints from other forms of advertising. Its rivals face significant barriers to attracting advertisers, in addition to the barriers on the consumer side. Google's market power has allowed it to charge higher prices to advertisers than its competitors. On a like-for-like basis, Google's prices are on average [30-40]% higher on desktop and [30-40]% higher on mobile than those of Bing[31].

More generally, modern doctrine assumes that the theory of the object of the contract, focused on filling those gaps that the codicistic norm neglects, has given rise to a well-known debate which also ended with the formulation of some theoretical and philosophical elaborations (Gitti, 2005, p. 11). Beyond these elaborations it is necessary that the indexation clauses increasing the price of the service with an unilateral will are contractually regulated[32]. The *ratio decidendi* underlying this thinking is based on the assumption that the parties, in the presence of a change in costs, need to know the commitment undertaken or, at least, the criteria for its concrete determination or the specification of the methods and quantity of the "final situation". Therefore, taking up what is claimed by some Italian scholars (Alpa, 1977, 703. Roppo, 1987, p. 147. Gabrielli, 2015, p. 109), this is a protection of the weak contractor against the possibility of arbitrariness and oppressive behavior by the other. In practice, the problem concerns not so much the *an* of *jus variandi* but rather the *quomodo*, that is, its methods of exercise which must not be arbitrary nor create prejudices to the weak part of the contract (Pagliantini, 1998, p. 2903. Lener, 1998, p. 255).

The pragmatic argument drawn from the aforementioned considerations is that, the clause inserted by Google represents a clear limitation to the advertiser's right to make exceptions, as Google has the right to arbitrarily vary the object of the service within a certain margin (Bianca, cit. 356 ss.). In this contest, the advertiser can not neither withdraw from the contract and go to a Google competitor because of the *de facto* monopoly of Google within the search adversting market (Witt, cit., p. 379[33]). The lesson to be drawn from this is straightforward: Google has abused its market dominance and has changed the economic condition of the contract knowing that the users can't use the same Advertising tools from another market.

In order to underline this concern, I should also point out that on December 19, 2020, the French Competition Authority decided that Google abused its dominant market position through its agreements with business partners and was able to amend contracts unilaterally. It was decided that the terms of Google are far from practising neutrality and predictability in terms of the usage of *Google Ads*; it is stated that Google which has a 90% market share in digital advertising, should provide a fair access to the *Google Ads* service.

Therefore, it is my opinion that this clause is unlawful. In this context, however, it is worth considering that, in the present case, the acceptance of these clauses turns out to be an obligatory path for the harassed advertiser not only to guarantee the daily continuity of the service but also for what has been noted above in relation to the "monopoly" power of Google and, therefore, the inability of the advertiser to choose alternative solutions to Google Ads (Roppo, 2002, p. 648 ss. Zoppini, 2008, p. 520).

CONCLUSION

However, from the above discussion a few conclusions can be drawn. The first is that the relationship between the protection of consumers and advertisers and search engine dominance is not clear to academia at this time (Geoffrey Manne, & Wright, 2011, p. 224-227).

The second conclusion to be drawn is not only that Google occupies a *sui generis* role in the web marketing but also that it is well established that courts have distanced themselves from the continued regulation of tech industries. We know the EU and USA antitrust institutions have made questionable decisions in the past, leaving todays tech industry functionally unregulated (Hughes, 2020, p. 432).

Critically, in the tech sector there has been a particular challange for antitrust and court enforcement because the industry is evolving so quickly and this speed could create an unintentional tech-company dominance (Newman, 2019, p. 1522). The law needs to be "meditative" or better still analyze every single case while tech sector is growing so rapidly.

In this contest, it is reasonable to assume that the Courts should carefully examine the tech industries practices and at the same time the antitrust institutions are obliged to thoroughly discipline all the actions that could creare a *de facto* monopoly or an abuse of the market power by the tech companies (Rantilla, 2020, p. 167) in particular by Google within the search engine market. In fact, this situation creates a reduction of the quality of search results compared to the social optimum.

From this perspective, it appears to me to suggest that courts must meticulously analyze the B2B standard contracts that the advertisers signed for Google services in order to judge if all clauses are worthy and to not create a significant imbalance between the parties.

In addition, it could be desirable that the lawmakers analytically discipline all the methods of tech companies that may create an abuse of the market (Hughes, cit. p. 433[34]) and, at the same time, regulate more aggressively the taxing of profits or requirements for distributed share ownership. From this perspective and with reference to the monopoly on the online search advertising, I agree that imposing search neutrality on Google might then be an important remedy to restrain their search adversiting monopoly (Newman, 2014, p. 435[35]).

In addtion, another goal that could protect the competition is to prohibit the cooperation between big tech companies or the acquisition of other specific companies in order to inhibit excessive advantages over rivals[36]. In so doing this enables engineers to utilize customer data derived from these additional websites or services that have to only purpose to improve search algorithms. In other words, do not replicate the Google's practices.

At the same time, I propose that a better way is to reduce Google's control of user data or at the same time to pay the users for access to their data.

Finally, it is reasonable to conclude, on the basis of existing evidence, that regulation of Google practice and protecting competition are two important lawmaker's goals in order also to ultimately benefit consumers and their rights (Akman, 2017, p. 371). In addition solutions in high-tech markets should aim to provide opportunities for competition on merit, while still enabling even a dominant firm to improve its products or services.

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ENDNOTES

[1] According to Gustin S. (2013): "truly high-speed wired Internet access is as basic to innovation, economic growth, social communication, and the country's competitiveness as electricity was a century ago".

[2] According to Telman (2015) "We use the term "Internet giants" to refer to those technology companies that dominate the online environment, such as Google, Facebook, Yahoo, and Microsoft. We argue that, due to their size and market dominance, these companies exercise quasi-governmental authority and monopoly power that makes consumer consent to data collection meaningless".

[3] In this way see <www.netneutrality.org> and <www.fairsearch.org>.

[4] A recent U.K. study has estimated that ad tech companies like Google could sweep up as much as 42 cents for every dollar spent on those ads. And for major brands and websites, it is difficult — some say nearly impossible — to buy or sell the advertising that funds much of the internet without using Google's products.

[5] According to Tan (2010) "AdWords transcends territorial boundaries in a manner that makes it an extremely effective vehicle for liberalizing international trade"

[6] According to Visco Comandini (2013) there are many benefits to use this online tools, in particulat the author hold: *il beneficio informativo che gli utenti ricevono con la pubblicità, che cresce all'aumentare della rilevanza dei contenuti cercati da ogni singolo utente*" (the information benefit that users receive with advertising that grows as the relevance of the content searched for by each individual user increases).

[7] Mays, L. (2015), points out: "[…] Google holds close to seventy percent of the market share of search in the United States and ninety percent of the European market. […] In assessing the strenght of the market, Amercian courts often find that a market share of forty to seventy percent may be a monopoly, while seventy percent and over is usually a monopoly, and European courts find a market share of over forty percent a monopoly. Moreover, the number of years that Google has dominated search also supports a finding of abuse of monopoly power. Therefore, both the direct and circumstantial evidence supports that Google has a monopoly".

[8] According to Witt, "Everyone knows the internet would not be the same without Google […] Google continues to be the most widely used Internet service not only in the European Union ("EU"), but the world. The search engine has changed the intemet to be what it is today and has become the staple of almost every intemet transaction"

[9] According to Newman, "Google is essentially the only company making any profits in the search advertising sector. Yahoo!, largely once one of Google's main competitors, has abandoned search, in favor of an alliance where Microsoft's Bing search engine now powers most search in Yahoo! properties-and its payments from Microsoft equaled its costs by 2011. With Microsoft's Bing search engine, essentially the only viable alternative to Google in the search-advertising sector, what is remarkable is that Bing's search advertising platform has been reported to be losing something on the order of $2.6 billion per year for Microsoft".

[10] For Langford: "Further, because Google is able to attract users with its superior search results, it is then able to attract more advertising dollars. These advertising dollars fund Google's continuing efforts to improve its search product in a cycle that makes it impossible for rivals to catch up".

[11] On May 27th, 2021, German, French and Dutch Ministers of Economy and Finance, while welcoming the innovation arising from the DMA proposal, nevertheless requested a greater "room for domestic discretion" on the part of Member States to "adjust" to digital markets (and, consequently, apply) specific national competition rules.

[12] In summary to qualify as a "gatekeeper" and fall under the DMA, a company must have a minimum of 8 billion euros ($9 billion) in European turnover and an 80-billion-euro market capitalisation. The rules still need to be agreed upon between the European Parliament and EU countries before

they can be adopted. Companies such as Amazon, Apple, Google, and Facebook fall under the DMA, but the law could also apply to the travel website Booking.com, Amazon's Chinese equivalent Alibaba and online retailer Zalando.

[13] European Commission, "Proposal for a Regulation of the European Parliament and of the Council on Contestable and Fair Markets in the Digital Sector (Digital Markets Act)," 2020 ("Digital Markets Act"), https://ec.europa.eu/info/sites/info/files/proposal-regulation-single-market-digital-services-digital-services-act_en.pdf . On this point is important to point out that on December 15, 2021, the European Parliament adopted its position on the proposal for a Digital Markets Act ("DMA"), ahead of negotiations with the Council of the European Union.

[14] Over the last two years, some Members of Congress have raised broader concerns about Google's conduction markets other than search services in congressional hearings and in a report, is sued by the House Subcommittee on Antitrust, Commercial, AdministrativeLaw, Investigation of and Competition in DigitalMarkets. This explores some of these additional competition concerns that may not be addressed by theDOJ lawsuit.

[15] Contrary Jamison, M. (2013). Should Google be Regulated as a Public Utility? *Journal of Law, Economics & Policy*, 232 according to wich "Despite this evidence, proponents of regulation argue Google search is a monopoly,' or perhaps even a natural monopoly. These arguments are flawed. Fairsearch argues that other search engines cannot compete with Google because of Google's economies of scale"

[16] At that time, *Microsoft* required "purchasers of its operating system software to [also] license its browser software". The Department of Justice ("D.O.J.") investigated *Microsoft*'s conduct, and required the company to enter into a consent decree, which prohibited "Microsoft from conditioning a license for any of its products on acceptance of a license for any other product." 90 In October 1997, the D.O.J. charged Microsoft for violating this consent decree, in an attempt to control the nascent web browser market, and to directly harm Netscape.

[17] In particular the DOJ contends that Google has secured similar default status on Android devices through a series of interlocking agreements involving its Android operating system. These contracts include: "Pre-installation" agreements with device manufacturers, which condition the availability of highly demanded Google apps (e.g., the Google Play store) and application programming interfaces (APIs) on the pre-installation of Google Search; "RSAs with device manufacturers and wireless carriers that pre-install Google Search on their devices. The DOJ alleges that "in many cases," these RSAs also expressly prohibit manufacturers from pre-installing rival search engines; finally, "Anti-forking" agreements that prohibit device manufacturers who pre-install Google's highly demanded apps from selling Android devices that do not comply with Google's technical standards. The complaint alleges that these agreements have inhibited the development of new mobile operating systems that could challenge Google's version of Android and thereby create alternative search distribution channels. In this way, the Congressional Res earch Service (CRS) Paper: *The Google Antitrust Lawsuit: Inizial Observations*.

[18] In the authors view "Relying on its market position and the high barriers to entry, Google could thus adopt practices that would aim to marginalize or exclude its competitors in the paid search market, in particular by artificially putting up barriers to entry in the search engine or search-based ads market. These can be of contractual or technical nature".

[19] In this contest William Barr, a former Trump's attorney general, reportedly pushed for the justice department to file its suit against the company against the wishes of lawyers who wanted to take

more time on the case. In fact, according to him "Today, millions of Americans rely on the internet and online platforms for their daily lives. Competition in this industry is vitally important, which is why today's challenge against Google – the gatekeeper of the internet – for violating antitrust laws is a monumental case both for the Department of Justice and for the American people," said Barr.

[20] In addition, Sen. Mike Lee, R-Utah, brought up Google's policy that requires advertisers who wish to publish ads on YouTube to do so through Google's ad platform, which he called a "restriction" that could "exclude some competing demand-side platforms from the market".

[21] According to the European Commission (July 18, 2018), in https://ec.europa.eu/commis-sion/presscorner/detail/en/IP_18_4581 "Today, mobile internet makes up more than half of global internet traffic. It has changed the lives of millions of Europeans. Our case is about three types of restrictions that Google has imposed on Android device manufacturers and network operators to ensure that traffic on Android devices goes to the Google search engine. In this way, Google has used Android as a vehicle to cement the dominance of its search engine. These practices have denied rivals the chance to innovate and compete on the merits. They have denied European consumers the benefits of effective competition in the important mobile sphere. This is illegal under EU antitrust rules." Indeed, the first investigation had launched on November 10, 2010, after other companies complained that Google used an algorithm on their search engine that gave a lower ranking to other companies in search results. The investigation lasted five years. The Commission ruled that Google abused its dominant position and gained an unfair advantage by activating algorithms that, in search results, put its own products at the front of other firms that provide the same services as it had been unable to achieve its desired market rate with its application "Google Shopping".

[22] Broadly, the Competition Commission of India (CCI) is analyzing allegations that Google is practicing anti-competitive behavior by creating barriers for companies who use modified versions of Android for smart TVs. Whereas China has also been reported as planning an antitrust probe into Google to investigate if Google used its dominance of Android to suppress competition in the market.

[23] The antitrust probe was started in 2019 when an Italian digital advertising lobby group IAB filed a complaint, and the investigation follows the complaint. It's going to have to be completed by November 2021.

[24] Here the Italian Antitrust Authority measure: https://www.agcm.it/dotcmsdoc/allegati-news/A542_avvio%20istruttoria.pdf . Although from different engines servives it could be important to point out that the European General Court (judgment in Case T-612/17 Google and Alphabet v Commission (Google Shopping)) has recently dismissed almost in its entirety the action brought by Google and Alphabet against the decision by the European Commission (Commission) of June 27, 2017, which found that Google had abused its dominant market position by favoring its own comparison shopping service (CSS) on its general results pages while demoting the results from competing CSSs. In particular the Courl hold 'the promotion on Google's general results pages of one type of specialised result – its own – over the specialised results of competitors involves a certain form of abnormality' (para 176).

[25] In this contest, it could be important to reports some statistical data suggested by Telman, D. A. J., cit, 739: "Americans are becoming increasingly concerned that companies are following their online movements. In a 2005 study, 81% disagreed with the statement that "what companies know about me won't hurt me," and 79% agreed that "I am nervous about websites having information

about me. In 2009, researchers found that 66% of adult Americans do not want marketers to tailor advertisements. This number was even greater - between 73% and 86% - when survey takers were informed of three common ways that marketers gather data to tailor ads".

[26] According to the AGCOM tags is "*un codice inserito nelle pagine web che consente di misurare e categorizzare le visite alle varie pagine, individuando i visitatori*" (a code inserted in the web pages that allows to measure and categorize the visits to the various pages therefore identifying the visitors).

[27] The AGCOM assumes that: "*Grazie all'utilizzo delle informazioni di contesto in tempo reale che le DMP sono in grado di offrire, gli inserzionisti possono ottenere una più elevata profilazione delle audiencee dunque affinare le proprie strategie di indirizzamento del messaggio pubblicitario*" (Advertisers can achieve higher audience profiling and thus refine their advertising message targeting strategies, thanks to the use of context information in real time that DMPs are able to offer).

[28] Indeed, a further investigation looked at Google's dominance in the mobile operatingsystems market. Launched by the EU Commission on April 15, 2015, the investigation revealed that Google used its market position to ensure that hardware producers and GSM operators preinstalled Google Search Engine and Google Chrome on their phone devices, including contractual clauses to prevent producers from using different operating systems developed using the open-source *Android* operating system. On July 19, 2018, Google, was found liable for abuse of its dominant position in the mobile operating system market, and was fine the highest ever fine of € 4.3 billion.

[29] Patterson rightly points out "it is difficult for consumers to assess the quality of at least some of the search results they receive, which means that search engines need not provide the highest quality of search results to succeed. They cannot provide very poor results, of course, but the difficulty and cost to users of assessing search results means that there is some freedom to provide less than the very best quality, just as the cost (once higher) of price comparisons means that automobile dealers need not always sell at the very best price".

[30] See also the Italian cases law Cass. Civ. Sez. lav., 2 maggio 2000 n. 5467, *Corriere Giuridico*, 2000, VIII, 1029 ss., commented by Di Ciommo, F.

[31] Here the final report https://www.gov.uk/cma-cases/online-platforms-and-digital-advertising-market-study

[32] See on this point Cass. 20 giugno 2007 nr. 19366; Trib. Milano, 23 febbraio 2005 in *I Contratti* n. 10/2005, 853 ss. with analysis of Senigaglia, R., according to which "*il paradigma della determinabilità esige, in quest'ottica, che la prestazione, ovvero il comportamento che il debitore deve attuare nei confronti del creditore, venga circostanziata nel regolamento contrattuale in modo inequivocabile*" (from this point of view, the paradigm of determinability requires that the performance, or the behavior that the debtor must implement towards the creditor, is unambiguously detailed in the contractual regulation).

[33] In her analysis her obseved that "But it is not illegal to dominate a market. It is not illegal to dominate multiple, multi-national markets. It is not illegal to be a monopoly. But it is illegal to abuse that position at the cost of consumers or use anti-competition behavior towards other companies".

[34] The Author reports the following advice: (a) directly or indirectly impose unfair purchase or selling prices or other unfair trading conditions; (b) limit production, markets or technical development to the prejudice of consumers; (c) apply dissimilar conditions to equivalent transactions with other trading parties, thereby placing them at a competitive disadvantage; (d) make the conclusion of

contracts subject to acceptance by the other parties of supplementary obligations which, by their nature or according to commercial usage, have no connection with the subject of such contracts.

35 On the same vein see Lianos, I. & Motchenkova, E., cit., 452 that rigtly points out "The concept of "search neutrality" is quite general in scope, but it seems that it can be interpreted as requiring a search engine to ensure that it does not explicitly favor one website/ company over another, for reasons other than those linked to the quality score of the specific website and/or consumer preferences, and that the algorithms designed to discriminate on the basis of assigning value to the production of search results are set and applied transparently and objectively. Search neutrality should be compared to a process-oriented, rather than an outcome-oriented, norm, as it requires the dominant undertaking to establish the adequate procedures for keeping the process exempt from any bias".

36 In general, it appears important to point out that Google has acquired over 100 companies. Most prominent among them are the acquisitions of *Android* in 2005; *YouTube* in 2006; *Double Click* in 2007; *AdMob* in 2009; *Motorola Mobility* in 2011; and *Waze* in 2013.

Chapter 20
Bullying and Cyber-Bullying: A Dialogue Between Psychology, Sociology, and Law to Understand and to Counteract Youth Violence

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ABSTRACT

Bullying is defined as an oppression, psychological or physical, repeated and continued over time, perpetuated by a person—or a group—that is more powerful against another person perceived as weaker. Three characteristics define the phenomenon of bullying: voluntariness of the behavior, repetitiveness, and imbalance between the violent and the victim. Initial studies aimed at understanding the phenomenon and defining the dynamics and roles. It is now clear that not only the victim and the bully are involved but also all the people who participate as supporters or silent spectators. There has been a worrying increase in the cyberbullying phenomenon (i.e., forms of bullying, violence, offense, and exclusion) by IT tools. The understanding of cultural-psycho-socio dynamics and suitable forms of intervention require a multi-perspective that takes into account the psychological, sociological, institutional, and legal dimensions. It is from the integration of different perspectives and several prevention tools that adequate interventions can be devised.

INTRODUCTION

Bullying phenomena presents itself as a typical form of social behavior that needs great attention, a

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scourge among the adolescents of our society, even if some forms of bullying can also be found among children who attend preschools and primary schools.

The term "bullying" (and the more recent one of "cyber-bullying") today has often become a large container in which youthful aggression behaviors, interpersonal conflicts, situations of interpersonal problems of the developmental age, forms of violence and of both physical and psychological abuse that are found since primary schools and spread up to high school (Pennetta, 2019).

However, not everything really falls within the defining parameters of this phenomenon. The most accredited definition is that of Dan Olweus (1996, pp. 11-12), who defines bullying as an abuse of power: a student is the object of bullying - namely bullied or victimized - when repeatedly exposed to offensive actions carried out by one or more comrades.

Therefore, in order for a relationship between people to take this name some conditions must be met:

1. Direct or indirect abusive behaviors are implemented (physical attacks, gossip, slander, defamation). Both prevarications imply the intention to harm and the "lack of compassion", since there is no identification with the state of mind of the victim.
2. These actions are repeated over time. Although even a single serious episode can be considered a form of bullying, the acts are usually repeated over time and occur quite frequently. Furthermore, the act of bullying does not necessarily include an intrinsic intentional willful misconduct, it is not aimed exclusively at damaging the victim, a mortification, it could on the contrary be aimed at a form of "fun" or self-affirmation.
3. There is an imbalance of forces or an asymmetrical relationship (both physical and personality) between bully and victim. One prevails and the other suffers, without being able to defend himself, experiencing a strong sense of helplessness. The constant inequality of strength and power may be due to physical strength, age, personality and, in the event that bullying is perpetrated in a group, to the number of aggressors;
4. The same subjects are always involved: one / some always in a dominant position (bullies) and one / some weaker and unable to defend themselves (victims) (Ziliotto 2019).
5. With these clarifications, which reflect the changes in post-modern society, bullying becomes "the new code for organizing relationships and hierarchies within the herd, in the most degraded suburbs or in uptown neighborhoods" (Lombardo Pijola, 2007, p. 12). Yet, it is worthy to underline the substantial transversality of a phenomenon that now embraces different socio-cultural contexts, placing itself mainly in a group dimension (Tirocchi, 2008, pp. 48-49).

BACKGROUND: DYNAMICS OF THE CURRENT CULTURAL AND SOCIAL TRANSFORMATIONS

Young people have often represented the metaphor of the difficulties linked to change, with their provocative lifestyle that feeds on an extreme exaltation of difference rather than sharing with the values of previous generations (Hay et al,. 2010). They thus become an expression of the unease experienced by an entire society, unease due to the difficulty of adapting to value schemes that are called "normal" only because they are so labeled in the routines of everyday language.

The language of the younger generations is increasingly a network and less and less a system (Morcellini, 2008). It is made up of open spaces and infinite expressive possibilities that are light years away

from the "frozen" communication of adults. The phenomena of adolescent and juvenile deviance that find ever greater expression in the multiplication of news stories, forcefully pose a question: How well can we understand young people? How much are we really able to decipher their language and their real emotions?

The difficulty in finding an answer to these questions lies in the fact that behind every language, and every form of expression, "there are styles of cognitive representation, models of construction of the social project, which place us in front of a radical change in intersubjectivity, relationship between ego and alter, of identity paths and socialization" (Morcellini, 2008, p. 8).

The complexity of the situation is then evident; and it becomes even more so if one thinks of the crisis of the traditional family, the birth of new types of family formations, the hybridized and hyper-connected family or the family seen as a "pantry of affection and material support" (Martini, Palumbo & De Luca Picione, 2020; Lancini, 2020).

This first problem is then associated with the consideration that the fragility of today's young people can also be explained by the experimentation of constant delays in all those spheres of social action (think of the first job occupation, the marriage, the birth of a child) that previously were the fundamental moments of growth and the affirmation of status. In this scenario, the manifest signs of the body, language, aesthetics and clothing end up being not only signs of rebellion (typical of the period of social moratorium) but also an expression of a more complex difficulty in management and control of affects, relationships and emotions in general (see relational and sentimental consumerism) (Pietropolli-Charmet, 2000, 2001, 2018; Aime & Pietropolli-Charmet, 2014; Salvatore et al, 2021a, Salvatore el al, 2021b).

The family, the school, and the work are no longer 'able to talk about values' and this generates rejection for mediation: the advice of adults and everything that appears to be prescriptive are no longer credible (Recalcati, 2014; Aime & Pietropolli-Charmet, 2014; Maggiolini & Riva, 2003). Unlike counter-values, which are the product of a mediation between what adults propose and what young people expect, there is a problem of dis-value, which instead expresses the strong discomfort of a generation (that is not satisfied with expressing their difference but which wants to redesign a new model of socialization and relationality).

An exemplary point of looking at dis-values is certainly bullying, which from a sociological point of view falls within the broader phenomenon of deviance (and adolescent and juvenile deviance) (DeCamp et al. 2015).

Commonly, deviance refers to any act or behavior (even if only verbal) of a person or group that violates the norms of a community and consequently faces some form of sanction, disapproval, condemnation or discrimination. It appears evident then (as already very well expressed by Durkheim in 1893) that deviance is not a property of certain acts or behaviors but a quality that derives from the answers from the definitions and from the meanings attributed to them, by the members of a community. In others words, an act is defined deviant not by the very nature of the behavior, but by the response it arouses in the socio-cultural environment in which it takes place.

Such a definition recalls the concept of relativity of deviance, for which what is valid in certain historical epochs and in certain geographical areas is not necessarily valid in other epochs or in other places. In reality, violence, in its various forms and expressions, has always existed. What has changed over time has been the perception of the phenomenon based on the degree of acceptance of the same by the society in which it occurs. Today in Western society, the phenomenon of violence is widely considered unacceptable and condemned by the community, from a moral and cultural point of view, especially in reference to youth violence and violence against women.

Over the years, we have witnessed a drastic social change, especially on the part of younger people who, at the mercy of irresponsible behavior, without often understanding the consequences, lash out at the weakest, sometimes hiding acts of inexplicable collective violence behind behaviors defined as "joking ".

However, it is also true that contemporary society exalts individualism, tends to mistreat the rules of civic sense, and interprets failure as something to be ashamed of and not as something that is part of life. This changed cultural scenario has therefore highlighted new frailties: those of the so-called millennials, which are obviously different from those of baby boomers. We are in a different era with: A) a different system of capitalism (as Codeluppi explains to us today we are immersed in the era of biocapitalism - 2008). B) The transition from the society of producers to that of consumers. C) The awareness that the exploitation of natural resources is no longer sustainable. C) Above all, different models of protagonism (no longer the heroic one of the past) and social commitment.

SOME MORE PUNCTUAL DESCRIPTION OF THE BULLYING PHENOMENA

To understand bullying it is necessary to grasp its relational nature, since the phenomenon involves two or more individuals. It is therefore essential to focus not only on the behavior or temperament problems of the individual, but also and above all on the type of relationship that is created between bully and victim. It is therefore necessary not only to focus attention on "what the bully does" or its characteristics (i.e. "who the bully is"), but it is also important to grasp the relational dynamics existing between bully and victim.

In this regard, it is important to distinguish the "actors" who take part, in different ways, in episodes of bullying, which fall into three broad categories:

- The bullies,
- The victims,
- The spectators.

From the point of view of some typical and relational and contextual dynamics, we can say that the most common forms of bullying are:

- *digital bullying* (repeated harassment of the victim through the use of electronic tools);
- *bullying towards the most gifted classmates* (that is a form of ostracism and negative pressure on the part of the peer group towards those who are particularly gifted in school or in other contexts – sport, music, dance, art, etc.);
- *sexist bullying* (based on negative gender-related stereotypes);
- *bullying towards the scapegoat* (identification of a person who is believed to be the cause of an unfavorable situation or event);
- *-homophobic bullying* (persecution and harassment of subjects considered homosexual or in wider terms LGBTQ);
- *ethnic bullying* (aimed at people from countries of different ethnic groups and cultures - for the color of the skin, cultural traditions, religion, language, nationality etc ...)
- *bullying towards the disabled people* (aimed at people with disabilities, with physical or mental handicaps or with learning difficulties).

Since the early 1990s research (Olweus, 1993; Whitney & Smith, 1993), the role of age and gender have been highlighted in addition to the different modes of manifestation.

It seems that the males act mainly physical bullying, while the females the psychological type

(Björkqvist, 1994). In particular, with increasing age, the roles of the subjects involved seem to radicalize and become increasingly rigid, with difficulty in getting out of them in the subsequent years of adolescence and adult life (Parker & Asher, 1987). In relation to gender differences, it has been observed a greater involvement of males in the role of bullies at all age levels (Olweus, 1993; Whitney & Smith, 1993; Smith et al., 1999, Sutton et al, 1999).

We highlight that the *maladaptive paths* that concern the figures directly involved in the phenomenon of bullying are generally two. Their consequences have a longitudinal character over time (throughout adolescence until to stabilize with adulthood) and go far beyond the episodic nature of the phenomenon:

- *A first maladaptive path* concerns the bully and is characterized by aggression, poor self-control, conduct disorders in school age and deviant and antisocial behaviors in adolescence and adulthood.
- *A second risk path* concerns the victim and is characterized by anxiety, insecurity, social isolation, low self-esteem in school age and psychological symptoms such as depression, insecurity, low personal and professional satisfaction in adolescence and adulthood (Rubin, Le Mare & Lollis, 1990).

If we consider very recent data in reference to the Italian context (from "*Osservatorio Indifesa 2020*" on a sample of 6 thousand adolescents, between 13 and 23 years old, from all over Italy), we observe that 61% of young people claim to be victims of bullying or cyberbullying, while 68% of young people claim of having witnessed it.

Another significant fact is the concern expressed about bullying and cyberbullying: they are considered - after drugs and sexual violence - the most feared threats by adolescents.

With reference to new information and communication technologies, 6 out of 10 teenagers declare that they do not feel safe online. Adolescents express suffering from episodes of psychological violence suffered by peers (42.23%). In particular, 44.57% of girls report the strong discomfort felt by receiving unwelcome comments of a sexual nature online. Furthermore, 8.02% of girls admit to having committed bullying or cyberbullying. This percentage for boys is higher: 14.76%.

Finally, in a widely shared way for children and teenagers, there is the perception that among the major risks there is cyberbullying, the loss of one's privacy, the revenge porn, the risk of enticement by criminals, the stalking, and the online harassment.

MISRECOGNITION, MINIMIZATION AND DISTORTIONS OF THE CRITICALITIES OF BULLYING

Some of the most common preconceived ideas concern a certain tendency to minimize the problem. In fact, it is classified as a question between children, or a test to access the adult world, or the direct effect of socio-economic conditions limited to degraded peripheral urban areas (Caruso et al, 2019; Tintori et al, 2021). Following, we put in evidence a list of the major commonplaces about bullying behaviors:

- *Bullying is just "a little girl" matter, a game between children, and it is better for adults do not to intrude.* On the contrary, bullying is anything but a game, although bullies often hide their responsibilities behind this justification to avoid punishment.
- *Bullying is part of growth path; it is a normal phase that serves to "strengthen" the personality*. In reality, bullying is not a phenomenon physiologically connected to growth and does not serve at all to reinforce, but it creates discomfort and suffering both in those who suffer it and in those who practice it.
- *Those who are bullied should learn to defend themselves*. We highlight that the victim is unable to defend himself and the constant bullying certainly does not help her to learn how to do it, but it increases her sense of helplessness.
- *The external characteristics of the victim play a fundamental role.* Here there seems to be a sort of blaming of the victim himself: it is the victim's fault for her characteristics if the bully persecutes her. It is commonly thought that physical appearance and some external details such as being overweight, having red hair, wearing glasses, having a speech impediment have a decisive influence in the "designation of the victim". It is worthy to specify that many children have these characteristics without being bullied. Rather, bullies often bring such elements as "justification" for their actions.
- *Bullying is a typical phenomenon of the poorest and most degraded areas; it is more widespread in large cities, in schools and in larger classes.* These beliefs are not reflected in reality. Bullying is in fact equally widespread in the more affluent areas from a socio-economic point of view, as well as in schools and smaller classes.
- *Bullying comes from competing for good grades in school.* The bully is sometimes believed to act aggressively as a result of frustrations from repeated school failures. This opinion has no basis, not least because both bullies and victims get lower than average grades at school.
- *The bully has low self-esteem and, beyond appearances, is anxious and insecure*. The bully is a person with a strong need to dominate others and is generally unable to feel empathy. He generally does not suffer from insecurity or anxiety, and his self-esteem is normal or even higher.

PSYCHO-SOCIAL ROLES ON THE SOCIAL THEATRE OF BULLYING: THE BULLY, THE VICTIM AND THE BYSTANDERS

The Bully

The bully is a member of the peer group, most often a classmate or older than the victim's age. The bully is generally stronger than the victim. The psychological and behavioral dimension of the bully identifies a positive approach to violence, which is considered a resource for social status as well as being useful for bullying others (Olweus, 1996). The profile of the bully outlines a person who presents problems on a relational level, characterized by an experience in which there is a malevolent aggression, and feelings of envy and desire for revenge (Fratini & Mariani, 2016).

In interactions with peers, bullies can show psychological and social adaptation difficulties, particularly during adolescence: school problems, school dropout, risky behaviors such as the use of drugs, incidence of depressive symptoms, paranoids attitudes and suicidal thoughts. The characteristic factor that distinguishes the bully is the extended desire to dominate; those who commit bullying are motivated

by obtaining a certain level of power. Power can take two different forms of manifestation: explicit power and implicit power. The former is manifested openly by the abusers, through the use of force and oppression. Implicit power refers to other elements such as high sporting or scholastic skills, being trendy, factors that convey a certain social popularity in the peer group.

The Victim

The victim is the bully's target, the person who repeatedly suffers abuses within a group context. The victim status does not present a gender difference. The victim's profile is generally that of a person who does not possess excessive physical weakness. The psychological, mental and behavioral characteristics generally constitute the risk factor, which triggers the bully's interest in identifying these people as a target. People who are victims of abuse reveal a submissive, insecure behavior and show moods of shyness, loneliness, low self-esteem.

There are different victim figures: the passive one and the provocative one. The former, which constitutes the majority of victims of bullying, is characterized by low levels of assertiveness, high shyness and elements that lead to passive behavior, not very contentious and tending to social isolation. The passivity factor incites the bully to perpetuate aggressive attacks against it. The latter category relates to the profile of the provocative victim, because she carries out acts that involuntarily provoke the carrying out of bullying actions towards them. The provocative victim is distinguished by the adoptions of both anxious and aggressive behaviors, with aptitudes of irascibility and hyperactivity (Russo & Foschino, 2019; Caravita & Gini, 2010).

In general, the victim struggles to defend himself, she feels continuously exposed to danger, crushed by helplessness and anger for the violence suffered, alongside a dramatic experience of exclusion and persecutory anguish. The deep traumatic wounds suffered appear hard to heal. Due to the state of alarm in which she is forced to live, she does not find the courage to report out of fear or shame, aspects that are superimposed on a pre-existing experience of precariousness, exclusion and devaluation, with the result of being harnessed in a *vicious circle* from which it is difficult to get out. The victim manifests signs of discomfort through forms of social withdrawal, refusal to go to school, depressive symptoms, self-harm, persistent physical ailments such as stomach pain and headache, intense mood swings and sleep disorders (Bernetti, 2015, psicobiettivo).

It is worthy to highlight that the experience of inadequacy is often shared by victims and aggressors. It is the one's own sense of fragility that triggers aggressive behaviors. The bully fears her own weakness and tries to exorcise it through the violence she relentlessly pours on an already fragile victim. While the victim experiences her own fragility more passively, that she identifies as the cause and confirmation of the attacks suffered, the aggressor uses prevarication as a defensive method from the recognition of her own fragility (Bernetti, 2015).

The Bystanders and the Spectators of the Aggression

The bully is surrounded by the spectators defined as gregarious and bystanders. They are figures who witness bullying conducts. The bystander can assume the role of assistant-help and reinforcement-supporter of the abuser. The former collaborates with the bully in carrying out the prevaricating actions, while the latter supports the bully in order to reinforce his actions (Genta, Brighi & Guarini, 2013). Supporters of the bully take actions through which they show approval and complacency towards the

bully's prevaricating behavior towards his target. The actions of supporters include inciting, supporting, laughing in order to reinforce and perpetuate the prevaricating acts.

Spectators can also play a passive function, in this case indifferent bystanders view bullying acts recognizing them as such without intervening. The indifference of the spectators reinforces and justifies the aggressive behavior assumed by the bully. Indifferent bystanders assume an attitude of passivity and reluctance to intervene to counter the attacks aimed at the target of the bully for different reasons such as fear of becoming the next victim, the belief that each person must know how to defend himself alone (Buccoliero, 2007).

Anyway, the spectator can be a very important deterrent against bullying episodes and against their systematic repetition. In fact, he can be the maker of strategies that block bullying. The spectator can take place both with *active strategies*: requesting the help of an adult; openly and verbally expressing disapproval of abusive behavior (e.g. explicitly telling the bully to stop); trying to help the victim to escape from the situation; urging classmates not to support such behaviors or episodes. The spectator can also adopt *passive strategies*, but still very useful for deterrence purposes: refusing to take part in the situation; expressing non-verbal refusal to take part in bullying; opening and introducing her own peer-group to the victim. In these terms, it is possible to detect another specific classical profile of the bullying dramatization: the *defenders of the victim.* Defenders of the victim constitute a further profile that expands the scenario of the bullying phenomenon. Defenders are those who show disapproval of the bully's prevaricating actions and engage in pro-social behavior in terms of defending and supporting the victim. They reveal good understanding of social episodes; they show a high empathic awareness, a high level of self-confidence in the implementation of positive and pro-social behaviors and the resulting consequences. Those who stand up for bullied people are generally girls. Defenders of the victim show that they are well integrated into the social group and have a strong social esteem within the group. The social empathy factor attributed to this profile leads to attitudes of criticism towards the behavior of the bully, and of protection towards the victimized persons (Bernetti, 2015).

BULLYING IN THE AGE OF TECHNOLOGICAL PROGRESS IN INFORMATION AND COMMUNICATION TECHNOLOGY

Cyberbullying, also known as *'online bullying'*, is a phenomenon that falls within the category of bullying, from which it differs in the use of ICT means, but the extent of its effects and consequences makes it a species of the genus that is far more dangerous for the victims. It is a form of virtual bullying which has been made possible by the evolution of new digital technologies, including new forms of online communication through text messages, e-mail, social networks, chats and instant messaging services, such as Skype, Google Talk, Yahoo, Messenger, etc.

Cyberbullying is often defined as an extension of the traditional bullying phenomenon, although it is characterised by the peculiar presence of a virtual social environment within which social interactions typical of the peer group are developed. Cyberbullying unlike bullying extends across a wide network of people, both known and unknown to each other within the same social space, with unlimited barriers of time and space (Brighi et al., 2012).

The promotion of online communication with the resulting emergence of virtual ties between real people has opened a debate in the scientific world and in segments of public opinion concerning the emptying of the real character of socialisation. The use of new technologies has led to questions being

asked about the possible impoverishment of the live links that psychology and ethology define as face-to-face relations. The reactions that have followed the disproportionate use of new technologies in relational systems are varied, being the main ones the concern about the establishment of superficial relationships with unknown people; the consensus on the social pressure that the Internet can generate on personal identity. The Internet embodies for young people a source of contents on sensitive issues related to human development such as sexuality, and in addition leads to the creation of deep and meaningful bonds. However, the extensive use of the Internet among adolescents generates different reactions because the variety of its consequences calls into question both the fascination of virtual communication and its opportunities and risks (Valkenburg & Peter, 2011).

Within this scenario of transformation of identity and relational systems, the phenomenon of cyberbullying has become widespread. This is due to the numerous advantages that the network offers to the cyberbully, including anonymity and un-traceability, which can make the offender more aggressive and bolder in committing offences. The bully, in fact, acts in total safety, usually in the tranquillity of his/her own room, without emotional involvement, since s/he does not see the reaction or the suffering of the victim. The lack of empathy amplifies the seriousness of the actions committed. The effects on the victim from the use of new media have a significant resonance and reach; the dissemination of material via the internet is uncontrollable as the web disregards traditional space and time barriers (Canale, 2017); this makes cyberbullying particularly insidious and dangerous. The term 'Cyberbullying' was coined in 2002 by Canadian teacher Bill Belsey; later, in the work *Cyberbullying: its nature and impact in secondary school pupils*, jurists and psychologists defined cyberbullying as a repetitive and long-lasting aggressive individual or group act, carried out with the help of electronic means against a victim perceived as weaker (Smith et al., 2008). In other words, for there to be cyber-bullying, the victim must suffer non-episodic and intentional damage through the various means made available by the network. Only recently in Italian legal system, following law no. 71 of 29 may 2017, a technical-juridical definition of 'cyberbullying' has been provided; the second paragraph of article 1 reads:

For the purposes of this law, 'cyberbullying' means any form of pressure, aggression, harassment, blackmail, insult, denigration, defamation, identity theft, alteration, unlawful acquisition, manipulation, unlawful processing of personal data against minors, carried out by electronic means, as well as the dissemination of online content also involving one or more members of the child's family whose intentional and predominant purpose is to isolate a child or a group of children by means of serious abuse, a damaging attack, or their ridicule.

English-speaking jurists usually distinguish between *cyberbullying* — a form of aggression between minors — and *cyberharassment*, which occurs between adults or between an adult and a minor; however, in everyday life the term cyberbullying is used without making any distinction between the two types. Like bullying, cyberbullying also takes on different names depending on the means used or the ways in which it is carried out; the eight types identified by Nancy Willard (2007), Director of the American centre EWA - Education Writers Association, for the safe and responsible use of the Internet, can easily be traced back to the following types of crime: harassment, defamation, persecution, identity theft and person substitution. It is therefore necessary to briefly mention these categories and their specific features (Cassano, 2017):

- *Flaming*: consists of vulgar, violent, offensive and provocative online messages containing insults aimed at provoking verbal battles on social networks or forums. Flaming is very common among teenagers, especially males, in the context of interactive video games where beginners are often targeted with insults and threats and become the subject of aggressive discussions due to trivial mistakes dictated by inexperience.
- *Harassment*: Harassment: the repeated sending of messages with offensive content by e-mail, SMS, MMS, telephone calls, sometimes even silent ones, aimed at hurting a specific person with the strong risk of causing him or her emotional and psychological distress. Sometimes the victim may respond to the offensive messages with equally aggressive communications, with the sole intention of stopping the harassing behaviour.
- *Cyberstalking*: this refers to threats, harassment, violence and denigration repeated over time with the aim of instilling fear in the victim for their physical safety or that of their loved ones. Cyberstalking can easily be found in the context of highly confrontational relationships between peers or in the case of breakups.
- *Denigration:* insulting or defaming someone online with gossip, lies, rumours and cruel, hurtful, and disparaging comments via e-mail, text messages, instant messaging, in order to gratuitously and maliciously damage the person's reputation or their friendships. Cyberbullies may even send or publish altered images of the victim on the Internet, for example by changing their face or body, or by making them the protagonist of sexually explicit scenes, through the use of photomontages with the sole aim of ridiculing them.
- *Impersonation* or *identity theft*: by hacking into someone's account or creating a new one belonging to the victim, the attacker replaces the victim and starts sending messages or publishing deplorable content in order to damage the victim's image and reputation.
- *Exclusion*: in order to assert his leadership, the cyberbully decides to intentionally exclude a user from a group set up on a social network (e.g., group of friends, chat rooms, interactive games, computer forums) with the aim of causing him to feel marginalised.
- *Outing:* (public confession of a fact or personal experience): the cyberbully first tries to trick the victim into trusting him by taking intimate details or pictures, and then later decides to spread them on the network, thus violating the confidentiality of the details. In other cases, the cyberbully may trick his 'friend' into sharing embarrassing secrets or information about himself or another person online with him and then disseminate them to other users, or threaten to do so if he does not comply with his (sometimes sexual) requests.
- *Sexting* (a combination of the words *'sex'* and '*texting* ', namely 'sending electronic messages'): the sending of sexually oriented messages, texts, photos and videos via smartphones and the Internet.
- *Doxing* (contraction of the words 'dropping dox'): public dissemination of the victim's personal and private information or other sensitive data via the Internet, thus committing an act detrimental to privacy.

It is worth mentioning here that cyberbullying, can integrate a violation of the rules of private law, the Criminal Code, the Privacy Code (Legislative Decree 196/2003 as amended by Legislative Decree 101/2018) and the fundamental principles of the Italian Constitution.

CHARACTERISTICS AND SPECIFICITIES OF THE NEW FORMS OF ONLINE COMMUNICATION

Communication on the web is distinguished by three factors: *accessibility, anonymity and asynchrony*. Teenagers consider the web as the main source of information for the exploration of their identity, their development and their sexuality. Finding information has become accessible, easy and above all fast. In this way, young people can choose their interlocutors and people similar to them with whom to share ideas.

The *easy accessibility* through social networks allows them to interact with people who could hardly meet in their life. The speed with whom information is found from adolescents is the same speed with whom they disclose personal information about their identity to a large audience. However, the high accessibility can lead to the formation of inappropriate bonds and interaction with unknown adults, generating the risk of soliciting minors (Valkenburg & Peter, 2011).

Anonymity is the second factor that characterizes online communication, and describes the situation in which the communication during a conversation is not attributable to a specific individual. Note that a condition of anonymity on the web can determine both positive and negative consequences on adolescents, such as the reduction of inhibition towards the interlocutor being unknown, the acquisition of greater self-confidence, and the decrease in shyness relating to one's physical appearance due to the presence of acne on the face or the redness when addressing strangers. On the contrary, anonymity on the web could relate to the emergence of impulsive reactions from young users, aggressive attitudes through offensive comments towards the interlocutor as in the case of cyberbullying (Valkenburg & Peter, 2011).

Asynchrony is the third element that describes online communication and concerns the non-simultaneity of interactions between people. Online conversations, especially instant messaging, cannot occur simultaneously between the interlocutors, guaranteeing a high level of modifiability compared to live interactions, since people can change the contents of their conversations before sharing them with the people they are addressing in the web. Online communication taking place on a temporally deferred basis favors shy teenagers, those who consider themselves unattractive and those who prefer to remain silent in face-to-face interactions. The possibility to modify, and to think about sharing information can allow young people to carefully measure the type of information to be disclosed but at the same time it can lead them to disseminate personal and intimate information (Valkenburg & Peter, 2011).

These characteristics have given rise to a debate between critical and favorable positions. Firstly, online communication can positively impact the personal idea that young people have of themselves, in reference to self-esteem and acceptance by others, as important elements that contribute to the psycho-emotional development of the human person. Online interactions allow adolescents to control the content to be shared with their interlocutors, managing to offer the latter the best presentation of themselves. A direct correlation has been identified between online communication and self-esteem in the use of the internet among adolescents. In particular, young people involved in blogging and social networking activities have a high self-esteem given by the sense of mastery and mastery applied in managing these online activities (Valkenburg & Peter, 2011).

Secondly, the insuperability of the physical barriers can be overcome by the internet. That has restructured the social system in a certain way. The fear of social atomization together with the individualism of individuals connected to other individuals physically distant, has been replaced by the awareness of a restructured social system composed of complexity of strong social relationships such as family and friend networks, and the coexistence of weak social relationships embodied by network ties.

THE PROFILE OF THE CYBER-BULLY: BETWEEN CONTINUITY WITH THE PAST AND NEW CHARACTERISTICS

The diffusion of ITC has therefore create a fertile ground to transform the forms of bullying. Some general features of the cyber-bully can be highlighted. The profile of the cyberbully shows not significant differences in terms of gender, although a greater involvement of young men in the role of cyberbullies (Baldry & Sorrentino, 2013). The reasons that motivate girls to cover the role of cyberbullies are: achieving high popularity, avoiding the risk of social exclusion, fighting boredom, entering a new social group and revenge. Researchers (Agatston et al., 2012) have indicated four roles that the cyberbully assumes on the web: *avenging angel*, *power-hungry cyberbully*, *involuntary reactive cyberbully*, and *aggressive cyberbully out of boredom*.

The role of avenging angel is assumed on the net by the one who has planned a revenge following an attack suffered personally or suffered by people close to her. It is possible that this cyberbully was in turn the victim of offline bullying as in the school environment and believes that members of this context such as teachers, classmates, parents do not support him. The victim becomes an online aggressor to avenge the injustices suffered in offline life. The anger directed at those who go unpunished, such as adults and teachers, motivates the aggressive conduct assumed on the net by the avenging angel (Kowalski & Limber, 2007).

The power-hungry cyberbully is the role of the young person who aims to obtain extended power in order to exercise power over others and reinforce her own self-confidence. She commands and victimizes others on the net to compensate for her inability to control herself in real life. This type of bully tends to surround herself with people who sympathize with her, seeking their complacency in order to gain approval to reinforce her actions.

The reactive involuntary cyberbully describes the young man/woman who commits condemnable and inadmissible actions such as stealing the virtual identity of a partner, but who is not aware of the gravity of her actions.

Another role is represented by the aggressive cyberbully for boredom. The person who performs aggressive acts for fun in order to counteract boredom. Often the justification for the assumption of an aggressive attitude by these children is leisure (Kowalski & Limber, 2007).

A relevant fact - concerning gender differences in the role of cyberbullies - concerns the greater involvement of girls in cyberbullying compared to the acts of traditional bullying, the explanation for this lies in the possibility of anonymity, a condition allowed by cyberbullying. The anonymity of the aggressor guarantees the implementation of more sophisticated forms of aggression that reduce the danger of vengeful actions by the victims. The non-visibility of the cyberbully is a factor that could define new forms of power relations among young people (Caravita & Gini, 2010).

EFFECTS OF BULLYING ON BOTH PSYCHO-PHYSICAL HEALTH AND RELATIONAL SYSTEMS

Exposure to violence has a serious impact on children and adolescents, with effects on their mental health, their academic successes and in general on the processes of socialization and adaptation (De Luca Picione, 2020; Esposito et al, 2016; De Luca Picione & Freda, 2016a, 2016b; Martino et al. 2019).

The experience of bullying impacts on the perception of safety and learning ability of the young people (De Luca Picione et al, 2018, 2019, 2020).

The consequences for victims of bullying can be classified as *short-term* and *long-term* consequences. The former relates to: moods of aversion and hatred towards the school environment; worsening of school performance; appearance of psychosomatic symptoms such as headaches, stomach pains, nightmares, fainting; manifestation of depressive and anxious symptoms resulting from the reiteration of abuse. While the long-term consequences refer to the structuring of depressive disorders and the onset of suicidal thoughts and the implementation of extreme behaviors (Caravita et al., 2014).

The lives of people targeted by the aggressive and violent behaviors of bullying are damaged in several aspects. In terms of the emotional impact, young people who are victims of aggressive acts constantly experience emotions of fear, terror, discomfort, caused by the repeated humiliations to which they are subjected and emotional states such as depression (diagnosed in most young victims of bullying), anxiety and feelings of loneliness.

The effects of bullying are the greatest source of concern for the young people involved. Those affected by abuse suffer consequences of devastating nature; loss of self-confidence, aversion to school, emotional and physical suffering (Maliki et al., 2009). Recently, attention has been paid to the long-term ailments caused by bullying in school age. The consequences of the harassment inflicted can extend beyond childhood and adolescence. The impact of bullying on young victims can persist even when the abuse is over (Arseneault, 2017).

During adulthood, problems of various kinds may arise for those who have been bullied, such as difficulties in establishing serene sentimental and interpersonal bonds. Furthermore, bullying exposes those who suffer it to an extensive increase in their sense of vulnerability that could lead to post-traumatic stress disorders in adult life.

The repercussions in young people connected to the school dimension are significant. The target students of the aggressive behaviors of bullying skip school for fear of being bullied, they prefer not to talk and think about school and school activities. Moreover, the young victims develop emotions of unhappiness, loneliness that produce a negative attitude towards school. Furthermore, internalization problems are often present; they relate to the emergence of social phobias, anxiety disorders, depressive moods (Maliki, Asagwara & Ibu, 2009).

A serious and widespread problem among young people targeted by the violence of bullying is the development of suicidal thoughts, especially in the context of cyberbullying in which the aggressive and persecutory behaviors can induce the young victims to death. In these situations, online life and offline life are intertwined through a complex web of relationships that can become risky for young people who are facing the growth phase.

BEYOND THE INDIVIDUALISTIC FOCUS: A SOCIOLOGICAL AND ANTHROPOLOGICAL REFLECTION

Beyond the typical characteristics of the personality of each category, it is important to reserve a space for reflection on group issues because, in the absence of an actively confirming or tacitly consenting public, the bully does not it could exercise its role and its power. The figure of the bully exists as immersed in a group context, made up of a set of consenting children, followers and spectators (Ziliotto, 2019, p. 17).

It is important to consider that with reference to bullying the term "*herd*" is often used. While in anthropology or sociology it can have multiple declensions, when it comes to the bullying the etymology is clear and unambiguous: it is used in a negative or derogatory sense, and is intended to delineate a group of children or young people who unite and behave inadequate, harmful to things and people.

It is evident that a large part of everyone's life takes place in group contexts, starting from the small nucleus of the family, passing through the class group, the group of friends, the work team. All these contexts have had and continue to have a decisive influence on the social and psychic life of each one: being part of a group is something positive that favors the development of personal and social identity. In a healthy context, isolating oneself and marginalizing oneself from social life is more negative than being part of a group[1] (the tendency to isolate oneself hides a precarious psychological state, as may be the case of the victim).

It is evident that in many cases it would be impossible to fill certain roles without the presence of a group (a scapegoat without the collusion of a group, a terrorist without a group to which he belongs, a bully without a youth gang, a mafioso without a "family" exactly like a bomber, a scorer, without a football team) (Ziliotto, 2019). When we talk about a group, however, we automatically think of adolescence: belonging to a group of peers is so inherent in adolescence that the definition "peer group" has now entered, in common parlance, almost exclusively in reference to this age group.

In the adolescent period, when children affectively divest parental figures, it is precisely the group of peers that is the natural container of their growth needs. As explained by Ziliotto (2019, pp. 20-22), the group of peers generally develops in two different and consequent ways in chronological order:

- The former, called the "gang". A group of adolescents, mainly of the same sex, allows children to experience an identity and horizontal relationships, different from those experienced in the family. It is here that the adolescent experiences her first "initiations" and transgressions, supported by the group through the socialization of guilt (the fault lies with everyone, that is, with no one).
- The latter is the evolution of the first. Males and females begin to get to know and frequent each other, favoring the adolescent in addition to relational competence, the construction of his / her definitive identity, both gender and social.

The peer group can therefore constitute for the adolescent a moment of experimentation, of a social moratorium that accompanies the growth. But it can happen, however, that a group can become "negative", when all the disillusions, the adaptive difficulties and the narcissistic tendencies condense into deviant and aggressive behavior; when it begins to close, to exclude, when it requires strict rules to become part of it (think also of situations of self and hetero racism). The danger reaches its maximum when the group is governed by an extremely charismatic leader, with the ability to exercise power, control and influence, plagiarism, up to the point of changing the shared perception of reality.

While it is quite clear that the bully "needs" a group to which he belongs to be recognized, it is less intuitive that in some cases a group "needs" a bully. It could be the fact of being unable to oppose the leader, or the need for submission to the charismatic figure, the sharing of ideas, the lack of a solid educational base and solid parenting points of reference, or psychological distress. In many cases, then, the group as a whole could allow one of its members, who are not leaders, but who are particularly suited, due to their personal characteristics, to become a spokesperson, a catalyst for collective needs and hardships. In this perspective, the bullies would no longer be contagious outbreaks or instigators of

nefarious effects on the group and the victim, but they reveal a latent discomfort, danger signals, that is, they would be particular expressive modes of the group (Ziliotto, 2019, p. 18).

The danger and aggression expressed by the group inevitably recalls the work that Cohen carried out in 1955 on the young gangs that populated the so-called underworld neighborhoods of large urban centers (which helped to make explicit the concept of subculture). He provides a snapshot of the delinquent subculture - both socially and culturally content - highlighting its being gratuitous, malicious and destructive (Cohen, 1955, p. 19). The gratuity is expressed by the implementation of actions without rational reasons; malice is shown with actions that are substantially animated by the subtle pleasure of transgression and provocation; finally, the destructiveness is due to the fact that the deviant takes cultural norms and overturns them: the conduct becomes delinquent just because it is considered unjust by the surrounding environment. These three characteristics, then, are supported, always or almost always, by intentional proactive aggression (one does not defend oneself from an attack, but one intentionally offends the other) and an orientation to immediate hedonism that does not set itself goals and long-term projects.

What has been said up to now demonstrates that bullying is never only an individual act but rather demonstrates how it should be read as a complex phenomenon of a social nature.

For this reason, any intervention against the phenomenon should consider this complexity to affect change, at various levels. In short, it is not enough to punish the bully and support the victim to eliminate vulgarity, but to intervene on a more complex system, where bullying is essentially the result of the interaction of multiple psycho-social factors.

Anyway, the complexity of the phenomenon is also due to its recent amplification, favored by the spread of ICT: first from television and later from social networks. With the advent of electronic media, the relationship between *digitization*, *mediatization* and *vitrification* of reality and the new forms of juvenile deviance has been highlighted, especially with the now infamous phenomenon of *cyberbullying*.

Cyberbullying consists in sending offensive messages, insults or humiliating photos via text messages, e-mails, spread in chat rooms or on social networks, in order to harass a person for a shorter or longer period. One aspect that differentiates traditional bullying from cyberbullying is that the latter is typical of the "always on" generation, dealing with communicative behaviors that are beyond the control of adults (Tirocchi, 2008).

Add to this the indirect nature of the bullying implemented online. As we have seen, there is no face-to-face contact between victim and aggressor when the outrages are committed. Considering the characteristics of virtual communication, in order to define an act of electronic bullying, persistence over time plays a less important role. Even a single offense disclosed to many people through the Internet or cell phones can cause harm to the victim, being able to reach a wide audience of people at the same time and be bounced from one to another hypothetically in an unlimited way, greatly expanding the severity and nature of the attack. Often, then, precisely because technology creates a buffer effect between victim and bully, the attacker might think that her actions are not dangerous.

All this would explain the criticisms leveled at the media in their relationship with adolescents. Sartori speakes, with reference to television, of the *video-child*, crushed on the audiovisual dimension and insensitive to the stimuli of reading (Sartori, 2014). Ferrarotti, with lighter tones, defined television as a formidable pedagogical iron (2005) that speaks day and night to the whole population regardless of age groups. Similar positions, then, were also taken in comparisons of video games and the virtual world in general. Even, the authors of the massacres at Colombine High School seem to be, in the reflections of Montgomery (Montgomery et al, 2006), precisely the children of that violent subculture that inhabits digital media.

According these views, the digital media favor a continuous process of making everyday life (and deviance) spectacular, causing a weakening of socialization and a transformation of forms of social visibility, creating a society, at least in appearance, transparent (Vattimo, 1992). Vanni Codeluppi defines *social vitrification* (2007), to indicate a general exteriorization of existence in which the concept of showcase extends to all aspects of social life (Tirocchi, 2008, pp. 77-78). In addition to the family and the school, the responsibility also falls on the media, proposing "negative" value models based on appearances, on emotional illiteracy, on the erosion of family authority and generating those conflicts of socialization. They aggravate the youth discomfort which is increasingly based on an excessively uncontrolled emotionality, which leaves no room for reflection, which neutralizes the difference between interiority and exteriority, which makes public what should be private (Galimberti, 2002).

The social, as well as psychological, relevance of bullying and cyberbullying is evident and the expansion of the phenomenon has prompted the legislator to intervene with specific actions (see next paragraph for a deepening of Italian case).

However, it is necessary to overcome the prospect of a plan of exclusively repressive strategies and interventions. Already the classic intervention program designed by Olweus in 1996, provided for an action program that had to move simultaneously on three trajectories: school, class, individual / family, with the aim of promoting awareness, the courage to denounce, knowledge and sharing a common communicative habitus.

Making use of communication in a preventive perspective means to insist on Media Education (Rivoltella, 2019; Morcellini 2004), with the intention of respond to the need to put the media back at the center, not as a problem to be solved but as an object of critical reflection and an opportunity for knowledge.

Experimenting with the programmatic lines of Media Education in schools, universities and families means promoting permanent training that knows how to exploit the language of the media, and how to stimulate reflection on the lawfulness and quality of media products in full compliance with the needs and skills learning of the juvenile target.

There is still a long way to go, as it is evident. The outcome will depend on the ability to support the educational responsibility of the school, which is not only a context of learning and socialization but a primary place for detecting and observing the phenomenon. The school needs to know how to help young people to avoid the risk that bulimia technology turns into existential bulimia (Serra, 2006). Certain cultural or media consumption behaviors can be correlated with deviant behaviors, the multiplication of desires and possibilities results in in a progressive impossibility of referring to values, rights and limits.

Nevertheless, it will also depend on how much dignity can be restored to family relationships (Donati, 2020). The family is not only a place of care. It is also a space to generate relational goods (responsible motherhood and fatherhood) and to educate in pro-social virtues (and not only individual), which are reflected in acting with justice and generosity towards others, accepting finitism and fragility as part of the nature of man, to face discomfort not simply by bypassing it but by training to stay inside.

THE PROTECTION AND INTERVENTION MEASURES IN THE ITALIAN REGULATORY CONTEXT: THE ANALYSIS OF *LAW NO. 71/2017*.

The seriousness and diffusion of illicit and harmful acts of the person linked to the phenomenon of cyberbullying, have given rise to a special regulatory intervention with which it has sought to introduce measures to prevent and combat bullying conduct carried out on the web.

Law No. 71/2017 (*Provisions for the protection of minors for the prevention and contrast of cyber-bullying*) certainly starts before the parliamentary process that led to its approval. In 2013, in fact, the episode involving an underage girl from Novara, who was portrayed on video, drunk, while some of her peers simulated sexual intercourse on her, had a strong resonance. It was an act that highlighted an evolving problem in the midst of a technological rise, namely the misuse of the web and innovative communication tools (Alovisio et al., 2017).

Referring to the aforementioned notion of cyberbullying adopted by the legislator with Law 71/2017, it can be observed that it was constructed partly by resorting to technical terms of criminal law and partly by adopting expressions which, although belonging to the common language, appear however to be preferable to some precise cases of crime (Bertolino, 2018). In fact, art. 1(1) of the Law defines cyberbullying as

any form of pressure, aggression, harassment, blackmail, insult, denigration, defamation, identity theft, alteration, unlawful acquisition, manipulation, unlawful processing of personal data to the detriment of minors, carried out electronically, as well as the dissemination of online content also targeting one or more members of the minor's family whose intentional and predominant purpose is to isolate a minor or a group of minors by carrying out a serious abuse, a harmful attack, or putting them in danger.

Despite the extreme variety that characterises the phenomenon, several hypotheses of crime could be configured. As already mentioned, criminal law protection is flanked by civil law compensation.

Nevertheless, the law in question has preferred to avoid recourse to criminal law instruments (although this was suggested during the first discussion of the text in the Chamber of Deputies), favouring instead an approach more oriented towards prevention and awareness-raising, particularly within the school environment. The law in question introduces a specific form of protection aimed at protecting the dignity of the child.

Article 2, in fact, provides for the possibility for each child over the age of fourteen who has been the victim of cyberbullying, as well as for their parents and other persons exercising responsibility for the child, to apply to the owner of the online data processing or to the manager of a website or social media in order to get *"the blackout, removal or blocking of any other personal data of a child spread on the internet"*. The request for obscuration must contain a precise indication of the URL address from which the harmful content can be found, and may also be made in the event that it is not possible to identify the offence of unlawful processing of data provided for by Article 167 of Legislative Decree no. 196/2003 or another case of criminal relevance. In this case, the timeframe is very short: the addressee of the report must take action by communicating within twenty-four hours that the request has been taken into account and proceeding within forty-eight hours with the obscuration, removal or blocking requested. In the event of inertia on the part of the data subject or inability to identify the data controller or the operator of the website or social media site, the data subjects may apply directly to the Data Protection Supervi-

sor, an administrative authority, which, within the next forty-eight hours, will either request the website operator to adopt measures or directly order the blocking of the data subject of the report or complaint.

The following articles are preventive in nature, starting with the establishment of a *technical committee for the prevention and combating of cyberbullying* at the Presidency of the Council of Ministers. The aim is to draw up an integrated action plan and set up a data collection and monitoring system.

The Ministry of Education has the task of adopting guidelines for preventing and combating cyberbullying in schools, as already provided for in 2015.

To this end, at each school a teacher will be appointed as the contact person and coordinator of all initiatives to prevent and combat cyberbullying; initiatives that should take the form of education courses on legality and the conscious and respectful use of the Internet and new technologies, in synergy with other bodies operating in the area.

The framework of the measures concerning schools is completed by the provision that if the school headmaster becomes aware of acts of cyberbullying, he has the duty to inform the families of the minors involved, also adopting disciplinary measures against students who have committed such conduct.

Article 7 of the law in question is also interesting, as it extends to cyberbullying the measure of warning by the police commissioner already provided for the crime of stalking (art. 8, paragraphs 1 and 2, of Decree Law 23.2.09, no. 11, converted with amendments into Law 23.4.09, no. 38). This intervention is aimed at interrupting, as quickly as possible, aggressive conduct that has not yet given rise to proper criminal proceedings. For this reason, it is stipulated that

until a lawsuit is filed or a complaint is lodged for any of the offences referred to in Articles 594, 595 and 612 of the Criminal Code and Article 167 of the Code for the protection of personal data, referred to in Legislative Decree 30.6.03, no. 196, committed via the Internet, is punishable as soon as possible. by minors over the age of 14 years against another minor.

The Chief of Police to whom such episodes have been reported - having acquired eventual further information useful to better frame the facts - can summon the minor-author, in the presence of at least one parent or other subject exercising parental responsibility, to admonish him orally and invite him to *'behave in conformity with the law'*. However, pursuant to Article 7 of Law No. 71/2017, the effects of the admonition automatically cease when the young person to whom it is addressed reaches adulthood.

From this measure, one can infer, *prima facie*, a reference to the now repealed Article 594 of the Criminal Code relating to the crime of insult, secondly, then, a relevant fact. While on the active side the recipients of the warning can be individuals aged between fourteen and eighteen years, under the passive profile of the victims of the harassing conduct can also be boys and children under the age of fourteen years (Bertolino, 2018)

However, from the point of view of the elements on the basis of which the police commissioner may proceed with a warning, the measure does not presuppose "the acquisition of evidence that can withstand a criminal trial, but the existence of elements from which it is possible to infer a persecutory or seriously threatening behaviour that could degenerate and prelude to conduct constituting a crime (Tar Trentino Alto Adige 14. 9.2016, n. 329, ruling on a measure of oral warning made in relation to a case of stalking, states principles that can be extended to the hypothesis of the warning of the police commissioner in order to report acts relating to cyberbullying)".

Outlined the main points of interest of the Law No. 71/2017, we can identify the positives as well as the critical issues. Under the first aspect, namely the elements of positivity that introduced the law

of 2017, certainly credit should be given to the two tools introduced to react against harmful conduct acted by cyberbullies: the complaint to the Data Protection Supervisor, to obtain the obscuration and / or removal of illicit content — damaging, the warning of the police commissioner (Bouquié, 2019)

However, under the second aspect, i.e. the criticality, some observations should be made. The law in question, has a preventive nature, so it introduces measures ranging from the presence of a reference teacher in each school (trained, with the task of coordinating the initiatives to prevent and combat the phenomenon of relational cybercrime), to the inclusion of appropriate disciplinary sanctions in the school regulations for the conduct assumed by the cyberbully. There are no particular innovations with regard to the conduct of minors below the age of 14, for whom the absolute presumption of non-attributability remains unchanged. In its regards, the judge may - pursuant to Article 224 of the Criminal Code - impose a security measure based on the seriousness of the fact and the moral conditions of the family to which the minor cyberbully belongs (De La Serna, 2018)

In addition, from the purely civil law point of view, Law no. 71/2017 has not introduced any new element; in fact, Articles 2043 - 2048 of the Civil Code are normally applied.

Lastly, the legislation in question focuses on cyberbullying, not considering that often from the 'digital' reality the phenomenon eventually shifts to the more 'common' one, also resulting in bullying *tout court*.

DISCUSSION

Social Contexts and Strategies for Intervention, Prevention and Promotion of Resources against Bullying

The contexts of intervention for measures aimed at counteract the phenomena of bullying and cyberbullying remain families and schools. The guidelines offered by both the *Telefono Azzurro* (see *Quaderni del Telefono Azzurro*) and the *Italian Ministry for Education* (see the GUIDELINES for the prevention and contrast of Bullying and Cyberbullying, 2021) address priority action in terms of education, prevention, and direct contrast both in families and in schools. School and family are not considered as two separate relational domains; rather, their synergy, cooperation and interdependence are promoted.

The family environment is an important place in which to intervene and prevent abusive attitudes on the part of children and young people. Given the developmental risks that bullying and cyberbullying causes, parents must be informed and supported in the intervention on their children (whether they are victims, bullies or spectators). Intervention in the family environment appears complex given the delicacy and intimacy of the place, although the involvement of families is a factor of significant importance.

The "*Quaderni del Telefono Azzurro*" (namely, special yearbooks of one of the most relevant Italian Association for the support, defense and protection of children and adolescents) have outlined a set of actions aimed at parents. It is suggested that parents need to: become aware of bullying; do not diminish the seriousness of the problem; promote a dialogue on such issue; strengthen the self-esteem of their children; not to fossilize in extreme positions of accusation or protection; become aware of the moods of their children; identify concerted solutions together with the children; open a comparison with other parents; propose extracurricular activities; support their children to become aware of their attitudes; avoid overprotective attitudes but encourage the autonomy of their children.

The structure of the interventions is characterized by several crucial actions: informing and preparing on the phenomenon; creating a synergy between the school and the parents; guarantying support to

families who encounter difficulties; promoting active participation. The action to inform and prepare on the phenomenon aims to make parents aware of bullying. It is important to present to families the behaviors and dynamics that define bullying and distinguish it from other types of behavior. The process of raising awareness of the bullying phenomenon of families consists in the development of written content, dissemination of information through websites or use of the school newspaper and information newsletters. The action to guarantee support to families who encounter difficulties consists of interventions and therapies aimed at families and aimed at guiding and correcting violent and / or dysfunctional conduct, including anti-bullying interventions, in the event that young people suffer or commit bullying (Gini et al., 2018). The promotion of the active participation of parents in situations of bullying is oriented to encourage families:

- to identify moments in which to dialogue with their children about their friends, about activities carried out outside the home;
- to reinforce listening as an essential dimension of constructive communication;
- to make parents aware of the importance of univocal and unitary rules and punishments;
- to highlight the importance of parents' assumption of pro-social and adaptive behavior models, also including models of interaction in which third parties are involved;
- to emphasize family resources rather than difficulties in order to strengthen the potential of parents and their ability to deal with conflicts and difficulties.

Strategies and Intervention Measures against Cyberbullying

The objectives of an anti-cyberbullying intervention include actions aimed to foster: a) understanding and awareness of the phenomenon; b) responsibility and assertiveness; and c) social inclusion.

The value of understanding implies the theoretical-experiential knowledge of the phenomenon of cyberbullying. Understanding cyberbullying is achieved through education in the use of the mass media, that is, a prudent and ethical use of new technologies that concerns the consideration of rights and responsibilities, as well as the legal and criminal aspects related to the problem. Awareness consists in subjective knowledge, the result of the personal position possessed or matured regarding the cyberbullying phenomenon. The value of responsibility and assertiveness are functional to highlighting the responsibilities, consequences and abilities of those who commit prevaricating acts and those who suffer them. The development of these values favor the emergence of self-esteem during pre-adolescence and adolescence. Finally, social inclusion is a relevant value in the implementation of an intervention to combat cyberbullying, because it aims to reinforce the role of individual differences as a quality and not as a prejudice. The implementation of inclusive dynamics through education for difference, associated with training for the management of daily conflicts within a more aware and responsible communication, leads to the construction of a collaborative team spirit that transcends differences.

CONCLUSION

Bullying and cyberbullying are growing phenomena in Western societies. Their specific characteristics are a violent and disparaging attitude towards a victim, a condition of relational asymmetry and a persistence / repetition of such behaviors. Many studies have identified specific characteristics of the

bully and the victim. However, we believe that a greater understanding of the phenomenon requires a multidisciplinary reflection that takes into account psychological, cultural, sociological and legal factors. In fact, the complexity of the phenomenon requires that the observation gaze be broadened: only in this way does it become possible to identify the psychosocial dynamics in which other actors are involved at the same time (the active and passive spectators, the defenders, and the indifferents; the role of groups, the role of families and schools).

For example, only by broadening the observation perspective is it possible to see cyberbullying not as a simple extension of classic bullying, but as a conduct made possible by a new culture, socialization and technical instrumentation of the contemporary world.

Bullying and cyberbullying - although very often read in the light of anthropological invariants of the phenomenon of deviance or aggression / rebellion of adolescence - are phenomena that require careful contextualization to avoid confusion and misrecognition. Only through a deep and open dialogue between the psychological, pedagogical, sociological and legal disciplines it is possible to design and implement systems of understanding, prevention, intervention and promotion of a culture aimed at rebuilding the social bonds of trust, respect and cooperation against contemporary forms of irresponsibility, individualism and indifference.

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ENDNOTE

[1] Konrad Lorenz (2005) used the concept of mobbing for the first time to indicate the natural behavior of some animal species, such as wild ducks, which engage in group aggression to scare a single animal perceived as a threat.

Section 4

Chapter 21
Science, Technocracy, and Artificial Intelligence:
An Ethical–Juridical Reflection Prompted by the Current Pandemic

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ABSTRACT

The chapter reflects the relationship between the advances that new scientific discoveries allow and their consequent and necessary legal regulation. Considering the fact that science does not always offer elements of definitive clarity and certainty on the issues, the reflections of this contribution must be read in the light of the current pandemic, considering the renewed relevance of the need to place ethical limits on scientific action today in order to guide the scientist toward the common good.

INTRODUCTION

The pandemic has undoubtedly highlighted the fact that the relationship between the progress allowed by new scientific discoveries and the consequent legal regulation that the legislator is called upon to cope with the new situations thus created, may present circumstances in which science offers elements of definitive clarity and certainty on the issues at stake, as well as situations in which the defining framework of the question is incomplete and prone to change over time. The invitation that we want to extend here is to read the reflections in this paper in the light of the current pandemic situation afflicting humanity and to consider the renewed relevance today of the need to place ethical limits on scientific action. Such limits would be capable of guiding the scientist towards the common good.

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SCIENCE BETWEEN AUTONOMY, FREEDOM AND THE PRECAUTIONARY PRINCIPLE: DEFINITION OF THE SURVEY FRAMEWORK

We can find confirmation of this in what the 1963 Nobel Prizewinner for Physiology and Medicine, J. Eccles, wrote: "I accept all the discoveries and all the hypotheses well corroborated by science, considering them not as absolute truths, but as the maximum point of approach to the truth that has so far been attained. But […] there is an important residue not explained by science, and even beyond any future explanation by science" (Eccles, 1990, p. 18). Indeed, from Eccles's statements one can, with good reason, derive the conviction that the legislator, especially in the field of the repercussions of scientific discoveries on the life of man and of the human species as a whole, must act in compliance with the precautionary principle (Marini, 2004; Amato Mangiameli, 2021, pp. 60-61). This is in order to prevent the work of science from bringing negative consequences for humans, rather than benefits. In fact, to conceive a completely autonomous action for the scientist, in our opinion means conceiving an incomplete action: incomplete when compared to the undeniable complexity of human nature, considered in the totality of its dimensions (the biological, the instinctive, the relational, the metaphysical, etc.). The autonomy of the scientist, ethically and legally, as we will try to demonstrate in these pages, should, however, be limited when his research does not go towards the common good and effective progress for man, considered in the totality of its dimensions.

WHAT LIMITS FOR THE SCIENTIST'S ACTIONS?

A point of reference, both for identifying the limits mentioned above, and for directing the scientist towards the path that can lead to the common good of humanity and towards respect for human nature as a whole, can be found in upholding human rights. With reference to the progress of the human species that occupies us here, human rights undoubtedly impose on the scientist (and more broadly also on the present generations in the present time) the duty of acting responsibly (Jonas, 1990, 1997), respectful of today's humanity and of future generations (UNESCO, 1997a, 1997b). This problem has undoubtedly been accentuated in the current pandemic period, in which the Schmittian "state of exception" seems to have allowed the scientist, instead, to act (temporarily?) without any form of ethical and in some ways even juridical limitation. Indeed, one can go so far as to say that the scientist's action, free from the binding nature of ethical principles, almost seemed to be supported by the urgent controls that regulated, and continue to regulate, the lives of citizens, at least on matters concerning the measures to combat Covid-19.In this regard and in support of what is stated here, we can cite, for example, what is argued by Lorenzo Castellani, who specifically writes: "The historian Charles Maier, in his Leviathan 2.0 (2018), provides a particularly interesting reading of the Schmittian " state of exception ". It can be manifested in two different degrees: the hard form, which bends or overturns constitutional legality, as happened in Italy with the advent of Fascism and in Germany with the Nazi seizure of power; the soft form that brings politics close to the limit of breaking constitutional legality without crossing the line, as in the case of the New Deal launched by President Franklin Delano Roosevelt between 1933 and 1937, which forced the traditional canons of American constitutionalism, or as in the case of the almost total centralization of powers imposed by Churchill's War Cabinet during the Second World War" (Castellani, 2020, p. 71). Now, it can be argued that what continues to happen in Italy with the regulations to combat the pandemic entrusted to the DPCM seems to be approaching that soft form of state of exception described

by Castellani. More precisely, it should also be said that Castellani does not even rule out that this soft state of exception may find its own form of stabilization in the future. He writes, in fact, further on, that "the possibility that the crisis may, in the near future, open the way to a permanent, albeit weak, state of exception cannot be excluded. Today to face the health emergency and limit the contagion, and tomorrow perhaps to manage an economic and social crisis that promises to be profound. After the pandemic, the evocation of the emergency and the use of extraordinary powers by political leaders in difficulty, for various more trivial reasons, in order to stabilize their power and neutralize the political conflict, could become a more widespread practice"(Castellani, 2020, p. 73).

For the purposes of our discussion, it should be noted above all that Castellani joins those who argue that there is the risk of an accentuation of that technocratic drift which scholars have long been debating (Tarantino, 2018). He does so, implicitly, when he writes that "the emergency tends to produce not only a temporary growth of the state, but a permanent expansion and a deeper penetration of public intervention within the socio-economic system.

With the response to the Covid-19 emergency it will probably go the same way, both nationally and supra-nationally. There will be no decentralization or democratization of institutions, as many populist, sovereign and even liberal theorists hope. The technocratic bodies perpetuate themselves, and in the crisis they grow, even in the overturning of political ideas and in the alternation of currents of economic thought. The steel cage of rules, procedures, bureaucracy, multilevel technical committees today appears too strong to be bent by the politician.

Of course, this does not mean that experts and specialists who become bearers of ideas and visions different from those of the past, especially on an economic level, cannot gain ground. Reality often disavows the dominant theories, and the last ten years bear witness to this. In this sense, the law of the circulation of elites applies to technocrats in the same way as to representative politics. Being related to *kratos*, to power, they are in fact exposed to the dynamics of politics. They occupy their place on the basis of the principle of competence and not of democracy, but they are not protected by the scientific nature of their knowledge in the face of political upheavals. In fact, a political position can be disguised, in order to be better legitimized, in the form of science or technology, but in the end it always remains so. It can win or lose depending on the events. And the more its political being hides, the more ruinous is the fall into defeat. This therefore appears to be the greatest difficulty of today's technocratic class, forced to renew itself and to review its paradigms as rapidly as the political one in order to keep its institutional structures intact" (Castellani, 2020, p. 77).

FROM TECHNOSCIENCE TO TECHNOCRACY

The general considerations made at the end of the preceding section introduce a more specific aspect of the relationship between progress and scientific discoveries. An aspect that, incidentally, appears to be of primary importance if we think about the concrete possibilities that doctors have today for the treatment of Covid 19 and also the possibilities that the lines of research adopted prior to the outbreak of the pandemic did not actually bring to fruition. The aspect to which I am referring with this example is the more general one of the relationship between science and technology: it too can be steered in the opposite direction from the path leading to the achievement of the common good and the actual progress of the human species. As has been highlighted by many, and as mentioned earlier, today we are undoubtedly witnessing a slide of a "technocratic" kind (if one looks at the political-juridical sphere) and of a

"techno-scientific" kind (if instead one adopts the viewpoint of scientific research), as a result of which the traditional relationship between science and technology is overturned. While until a few decades ago, in fact, it was science that indicated to technology which tools to produce to facilitate and improve the free research capacity of the scientist, today, instead, (often with the consent, not always fully aware, of the political decision maker) it is frequently technology to imposes on scientists the objectives to be achieved. Most of the time, this is for the precise purpose of pursuing the sole needs of the technology itself and implementing its potential, and not of actually achieving an authentic improvement in the well-being and progress for human beings (Palazzani, 2015). Consider as an example the weakening in recent years of research on Corona viruses highlighted by some scholars, who also hypothesize that this weakening came about on the specific volition of some pharmaceutical companies, which did not find it in their interests to finance research in that field, preferring to finance studies in different areas. For the sake of completeness, we must also consider the fact that the "techno-scientific" drift, then, often declines into a "technoeconomic" slide. This happens when the tools and revenues of the economy no longer serve the progress of man as a whole, but become ends in themselves, with a view to individual enrichment. Enrichment that is often pursued to the detriment of others (this happens, for example, when the richest peoples exploit the natural and economic resources of the less rich and less developed peoples) and of the natural environment in which man lives. This is an aspect that Barbara Troncarelli underlined well when she wrote: "A society lacking or devoid of regulatory principles, which induce respect for the surrounding world in all its manifestations, human and environmental, and which by translating into specific rules guarantee a system of mutual trust between the rulers and the governed, between institutions and citizens, between decision-makers and the community, between entrepreneurs and workers, between sellers and buyers, is doomed to failure, not only economically, but in every other dimension of the human bond, and of the socio-environmental reality" (Troncarelli, 2015, p. 71).

SCIENCE AND POLITICS: TOWARDS A RETURN TO THE CENTRALITY OF THE HUMAN BEING

With the pandemic, however, the techno-economic structure that had been achieved up to now entered a crisis. It entered into crisis because Covid 19 has eclipsed the models, social behaviors, the often ephemeral needs of consumerism to which the model of the globalized economy had accustomed citizens. The same crisis also hit the technocratic tendencies which, albeit partially, had taken root. Faced with Covid 19, fear, imposed isolation, distancing from affections, deprivation of social life, the economic model of globalization had to give way to an urgent request for the return of the humanum. Man and the foundations of his existence have returned to the center and, consequently, politics has been required to reflect that it is capable of moving away from the conceptual schemes that had characterized it until the outbreak of the pandemic. Such reflection (and responsibility) are capable of leading to an effective protection of all the dimensions of human nature, and therefore not only of those that with the globalized model had become preponderant. Among others, Alberto Scerbo noticed this and lucidly remarked that: "Having abandoned the plot of the spectacularization of politics, at the same time, the logic of politics has been liquefied through images or virtual messages, or personalized emotional simplifications. In the face of death, the nightmares of loneliness, the impending psychological distress, the uncertainty of the future and the disruption of economic conditions, appearance no longer counts and there is no room for mere expressions of effect. The cry coming from below translates into the request for specific skills and

speed and precision in the planning and concrete implementation of public interventions. Words must give way to facts, commercials to concrete actions, propaganda slogans to ideas. The globality of the pandemic phenomenon has reduced the prestige of those who have discovered, behind the mask, their own inconclusiveness and approximation on the global level" (Scerbo, 2021, p. 273).

In the midst of the pandemic, the concrete actions that are required of politics cannot be disconnected from the discoveries that science has made. The discoveries of science, however, cannot even take away from the legislator any dimension of autonomy, with the justification that one lives in an emergency state. In this regard, one can again agree with Scerbo, who states that: "On line with the long-established practice of a political sphere that deliberates on the basis of reasons deposited in an indefinite elsewhere, current events give us a decision-making apparatus inspired by the indications coming from science. This is a change of course to be evaluated favorably, above all because, after having disregarded for decades the warnings expressed by the scientific world on the upheaval of the planet and on the consequences caused to human health, it is finally understood, at least this is the hope, that it is not possible to plan human existence globally without the contribution of the results of scientific research. This does not exclude, however, that the life of the community cannot, and must not, be decided solely by virtue of the conditioning of the results of science. Or rather, the political will cannot, and must not, be masked behind the veil of the external will of science" (Scerbo, 2021, p. 274).

In this regard, as recalled at the beginning with Eccles, we must also consider the fact that the maximum degree of knowledge that scientists have reached at a given moment in human history always remains a limited degree of knowledge and not an absolute degree. The arrival of new discoveries, in fact, can call into question the scientific results achieved up to that moment. And politics cannot fail to take this into account, consequently having to exercise prudence in the decisions it is called upon to take. In the background, therefore, on the one hand, there is the inability of man to reach a certain knowledge of the phenomena of nature, on the other hand the certainty that in the scientific interpretation of natural processes we must continue to recognize that the principle of causality has a role. Scerbo is convinced of this and, continuing his discourse, also remarks, however, that: "The delineation of the main features of the evolution of science and the summary exposition of the transition from the epistemological theories of modernity to the post-modern ones make it clear that scientific research continues to have a hypothetical basis and proceeds by trial and error, also through the use of the probabilistic method and statistical evidence. Moreover, from within the epistemology of complexity there emerges the necessary evaluation in the cognitive process of the unavoidable existence of factors of error, the unforeseen and contradiction, which, after all, constitute the basis for the elaboration of the risk society theory. Not to mention that, both in the perspective that favors the methodological unity of the sciences, and in that which reaffirms the specificity of the individual areas of knowledge, the principle by which scientific knowledge is exercised within the boundaries of the single research field remains unchanged. This has implications for the translation of phenomenological correspondences into theoretical laws and, conversely, for the issue of the justification of theories.

These annotations explain the role that can be played by science in the context of the government of public affairs. In fact, one cannot ignore the contribution of knowledge provided for the reading and understanding of an event of scientific importance. Nor can we ignore the forecast data on the line, or curve, of the trend, propagation and changes in progress and in future projection. Even less can the indications designed to deal with, control and contain the impact, development and effects of an event be neglected. It should be taken into account, however, that the hypothetical structure of scientific knowledge can easily lead to errors of interpretation or to the adoption of defensive or more generally

operational strategies, that are not exactly adequate: no wonder, therefore, that the pandemic saw hasty initial underestimation or radical reversals of opinion. To this we must add that scientists focus their attention mainly on the connotative elements and on the experimental data of the particular object of their own particular field of knowledge. Hence the impossibility of transferring the entire responsibility of institutional choices to science, because, while it is true that in a world exposed to the globalization of risk, the precautionary principle takes on fundamental importance, it is also true that politics is responsible for balancing risks. This must be carried out with the contribution of science, but according to criteria of transparency capable of allowing a public evaluation that tends to be objective, which prevents power from hiding the formulation of the content of the decisions taken behind the cloak of science" (Scerbo, 2021, pp. 275-277).

In conclusion, what Scerbo wants to affirm, in our opinion, is that politics has the duty to continually seek the balance between the needs of the individual and those of the community, with the need to always consider the humanum at the center. Politics becomes the obligatory passage on the inclined plane that leads from the knowledge of the various sciences to public decisions. Its role, in the words of Aristotle, Scerbo still remembers, is a filter, it is that of grounding "what must be done and what to avoid [so that] its end might include that of the others, so that it would be the common good; certainly it is desirable even when it concerns a single person, but it is more fitting and more different if it concerns a people and cities" (Aristotle, Nicomachean Ethics, I, 2, 1094b, cit. in Scerbo, 2021, p. 277).

THE ADVISABILITY OF INTERVENTION BY THE LEGISLATOR TO REGULATE TECHNO-SCIENTIFIC POWER AND ITS LIMITS

Perceptive comments on "techno-scientific power" and its repercussions on human rights have recently been made, among others by Lorenzo D'Avack. He points out that starting from the Renaissance, and then with the Enlightenment, there was the belief that science and human rights were a union. He concludes: "However, the new democracies seemed to have forgotten that the struggle for human rights is a defense, a protest against all forms of power. And if over time the adversaries had first been religious power, then political power and finally economic power, it was not possible to imagine that in the near future the threats to dignity, freedom and the environment could well have come from the power of science. and its technological applications" (D'Avack, 2018, p. 2).

The threats referred to by D'Avack were implemented in the technological applications that in the twentieth century served for war uses, such as nuclear bombs. With the 2000s, then, the threats came from the new applications of biology and genetic engineering. It has therefore been seen that since the Enlightenment, the combination of science and human rights has been looked upon with favor and optimism and consequently it was considered pointless for any limits to be placed on the actions of scientists. Today, on the other hand, States are asking themselves specifically about the need to set such limits because we realize that scientific discoveries do not always lead to the common good and do not always contribute to respect for human rights. For example, with reference to so-called "Convergent technologies" (also known by the acronym NBIC - Nanotechnology, Biotechnology, Information technology, Cognitive science) today we see that: "In the relationship between man and biotechnology, the last generation of human rights, of bioethically relevant rights, is increasingly emerging, invoked for the most disparate and opposing conclusions on the level of the *ius condendum*. Consider, among others, the right to happiness, the integrity of one's genetic heritage, the right to have a child, the right to unique-

ness, the right to know one's genetic origins, the right not to be conceived, the right to be born healthy, the right to enhancement, the right to a dignified death, the rights of animals, the right not to manipulate the environment as an ecosystem. A set of human rights that often rests on bases that are not always objectively certain and that requires verification, an adequate bioethical and bio-juridical reflection to clarify, coordinate and elaborate their contents" (D'Avack, 2018, p. 3). The uncertainty about the bases of these new rights and the need to coordinate them to which d'Avack referred mean that science does not contribute to increasing the protection and respect for human rights, but instead leads to a situation of conflict between the human rights traditionally recognized and already protected in the documents of international law and in constitutions and these new rights that science favors, on which, as mentioned, a bioethical and juridical reflection is required. This situation of conflict is "all the more difficult to regulate if we consider that, as is already the case with human rights vis-à-vis political power, that form of submission given by "fear" the desire for "security", by the need for well-being expressed by everyone [especially in the time of the pandemic, one might add, ed.] and strongly felt by society. Such states of mind, translated into demands, arouse an unexpected legitimacy for scientific power by creating "a utopia in the making" that in the field of biotechnology one might think, as the bioethicist Lucíen Sfez writes, is aimed at "perfect health or great health". "Because it is not just about the perfect health of the individual, but the health of the planet itself" (L. Sfez, *The Biotechnological Dream*, Milan, 2002, p. 10)" (D'Avack, 2018, p. 4). But the observations made on biotechnologies and on the ethical and legal limits to be placed on their use can easily be extended to all fields of activity of science and technology.

It is therefore up to the law to produce and implement these limits, but in doing so, given the complexity of the matters to be regulated and the speed at which scientific discoveries follow one another, it cannot rely solely on an autonomous evaluation: instead, it needs to interact increasingly with the scientists, in order to have the greatest possible knowledge on which to base its continuous assessment of the limits and advisability of intervening. Among others, Laura Palazzani refers to this when, after reflecting on the need for ethical guidelines for the governance of emerging / converging technologies, she writes: "This is the horizon that is emerging for an innovative "governance" of technologies in the science-ethics-society triangulation. A regulation that must start from the real representation, on the basis of reliable empirical data and from the imaginary anticipation of the possible scenarios that can be configured, weighing the pros and cons and evaluating the alternative options on a scientific, ethical and social level, balancing the decision in a transparent, wise, prudential approach. In the awareness that the more there is exposure to uncertainty in the severity and irreversibility of the risk / damage to man and humanity, the more there must be an individual and social responsibility. The regulation will be called upon to calibrate, in the specificity of the different technologies, which tools are necessary to defend mankind and fundamental rights. As part of the discussion, new possible rights are emerging: the right to access emerging technologies, whose safety and efficacy have been demonstrated; the right not to use emerging technologies and not to be indirectly "forced" to use emerging technologies due to social pressure on individuals, who would otherwise remain marginalized and emarginated; the right to be informed and educated in the use of emerging technologies; the right to acquire a critical awareness of emerging technologies in order to acquire the conceptual tools for an autonomous evaluation (including rejection of technologies); the right to participate in the "governance" of emerging technologies, to be actively involved by institutions in the definition of policies and in the regulation of new technologies" (Palazzani, 2018, p. 95).

Finally, think of the boost that progress has received in all fields since the introduction into everyday life of the innovations achieved by artificial intelligence technologies. Also in this area, as for those

mentioned above, the identification of ethical-legal limits has become increasingly necessary, especially due to the swift development typical of these technologies. Admittedly, artificial intelligence has reached different levels of development, in different fields. And in this regard, here it is argued that the various problems inherent in artificial intelligence can be brought together, as was the case for other issues addressed above, in the primary principle of responsibility. On this point, one can fully agree, in fact, with L. Palazzani, when she states that: "One of the first questions, even in the absence of conscience and awareness, concerns responsibility, closely connected to autonomy. A. I. can have more or less autonomy, meaning by this term, taken from anthropology, the possibility that the intelligent artifact is able to learn and, even in the absence of awareness and self-awareness, to define paths independently of the programmer" (Palazzani, 2020, p. 54). And in approaching the conclusions of this paper, we will finally make some observations on the question of artificial intelligence, considered in its application to robots, with specific reference to their autonomy and the responsibility for their actions.

ARTIFICIAL INTELLIGENCE AND ROBOT AUTONOMY: WHAT RESPONSIBILITY?

On the problem of the need to refer to the principle of responsibility for the application of artificial intelligence to robots, but also to the various areas of human activities, such an endless number of studies have appeared, especially in recent decades, that it would be difficult to envisage even an essential bibliography. In the space allowed by this paper, therefore, we will confine ourselves to referring only to some of the main challenges and the most pressing issues of an ethical nature presented by the application of A.I. (Artificial Intelligence), on which bioethics and law have to reflect. Incidentally, according to some authors, these issues, will coincide in the future with the management of machines equipped with AI that by the end of the current century might be able to outdo man in the ability to carry out many of the human professions, even at a cognitive level (Cfr. Bostrom, 2018, pp. 44 et seq.).

Against the background of the reflections proposed here, an article by Agata Amato Mangiameli entitled *Algoritmi e big data. Dalla carta sulla robotica* contained in the Journal of legal philosophy, in the second section of the first issue of 2019, devoted to the study of some of the major issues relating to the application of A.I. and entitled "Subjectivity, responsibility, normativity 4.0. Philosophical-legal profiles of artificial intelligence". We will discuss this article as the reflections it contains can be seen as the continuation and the exhaustive, clear completion of the argument put forward so far.

The lucid observations in Amato Mangiameli's article give the reader an in-depth picture of the issues concerning algorithms, big data, artificial neural networks and the problems that can arise from the applications of these technologies to the daily life of the human being. More specifically, after describing the close connection between the algorithms, A.I. and big data, she focuses on the problem of the non-neutrality of algorithms (which are perhaps the main implementation of artificial intelligence) that are widely applied today in the most diverse areas of the public activities of states and the private activities of individual citizens. She underlines the critical issues, such as, for example: "the information asymmetry between a company offering a service and the user, the lack of transparency relating to the principles and parameters underlying the functioning of the algorithm, the creation of a sort of filter bubble, so that only the information that the algorithm has calculated may be of interest to the user is shown, or on the contrary, which it has deemed for various reasons not to provide" (Amato Mangiameli, 2019, p. 109). Amato Mangiameli is therefore convinced of the impossibility of having neutral algo-

rithms, since the result they can achieve always depends on the parameters that the programmer or user sets for their use. Nonetheless, the use of algorithms is increasingly widespread, including by the public administrations of countries for the storage and computation of citizens' information (including sensitive data). Starting from this, the author invites us to draw attention to the fact that countries need a univocal rule for the treatment of the immense amount of data available. This also springs from the observation that "Today's quantity of data is really abnormal [...] the flow is continuous, the order of bytes reaches incredible records, but what leaves us amazed in some ways is the ability to use any single information of this unspeakable quantity to analyze, elaborate, suggest and orient models of interpretation and action" (Amato Mangiameli, 2019, p. 112). The risk is that this immense amount of data can be managed (or manipulated) by those who own the algorithms. To overcome this risk, Amato Mangiameli tells us that: "It is in part a mandatory route. It is a question of guaranteeing informed consent in the strict sense, which in many cases is lacking, especially in those where, in exchange for free content or services, personal data are given; it is also a question of making algorithms transparent, so as to understand how information (and disinformation) is formed, as well as how the orientations of social actors are shaped at the same time" (Amato Mangiameli, 2019, p. 112). This condition is partly enshrined in the European Regulation on the processing and free circulation of personal data, to which the author makes precise reference in the rest of her article.

But it is above all on the ethical-legal principles contained in the European Parliament Resolution on robotics (Civil law rules on robotics. European Parliament resolution of 16 February 2017 with recommendations to the Commission concerning civil law rules on robotics) that Amato Mangiameli's reflections acquire particular importance for the argument put forward in this article. She recalls, in a nutshell, that in the Resolution in question, in the Ethical Principles (points 10 and 12), there is a recommendation on the use of robotics to safeguard health, safety, freedom, dignity, non-discrimination and the protection of personal data of individuals. Here, emphasis is placed on the principle of transparency, which in fact is the desired remedy in the field of E.U. law for the problem of the non-neutrality of algorithms to which, as we have seen, Amato Mangiameli also referred.

But above all the author reminds us that there is also a need to consider the problem of responsibility, which follows from the greater or lesser degree of decision-making autonomy that robots can have. How to compensate for the damages resulting from the autonomous choices of such machines, she wonders? The legal solutions, the author points out, are not very easy, but particular importance, among other things, must be given to the fact that in general "it becomes essential not to limit the forms of compensation that can be offered to the injured party for the simple fact that the damage is caused by a non-human subject (point 59 a-f)" (Amato Mangiameli, 2019, p. 121). And indeed, the reference that Amato Mangiameli had made, in the 2019 article just mentioned, to the need not to limit liability for damage caused by a robot is in many ways confirmed in its subsequent enunciation in another European Union document. This is the European Parliament Resolution of 20 January 2021 on Artificial Intelligence: Issues relating to the Interpretation and Application of International Law to the extent that the EU is concerned with regard to civilian and military employment and the authority of the state outside of the area of criminal justice (2020/2013 (INI)), with which the European Parliament "reaffirms that an autonomous decision-making process should not exempt human beings from responsibility and that people must always have ultimate responsibility for decision-making processes, so as to be able to identify the human being responsible for the decision (point 8)".

CONCLUSION

These, in summary, are the general lines of a possible reflection on the future of mankind and its progress, with reference to the impact of new technologies on people, society and states. Such progress cannot ignore the duty for the present generations to act responsibly towards the generations to come, in order to protect their fundamental rights and their dignity. Generations present and generations to come constitute in actuality what the human species is in potential. This is because, alongside individuals, the human species must also be considered, with its identity that undergoes changes and evolution over time, as can be seen from the succession of different types of Homo that have come and gone over the millennia of human history. The human species has had implicit legal recognition up to now in some documents of international law and in some constitutions (A. Tarantino, 2007, pp. 31 et seq.) but perhaps, also in light of the observations put forward in this article, it is time for it to receive a definitive and full recognition as a subject of law.

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KEY TERMS AND DEFINITIONS

Algorithms: Sequence of instructions to perform operations on computer data.

Artificial Intelligence: Ability of a machine to reveal human intellectual abilities.

Autonomy: Ability to govern itself, with its own laws.

Ethics: Reflection on the practical behavior of the individual, which intends to investigate the good for man and his moral duties.

Robot: Mechanical and electronic automaton, driven by artificial or programmable intelligence.

Technocracy: Political-social condition in which technology prevails over every field of human life.

Vulnerability: Condition of fragility of an individual, due to which, for example, he can receive damage or discrimination.

ENDNOTES

[1] The present author has already published studies on this theme, prior to the pandemic, some of the arguments of which are found here, expanded and enriched in view of the many changes that Covid-19 has brought to people's lives, in social relations, in politics, in the affective sphere, in work, etc. Cfr., *passim*,G. Tarantino, *Diritto alla vita e libertà della ricerca scientifica con riferimento alla costituzione italiana,* in A. Pisanò (a cura di), *Se la specie umana sia titolare di diritti*, ESI, Napoli, 2007; Id. *Lo sviluppo sostenibile. Il necessario equilibrio tra progresso, economia e limiti etici. Materiali per uno studio*, in *Il turismo tra accoglienza, attrazione e investimento*, a cura di F. E. Rubino, P. B. Helzel, L. M. Hita, Franco Angeli, Milano, 2017.

[2] The translation from Italian of the parts in quotation marks in the text was carried out by the author of this paper.

Chapter 22
The Border:
Between Hybridization and Separation

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ABSTRACT

The global phenomena of our current time requires us to reflect on the nature of borders, as one of the main human devices to organize experience in sociological, psychological, cultural, and geographic terms. With the expansion of capitalism and the globalization processes, there has been an intense phenomenon of intersections and 'insemination' between different cultural forms and previously separate. The advent and widespread diffusion of ICT contributes and accelerates transformations. Therefore, the distance no longer seems to matter much, and space has ceased to be an obstacle. Paradoxically, in this intensification of contacts and displacements, it happens that the borders, rather than being zeroed out, undergo a multiplication. Therefore, borders raise many issues and concerns. Beyond a simplistic view of separation of an 'inside' and an 'outside', borders are always both limen (threshold) and limes (demarcation); they 'write' our personal and social space; it is that line along which two people can touch (cum-finis), allowing to define an identity and/or differentiate it.

INTRODUCTION

With the expansion of capitalism, the intensification of the international economy, the evolution of globalization processes, there has been an intense phenomenon of intersections, mutual enrichment and 'insemination' between different cultural forms and previously separate (Clifford 1993, Amselle 1999,

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2001). Furthermore, the advent and widespread diffusion of information technologies and new information channels contributes and accelerates transformations. Therefore, the distance no longer seems to matter much and space has ceased to be an obstacle. The very meaning of geographical location is beginning to be questioned at any level. We have all become nomads - but still in contact with each other (Benedikt, 1995, p. 42).

However, paradoxically, in this intensification of contacts and displacements it happens that the borders, rather than being zeroed out, undergo a multiplication: in a world that is increasingly stretched in space-time, one thing that is not happening is precisely the disappearance of borders. Indeed, new ones seem to spring up everywhere.

Therefore, it is clear that the question of the border is posed with force and, in some respects, with concern. In fact, it is something much more complex than defining the border as the tool to separate an 'inside' and an 'outside'.

The study of borders has undergone a renaissance during the last decade. Borders have taken on a multi-dimensional meaning. No longer the exclusive domain of the geographer, the study of borders is discussed by sociologists and anthropologists, focusing on the functional significance of the bordering process. Contingent upon social and political conditions, borders reflecting the degree to which cross-border separation or contact takes place (Ullrich, 2020; Thomas, 2016; Scott, 2020).

Indeed the border is not only a geopolitical line of separation but it is also *limen* (inclusive) and *limes* (exclusive) together; it 'writes' our personal and social space; it is that line along which two people can touch (*cum-finis*), allowing to define an identity and / or differentiate it. Therefore, it becomes a device for organizing one's identity, for regulating and mediating one's intra and inter subjective experience (think also of the so-called 'identity rhetoric', understood as an irreducible dimension of the 'Me' or of 'Us') (Español et al, 2021). It is the threshold between real life and virtual life, which disappears in the violation of individual freedoms or is recomposed in the new 'diasporic public spheres', that is, imagined super-communities, where the idea of common ethnic belonging is strengthened, without however having any concrete experience of the territory.

Based on these statements, this work wants to emphasize the idea of how much reflection and declination of the concept of border is necessary in different perspectives: social, psychological, geopolitical. A multidisciplinary perspective is necessary since the theme of the border requires a care of the social and relational space as well as a profound ethical and programmatic reflection on the development of the civic and community sense. This objective becomes indispensable, for example, to avoid a reified and reductive vision of individual cultures, and instead increase their capacity for dialogue as well as for understanding the 'other' emotions. "The Other will increasingly become part of us in our multicultural societies. The emotional frontiers of the world have become as important as its geographical frontiers" (Moïsi, 2009, p. 228).

To all this is added the contribution of the geographic sciences. Hybridization and separation are supported by mediation and adaptation. In fact, the geographer in his mediation plays an active, delicate role, since he guarantees that the conciliation process ensures growth and autonomy. Frontiers and borders are the result of the common adhesion to the new market economy. The research activity will benefit from economic geography, grappling with the trans-territoriality of globalization and with the new territorialisms that emerge from the processes of regional despecialization and respecialization (Zilli & Modaffari, 2020, p. 6) induced by technological change; the social geography that deals with the problems relating to migrants, the relationship with the different; of cultural geography for the confrontation with the new borders (political, administrative, national, working, cultural, mental…) and

the new confined; of historical geography, which reflects on the evolution of the relationship between community and landscape.

BORDERING PROCESSES AND THEIR DYNAMISMS

The anthropological panorama since the last decades of the last century has followed a process of rapid transformation that has increasingly invested many dimensions of human activities. We have witnessed the development of computer systems, the acceleration and extension of communication systems, the ability to computationally process increasingly large amounts of information, and to create larger and larger networks of virtual relationships. There is talk of a so-called *Fourth Revolution* (Floridi, 2014, 2008) in the field of information and communication technologies that has blurred the borders between real and virtual life, generating a '*global infosphere'*, that is, a hyper-connected system of information and continuous production of data.

These rapid transformations of the anthropological, social, economic and cultural fabric attract the attention of the politician, the legislator, but also of the sociologist and psychologist researchers in the search for reading perspectives capable of sustaining the current complexity of relational systems.

In fact, the possibility of delocalizing one's relational systems in terms of work, education, political refuging and to aspire to better living conditions in states and nations different from that of one's origins, has made the contemporary world not only the age of information but also of displacement.

Read in these terms, globalization is not simply the world of commercial exchanges, the free circulation of goods, services and people, but a situation that generates contradictions, opportunities and risks, a simultaneous tendency to open and close one's living spaces, a hybridization of identities but also a defense of their alleged originality and purity (Martini & Vespasiano, 2020).

Paradoxically, globalization, through IT technological progress (and its speed, delocalization, and virtualization) has strongly drawn attention to the issue of spatiality, identity and the function of borders. A broad line of research, the so-called *bordering studies*, deals precisely with the implications concerning borders and their functions in organizing human relational systems (Nail, 20216; Sferrazza Papa, 2020a, 2020b; Español et al, 2019; Tateo & Marsico, 2021; De Luca Picione, 2020a, 2021 / in press; Leone, 2012, 2015; Konrad et al, 2019).

The authors move from an ontological vision of borders, that is to say as defined and stable systems for separating the spaces of human activities, towards a processual vision (Tagliagambe, 2017), according to which the border is a dynamic device capable of configuring and transforming the human experience, both at inter-subjective and intra-subjective level (De Luca Picione & Valsiner, 2017; Valsiner, 2016, 2021).

According to Thomas Nail (2016), who develops a theory of borders for the study of geopolitical processes of migration and dynamics of power, the authors can indicate four main characteristics of borders:

1. borders are "in-between", since they do not they constitute only the edge / side of a system that touches another system;
2. borders are fuzzy spatial phenomena of "inclusive disjunction";
3. borders are not static but always in motion;
4. borders are processes of circulation.

An inclusion / exclusion perspective is not enough, since one of the major effects of borders consists precisely in their ability to produce hybrid transition zones (Nail, 2016, p.8). Therefore, a border is not reducible to a space dimension; in fact, it constitutes a primary and original process, and not a process of derivation starting from a pre-established spatial order.

As the recent pandemic experience has shown, the global planetary level of the crisis has not at all questioned the importance of borders, indeed in many cases they have been strengthened as a first response to the emergency (from the macro level of international closure of frontiers up to the micro level of the individual confinement).

The support of information and communication technologies (e.g., the constant monitoring and processing of scientific and medical data; the strengthening of social networks and all videoconferencing platforms; distance learning; smart-working; etc.) offered food for thought: on the one hand, the possibility of remaining connected, of overcoming the spatial distancing imposed for safety reasons; on the other hand, it showed in all its power what social transformations and anthropological criticalities were already underway in our societies, namely an irreversible transformation of the human ground (Venuelo, et al, 2020; De Luca Picione et al, 2021/accepted). Information flows and communicative interactions on social media, the Web and the expanding Internet of things are changing the possibilities, the actual methods and models of interaction between human beings, objects and life environments.

The new communication systems and the new technologies make it urgent to reflect on the notion of identity, relationship, separation and distinction. A conceptual turn to the boundary, understood as a 'site of difference', highlights how the two sets of practices operate simultaneously in creating shared senses of belonging to a community. As the sociologist Furedi (2020) drew attention recently, borders matter and are essential for the human experience. Therefore it is not a question of ideologically supporting a point of view that hovers over freedom as the supreme value and that sees borders as the enemy *par excellence*. Nor is it a question of believing that borders and their strengthening represent the solution to international disputes, an ultimate defense system, or the ideal protection against the feeling of disintegration of one's own identity (Kullasepp, 2021; Kullasepp & Marsico, 2020).

Taking up the thought of a semiotician of culture, Yuri Lotman, borders represent filters (plastic and permeable) that allow real *translation processes* to be carried out, aimed at encoding and recoding information between one semiotic system and another (2005). In Lotman's perspective, borders are areas of potentiality, characterized by great instability and by transformation processes with a speed greater than that of the central parts (the so-called *identity nuclei*) of the semiotic system. Borders are peripheral spaces in contact with otherness, extraneousness.

While the central parts of a semiotic system are slower to change and are more stable, explosive processes take place along the borders (Lotman, 2009). On the one hand, these explosions perturb and threaten the identity of the semiotic system, but, on the other hand, they also represent the very and unique possibility of development and integration of new parts and functions. Borders are sensitive interfaces of any system. They are able to absorb and accelerate the stimuli that come from the peripheral areas, transmitting them to the central structures.

As a biological membrane, the borders trace a transition profile that allows a dynamic balance between the maintenance of stability and the possibility of transformation, between entropic dissolution and the development of new anthropological structures. Along the borders, people can think about their own history, dialogue with different voices, and imagine new possible futures.

The technological innovation of communication and information urgently places reflection on borders, on identities, on the ability of crossing them and of dreaming new possible scenarios.

IDENTITY AND GLOBALIZATION

Defined by Bauman as the "compression of space and time" (1998), globalization presents itself as a set of material and symbolic processes that makes its direct effects felt on people with the enormous extension of communication, the mixture of lifestyles, the encounter between different cultures, the speed of transport, and the hybridization of musical, literary, artistic forms,.

Despite the myth of globalization (Cesareo & Magatti 2000), which would inexorably tend towards the unification of the world, people are actually faced with an omnipresent patchwork. Global processes, in fact, do not naturally tend towards unity or uniformity, but on the contrary, if left to themselves, they help to distance the ideal of community, producing instead strong imbalances, inequalities, exclusions. People are seeing an ambivalence between forms of *exclusionary inclusion* and softer forms, although not entirely definitive, of *selective inclusion*. Therefore we are witnessing an ambivalence that creates differentiations and that grades several levels of inclusion and marginalization (Tucci, 2018).

In this situation, however, there is a justification for the fact that the demand for a livable community among human beings is becoming more and more pressing from many people, although it seems that we must be satisfied only with substitutes for community, since the communities no longer present themselves as a natural fact (Tönnies, 1887; Rosemberg, 2003).

Contrary to natural communities, such surrogates fail to resolve the freedom / security dichotomy, on the contrary they sharpen it. Bauman clearly states that if it is true that the community gives security, it requires a certain sacrifice of freedom (Bauman, 2001). Modern individualism makes us increasingly insecure, precisely because it offers us (but not to everyone!) freedom in exchange for security.

It is precisely the vulnerability of individual identities that induces us to seek *crutch-communities*, on which people hang together their concerns, otherwise experienced individually (Bauman, 2001). The need to rediscover a space-centric unity is accompanied by what Hobsbawm and Ranger (2002) call the invention of a tradition, that is, a possible response to rapid social change, a need to establish continuity with the past, through social practices and rituals. They can ensure socialization and social cohesion: "Nor does the term community imply necessarily co-presence, a well-defined, identifiable group, or socially visible boundaries. It does imply participation in an activity system about which participants share understandings concerning what they are doing and what that means in their lives and for their communities" (Lave & Wenger, 1991, p. 98)

However, it is the return to tradition that lends itself to an inevitable pitfall: to continue to consider the community as a place of homologation and identity and not rather as a place of contamination between local and global, between equal and different, of the conviviality of differences (Nanni, Weldemariam, 1994). In this sense, then, the community would be invented to exorcise fear and neutralize danger, through coming together (Berti, 2005).

This *narrow and silent vision* of community highlights all its limitations when fear towards the other is read as fear towards the stranger. Bauman illustrates that not being together but avoiding one another and being separated have become the main strategies for survive in contemporary megacities (Bauman, 1999).

This insecurity from which the individual suffers - Giddens (1990) calls it the *disembedding process* - creates the absence of that pure concept of community, which cannot arise out of dialogue, but which must be reconstructed starting from the difference and not from an original assimilation requirement. In this regard, Young states that when the community collapses, the notion of identity is invented (Young, 1999). Identity means coming out of the pack, being different and, as such, unique. This is how the

myth of identity is born, whose obsessive search can only divide and separate, drawing borders that are sometimes insurmountable (Remotti, 2007, 2011, 2017).

Friedman considers that it is not surprising, then, that in a world that is increasingly stretched in space-time one thing that is not happening is the disappearance of borders! On the contrary, it seems that there are always new ones on every street corner of any dilapidated neighborhood on our planet (Friedman, 1999).

According to Bauman, even the new cosmopolitans feel the need for "community", except that, of course, they tend to recreate flexible and "timed" communities, which can be easily disassembled and which rely solely on their dreams and desires. This translates into an unbridled search for a safe and overprotected social environment, and the community becomes the preferred tool of those who believe that "identicality" only means exclusion of the other as different (Kullasepp, 2021). The "safe community" thus becomes a "voluntary ghetto". All this does nothing but fuel mechanisms of segregation and exclusion that are self-perpetuating and self-feeding. It is very likely that *identityism* (namely the great myth of identity) is actually a strategy for the defense of our privileges. Yet it is a short-sighted strategy, which beyond defense, can only foment conflict: the "we" who use it do not see any other solution than their own privileges and advantages. Beyond the "we", there are only enemies (Remotti, 2011).

The search for a safe space (a tendency to *re-embedding*) underlines the importance of the emotional dimension of globalization (Salvatore et al., 2019; Salvatore, 2018). The 'indicators of self-confidence', as Moïsi calls them (Moïsi, 2009) scientifically measure the level of confidence of a population in their future, the ability to use their skills and even transcend them. The level of self-confidence is well expressed by three primary emotions: fear, hope and humiliation (Moïsi, 2009). The rediscovery of emotions is necessary where states, such as the Western ones, can no longer and only rely on historical ideals or on economies that have become too evanescent. In these scenarios therefore arises an attitude of bitterness and a desire to protect themselves from hostile forces. Moïsi (2009) considers the main reason why today's globalized world represents a fertile ground for the flowering or even the explosion of emotions is that globalization causes insecurity and raises the question of identity. Remotti defines identity as the product of cultural impoverishment. Because of our identity, we do not know how to see anything but a threat in our relationships with others, and this is enormous cultural poverty. In such a context, the myth of identity also combines with fear. There is a great fear underneath all of this: the fear of losing one's possessions, one's privileges, one's possessions, and the great fear of having to share. We therefore cling to identity as something that illusively gives us security: an illusory security, a fallacious and dangerous myth (Remotti, 2011).

It is the intertwining of these emotions that is the key to understanding others. Very often, the emotional discomfort provokes situations of non-recognition of the other's face and indifference.

This is what happens when those who cross the border become for us a "radically other", not attributable to our world and towards which it is very difficult to activate the ethical action of solicitude (Ricoeur, 1997).

THE BORDER AS CONFRONTATION, COLLISION, AND HYBRIDIZATION PLACE

Bauman states what appears to be an achievement of globalization for some represents a reduction in the local dimension for others. For some globalization signals new freedoms, for many others it descends as an unwanted and cruel destiny (Bauman, 1998). Bauman's thought introduces the delicate issue of

migration, a phenomenon that is taking on an increasingly broad spectrum and has now transformed Western societies into pluralistic and cross-cultural places.

Immigrants express a demand for recognition of particular rights on a cultural level that pushes to review the connotations of identity and social inclusion. Not surprisingly, the most felt problems in this field are represented by:

- The type of space granted to particular cultural rights in the framework of a unitary society.
- The question of dual citizenship and multiple affiliations of immigrants (Colombo 2009).
- The perception of the country of residence as a source of rights and of the country of origin as an identity resource. Consider that on the perception of better worlds and the hope of a more dignified life, the spread, on a world scale, of new media has also contributed a lot, favoring what is defined as the imagination of displacement, a push to get out of everyday life and which acts to orient it (Fabietti, 2015).
- The increase in naturalization applications as a possible reaction to the tightening of borders (Ambrosini, 2014, 2017).

It is evident, then, how strongly the question of the border is posed, of the space to be occupied (Martini & Vespasiano, 2016).

Zanini says the important thing to be able to claim some right within an unlimited space is to put your feet inside, settle there, sneak inside it, take possession of an area of interest, occupy an area that can be territorial from time to time social, political, sexual, mental, economic. Only after having occupied it, if you want, can you trace its outlines, close it within a boundary, and delimit it. The experience of the border therefore always starts from within (Zanini, 1997).

Therefore, as Costa (1999) say, it is not easy to think that someone belongs to a community, to a political organization, without at the same time imagining some form of separation and delimitation of a border. Therefore, the function that the border plays is that of necessarily defining an inside and an outside.

Some insightful ideas come from the Latin word "*cum-finis*". According Cacciari, it attests a double menaing: *limen* or *limes* (Cacciari, 2000, pp. 73-79). The limen is the threshold, the passage through which one enters a domain or leaves it and the *limes* is instead the perimeter that circumscribes a territory, which encloses its shape. On the basis of this etymological suggestion, Gomarasca (2004) hypothesizes a border model organized according to two fundamental theses. The former concerns the structure of the border, namely its essential duplicity: there is no border that is not *limen* and *limes* simultaneously. In fact, the border is never a rigid border. It indicates the line along which two men touch (*cum-finis*). The latter instead concerns the writing of the border: we can inhabit (and therefore build) a space only if we draw borders. Here, above all, the anthropological value of the concept is at stake: each of us, acting and interpreting the world, continually establishes borders (Mezzadra, 2000). In other words, men are beings that around themselves produce, wherever they live, guarded spaces (Gomarasca, 2004, p. 18). The correlation of these two theses leads us to affirm that the border distinguishes by uniting. Therefore no border can eliminate the other or exclude it since it implies it in its very essence (Gomarasca, 2004, p. 19).

If very often it happens that mechanisms of solidarity activate processes of solicitude for the other, it is equally true that in many other cases it is the opposite that occurs, with episodes of hostility, fear and indifference, which evoke ethnocentrism as a universal characteristic of human groups.

On the one hand, in fact, the border is today interpreted in an eminently constructive way, as the place where identities meet and hybridize (not a line but a zone in which a large number of exchanges take

place). On the other, the border is often interpreted on the contrary as a place of separation, conflict, collision and exclusion Martini & Vespasiano, p. 59).

Bocchi consider we tend to speak of conflict as if it were located in geographically or culturally defined poles. In reality, it is a deeper conflict that disrupts the field because it divides the various cultures, religions and ethnicities. It is a conflict between two different notions of identity that can be fairly and trivially defined as static and dynamic, as essentialist and evolutionary, as closed and as open (Bocchi, 2009, p. 77).

Geremek remember that one of the natural consequences related to the construction of the border is precisely that of throwing out, the expelling from the sphere that has been created what is considered an intruder. Exclusion leads someone or something towards the edge of a territory, away from the center: this is where the marginalized comes from (Geremek, 2012). Zanini insists on this point: sometimes this can be pushed even beyond the margin until it becomes a foreigner, therefore other than what one wants to contain within the border (Zanini, 1997). Waldenfels (2006) argues that the stranger is a border phenomenon *par excellence*. The weight that is given to extraneousness therefore depends on the way in which the order in which our life, our experience, our language, our doing and our creating takes shape. If the order changes, then the stranger also changes, which is as multiple as the orders he crosses and from which it deviates.

This attitude towards the other-as-different has a strong correlation with the social and cultural structure of belonging. According to Cotesta, the attitude towards the foreigner depends on the way of feeling and being of the community, social groups and individuals. Individual and especially community identity determines attitudes and action strategies (Cotesta, 2002). In other words, it is from the inability to classify the marginal elements, seen as deviant, dangerous through their own cultural categories, that the mechanism of exclusion is triggered.

According Zanini, the foreigner becomes someone who does not belong to the same our sphere from the beginning. When he arrives there, he brings a set of peculiarities, qualities, which in the long run can transform its character more or less in depth (Zanini, 1997, p. 60). The foreigner upsets the familiarity of the space to which he belongs and obliges, in any case, to reorganize this space and to review its limits. This reorganization depends on the ability to integrate other individuals within one's own internal. When this capacity is lacking and to this is added a lack of self-confidence, then there is a tendency to assume attitudes to be suspicious and hostile. However, as brilliantly observed by Amselle (1999), it is precisely the mixing, the hybridization that is at the origin of humanity, because cultures and ethnic groups are built in relation and in opposition to each other. The ethnic groups, formations with fluid and changing borders, are not so much defined with reference to the territory, the blood, the language, but arise from contacts, selections and loans, they are incorporated or encompassed according to the dynamics of power that run through them. The concept of hybridization means that those cultures are neither given nor fixed; rather they flow and tend to blend (Friedman, 1999). Cultures are shaped and reshaped through interactions with other cultures, whereby people reflectively or unreflectively insert new meanings into their own cultural understandings (Bhabha, 1994; Werbner & Modood, 1997).

In synthesys, as Nuzzo proposes, on the border and across the border, differences are structured. These differences are of meaning, symbolic, juridical, political. Differences that produce other differences, between who is the holder of rights and who is without them; between those who belong to a specific community and those who are excluded (Nuzzo, 2006, p. 129). In this way, the border constructs its own citizens according to criteria of homologation and uniformity and thus becomes a necessary and, at the same time, non-democratic condition of democracy (Rigo, 2015).

CROSSING THE BORDER: THE ABILITY OF ASPIRING, IMAGINING AND DREAMING

Crossing borders is essentially an intentional action of a cultural nature, generated by the ability to imagine of being able to change the constellation of one's destiny by going elsewhere, changing the original life context. Such a statement does not exclude, nor does it underestimate, the material driving factors (poverty, deprivation, tyranny, etc.); on the contrary, they work as activators of moments of reflection and individual, family and collective self-awareness.

According to the Indian anthropologist Arjun Appadurai (2004, the ability to aspire is a capacity of a cultural order whose limits and possibilities of expression are rooted in the material and symbolic reality in which it originates; it feeds on the set of social norms and value systems to which that society socializes. Appadurai clearly states that aspirations certainly have something to do with wants, preferences, choices, and calculations. Aspirations are never simply individual (as the language of wants and choices inclines us to think). They are always formed in interaction and in the thick of social life (Appadurai, 2004, p. 67).

The ability to aspire is a complex ability, both in the initial phase of imagination and creativity, and in the final phase of realization. Appadurai's analysis are focused on a reality characterized by extreme material poverty and social degradation: the slums of Mumbai. Here, the work done by a network of activists (Slum/Shackdwellers International - SDI) is centered on activating the ability of the poor to aspire to better and more dignified living conditions. There are many difficulties that the activists and the populations involved in the program must overcome: first, the ability to aspire is strictly connected to the concrete resources individuals have at their disposal and are presumed to have at their disposal in the future. Main implications of that are for those persons who have always lived in a reality deprived of material goods and of elaborate cultural codes. This generates an evident difficulty in imagining a better future: the objective limits of the social and cultural environment (material and immaterial) reduce the ability to dream a future significantly different from the present and, if they succeed, consider it feasible in consideration of the real resources they have at their disposal (Martini & Vespasiano, 2021, p. 61).

The experience described by Appadurai shows, however, that competent work, aimed at generating collective awareness of the state of things and the belief that it is possible to change them, is an effective strategy for achieving both goals. Starting from the ability to save, considered the indispensable point to start the reflection on the construction of a dignified future.

Appadurai observes that in collective discussions - between activists and slum poor groups - there is consistent discussion on what to do and how to do it. There is a lot of discussion about the need to save, about the best ways to do it and there is also discussion about why some members of the community are unable to save regularly, as well as about the correct ways of using the community funds received on loan and on what duties one has towards the community, etc.

Within these collective moments of ideational confrontation, the local horizons of hope and desire enter into dialogue with other designs for the future (Appadurai, 2004). The complex community work, from which Appadurai's reflection starts, shows that not all those involved in the awareness program behave correctly towards the proposed purposes and, some prefer to use the resources made available by activists without actively collaborating to improve the situation. They show themselves as unable to aspire to a better future, contenting themselves with the status quo. Others - women to a greater extent - try to cross the borders of the system that holds them captive. This translates the ability to aspire into a *meta-capacity* unequally distributed in societies and available to a greater extent among the rich, whereby

these will have more and more opportunities to become richer and more affluent. The reasons for this mechanism can be identified in the ability of the rich and the privileged to understand the subtleties of social norms and identify the means available in more subtle ways and, in order to make them flexible to achieve the most sought-after social goals. In this way described, the ability to aspire appears as an *ability to navigate* between different social planes. An unavoidably unequal ability between those who have a reference map and know how to read it, and those who do not have any map available and, if they ever had it, would not know how to use it. Appadurai attributes the reasons for this inequality of capacity to the fact that, in every society, the most privileged have had the opportunity to use the map of norms more frequently and in a more realistic way to explore the future. The complexity of the operating mechanisms of the rules and the fluidity of the best strategies to be implemented suggests the bandwidth of the ability to aspire. It has multiple ways of being imagined and implemented, but this multiplicity narrows much for those who do not possess the adequate social codes to understand it, refine it and realize it (the combinations of means and ends, to return to Merton). Not surprisingly, Appadurai connects the ability to aspire with the Hirschmanian capacity of the *voice*, protesting the conditions of life to which one has been assigned by local authorities or any other authority (Martini & Vespasiano, pp 61-62).

The point at stake is the protest and not the exit (i.e., abandonment) or the loyalty (i.e., loyalty to belonging). The voice is a political, associative reaction, aware of rights: it is fed by SDI activists in the work of generating the capacity to breathe among the poor in the slums of Mumbai. Conversely, the exit is the reaction of those who have no hope of having their rights recognized and their aspiration for a better future and then abandon. They leave, go out, go out, emigrate.

From this point of view, the metaphor of navigation is useful: the richest and most privileged know how to use at best (to the right extent) all three strategies described by Albert Hirschman (1970): a gram of strengthening of belonging to the social group, some ounce of threat to leave the system, a considerable amount of protest. The result normally works; but since even the rich can get the doses wrong, when the first attempt does not have the desired effect, they start all over again with different combinations of doses, or they give up momentarily and wait for better moments to realize their wishes. On the other hand, as Appadurai writes (2004), the rich and the wealthy are flexible and have a lot of experience in complex and complicated situations. The poor are not flexible in equal measure, so they stiffen in a behavioral pattern (very often loyalty, in the hope of being rewarded for having been good and quiet; other times with the exit, in the hope of being able to build the desired future; rarely with the voice, because the poor and marginalized have no voice). In these terms, the approach based on the ability to aspire, as Appadurai himself writes, recalls the *capabilities approach* of Amartya Sen (1979) and Martha Nussbaum (1988). The skills approach, to use Sen's words, is based on a vision of life as a combination of different ways of doing and being, and evaluates the quality of life in terms of the ability to achieve valuable functioning (Sen, 1991).

Capabilities are abilities that a person has available to exist and act; the functionings, which derive from the different possible combinations of the abilities available to a person, range from the most elementary needs to be satisfied (eating, drinking, covering oneself) to the most complex and sophisticated (self-realization, obtaining social recognition). Properly as a sort of Maslow scale of human needs. Since people differ on the basis of capabilities, functionings and combinations, they choose (more or less freely), as is the case with Appadurai's ability to aspire, the real achievable levels of personal and collective quality of life discount these differentiations between social actors and internal to concrete communities. From the set of abilities of a person (or a community) her freedom (and that of the social

group to which he belongs) is generated to lead different lifestyles. That is, to cross the borders of a bad life (Martini & Vespasiano, 2021, p. 63).

The ability to aspire, in the words of Ernst Bloch (2005), is the strength to imagine as achievable the "not-*yet-conscious, the not-yet-become*" that has been "*daydreamed*". What is seen with open eyes becomes the driving force to face the unknown and its costs (hope does not allow us to be satisfied with the bad present, it does not allow us to give up), with the conviction to realize the utopia of a good life worth living, a world without borders. The affection of hope expands, it enlarges men instead of restricting them.

Therefore, aspiring to a future requires the ability to think of it as achievable. In this field, cultural resources are once again crucial, just as political capacities to have an adequate voice to express such an aspiration become crucial. The *capacity to aspire* is connected to the *capability to freedom*, because the ability to give voice to one's aspirations is a cultural resource and its practical possibility is a political skill (Sen, 1999).

Appadurai shows that who have gone beyond the borders of their homeland and of the reference culture has resources and skills of construction and activation of the memory (Appadurai, 2016). For the author, the emigrated communities can be identified as virtual communities. Unlike the natural ones that have remained within the original territory and are able to build relationships and connections starting from the memory of the community, these virtual communities build memories from connections, and usually these reminiscences do not refer to the natural genealogies of kinship, intimacy, or everyday interaction. Rather, they are based on the expansion of the possibilities of imitation of sociality, of construction of entire identities through the conventions of "*false*" identities, and of the production of cloned socialities, which try to build social worlds complete with everything starting from surrogate portions of identities, history and affinity (Appadurai, 2016).

For those who emigrate, the archive of images and imagination on the homeland they left behind and on the original culture is a map, a guide to the uncertainties of the construction of identity in adverse conditions. The construction of an archive of memory (more or less invented), therefore, is both the product of migrants' imaginative work and the indispensable source for strengthening the capacity to aspire. For Appadurai (2016), if this capacity to aspire is not developed, poor migrants will always remain servants of the whim of those who command them, prisoners of their domestic tyrannies and self-fulfilling prophecies.

On this point, Appadurai takes up a passage from Benedict Anderson (1991)'s famous work, to emphasize that imagined communities are sometimes more radically real to migrants than any 'natural' community can be, because electronic mediation assists and it often also replaces print mediation and previous forms of communication (Appadurai, 2016).

Also in this way (using imagination, symbols, signs, memory, narratives) the ability to aspire builds worlds and constructing worlds means going beyond the borders of current worlds (Valsiner, 2021; De Luca Picione, 2020a, 2020b; De Luca Picione & Freda, 2016).

CONCLUSION

In this chapter the authors have discussed how the border is a concept that can be understood as a threshold to be crossed, if you want to enter a differently structured reality. The border can also be understood as

a frontier to be respected, in front of it there is need to stop if not authorized by those who have power over the space in which you want to enter.

It is evident, then, that the authors are faced with two conceptions that describe two different social institutions. The anthropologist Victor Turner has conducted valuable reflections on the social institution of *limen*, understood as a margin, as a threshold to cross to get out of the condition of social ambiguity. The concept of *limen* can be traced back to the pioneering studies of Arnold van Gennep (1909) where it can be traced to describe the transition of social status within the rites of passage.

The concept of *limes* finds its analytical ground within political studies. The philosopher Massimo Cacciari, indicating the ambivalence of the concept, clarified that the difference between *limes* and *limen* was justified from an analytical point of view, but should not be understood as a clear operational separation, as the border (*cum- finis*) is a communicative reality, it is a line that inexorably connects two territories (Cacciari, 2000). The image used by Cacciari leads us to question the real possibility of operationally closing two separate spaces, for the sole fact that they are delimited by a politically fixed demarcation line (legitimized by international law and, if necessary, defended with the use of of military force). That is: we should ask ourselves how it could be possible to close the passage of men and women belonging to different ethnic groups and certain groups, in a globalized society, full of international collaboration agreements and characterized by continuous flows of goods between different socio-economic systems, if the boundaries are also concretely *cum-finis*, or lines that put different social spaces in contact. It is obvious that the now widespread response provided by some politicians with simplistic populist prosopopoeia is to be considered completely unsustainable.

However, it is good not to underestimate the growing adhesion of citizens, frightened by the metaphor of the invasion, and the pressing demand for the construction of impassable walls.

Avoiding simplistic and populistic solutions of dichotomy, the border can therefore be understood as a space where both encounters and clashes gather. Its ambivalence challenges the social actors to decide which side they want to activate, inviting them not to forget that both choices produce effects that are not entirely predictable and, in some cases, perverse. In any case, the inevitable reality of the border prevents you from reacting to the complexity of its management by simplifying the answer, such as: all outside / all inside.

As Victor Turner has shown, the threshold is the place of transition from one social status to another; it is a procedural, structural reality; it is a dramatic moment. It is the readiness for structural transition that transforms the border as a border (*limes*) into a border as a passage (*limen*). It is this intentionality to pass that initiates communicative exchanges of an intercultural type (Turner, 1972).

The Polish historian Benedykt Zientara wrote, recalling the anthropogeographer Ratzel, that the origin of the border lies in the movement that characterizes every living being, for which it is inevitably mobile; in this way, it is possible to understand the border line as an abstraction that has no real existence outside the geographical map.

The mobile nature of the border can be easily seen by observing the maps of the last 100 years, especially in anamorphic maps, which show the displacements of the border lines between states following a series of traumatic events (wars and post-war treaties). Strict or fluid compliance with the border is demonstrated by the presence / absence of customs crossings, which peaceful agreements between states can connote differently (Khosravi, 2019; Marshall, 2018; Schain, 2019).

For Zientara, the constitutive factor of borders is always a community made up of a more or less extensive, more or less stable organization. The social events within the neighboring communities, therefore, significantly affect the border line and even more so on the methods of use (excluding or including).

The existence of a no man's land, set up to separate two states, can be considered as a shared necessity due to the impossibility of drawing a certain dividing line; the spatial width of no man's land is directly proportional to the degree of conflict between the two states that share it (Zientara, 1979).

The border between territorial, cultural, linguistic, economic, political, religious spaces is to be understood as a convention - sometimes fluid, other times rigid - often due to the political need to narrate, to the social group to which they belong, to be protected even by the existence of the border that that border delimits (De Luca Picione, 2017). Protected because it is closed to those who intend to cross the border to enter, of course; but not closed to those who wanted to go beyond it from the inside to exit (only in dictatorial countries it is forbidden to leave the space of origin). The errors of interpretation will remain, on both sides; on the other hand, conflict is inevitable and unavoidable in a complex process of structural transformation. Nevertheless, as Victor Turner suggests, the intentionality of the relationship knows what to keep from the original structure: that is, all those components that reduce conflict and open up sustainable solutions.

The newest information technologies, the new information and communication systems, and all the algorithms for analyzing the growing amount of data cannot overlook how much dynamic the nature of human activities is. The construction, maintenance and continuous dismantling of anthropological, social, cultural and psychological borders is strongly interconnected with the opportunities and the developments of technology. We are inclined to consider that the same technological development - by modifying the capability of memory, storage and imagination of the future - contributes to exacerbate and made more extreme the explosive dynamics that occur along the borders. Human experience cannot do without the border both as a *threshold* and as a *limit*. This represents a challenge for the future, far beyond any commonsensical consideration on the need to break down borders (as tools of separation, segregation and inequality) or to strengthen borders (as defensive tools for identity, security and the maintenance of privileges).

NOTE

The essay is the result of the collaboration of all the authors. However, paragraphs 1 and 6 are attributed to three authors; paragraph 2 to Raffaele De Luca Picione; paragraphs 3, 4 and 5 to Elvira Martini.

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Chapter 23
Computer-Supported Collaborative Learning and Psychology:
An Option for the Future?

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ABSTRACT

In Italy there is still a diffused academic distrust the e-learning can transfer academic and professional skills especially in the field of psychology. Opponents of online teaching underline that teacher physical presence represents a "modeling asse" when transferring professional competencies which are also based on nonverbal behaviors. However, as Rudestam hypothesized, the characteristics of asynchronous CSCL may compensate the lack of nonverbal cues. Recent research has made a relevant contribution in this field, showing that CSCL can be an important tool, not only to increase knowledge on psychology, but also teach professional skills. This research also reveals that collaborative learning was effective in both learning settings, even with teachers with more or less experience. Overall, these studies, though with their limits, show that in Italy, to avoid psychology slipping behind other disciplines in online learning, CSCL could be applied to transfer knowledge and professional skills and social capital in the field of psychology.

BACKGROUND

Covid19 Pandemic has had a massive impact on people's lives. The urge to respect the social distancing measures has led to a shift in the fruition of services. The lockdown has resulted in a global closure of schools and colleges. About 1.2 billion students were out of the classroom worldwide (186 countries) (World Economic Forum, 2020). Fortunately, the closure of schools did not end schooling altogether, but it did change it. During the lockdown, schools had to search for new ways to provide access to education

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to minimize the effects of closures. Education was carried out online and on multimedia platforms. Many of the courses traditionally carried out face to face have been conducted online.

Before the Covid19 crisis, the use of distance learning worldwide was comparatively rare. According to the World Bank data, no nation had a universal multimedia curriculum for teaching and studying and just 20% of countries had teaching tools for digital learning, but it was only available in certain schools (European Data Portal, 2020). The physical "brick and mortar" classroom lost its monopoly on education since the recent COVID-19 crisis has seen a significant rise in online learning. The Covid 19 crisis provides an important measure of online learning potentiality.

With this sudden shift away from the classroom in many parts of the globe, some wonder whether the adoption of online learning will continue to persist post-pandemic.

There are several challenges that online learning expansion has to address still.

The first one is the digital divide; the disparity in access to information and communication services in certain geographical areas or population groups. According to data from UNESCO (2020) Globally, 826 million students do not have access to a household computer, and 706 million do not have access to the internet at home. In high-income countries, access to a computer is higher; for example, according to the OECD statistics, 95% of students in Switzerland, Norway, and Austria have computers for their school work. To appropriately implement online learning, access to the internet is necessary, but it is also necessary to have a quiet place to follow the lessons. According to a recent OECD report based on the Program for International Student Assessment (PISA) among 15-year-olds, 91% have access to a quiet place to study in Europe, but in Indonesia, just 70% have access to a quiet place to study (European Data Portal, 2020). The new significant shift in online education could widen inequalities and socio-economic related to the digital divide. With school closures, low socio-economic groups such as racial communities, refugees, learners with disabilities face the risk of slipping further behind. Governments need to promote policies to bridge the divide for low-income students.

According to the Digital Economy and Society Index (DESI) that considers the level of digitization of the countries of EU in four areas: Connectivity, Human Capital, Use of Internet Services, Integration of Digital Technologies and Digital Public Services. Italy ranks twenty-fifth out of all 28 member countries (Desi, 2020). This data shows how Italy is clearly behind the major European states. Compared to the EU average, Italy has "very low" levels of basic and advanced digital skills. Moreover, Italy ranks last in the EU on the Human Capital dimension. Just 42% of people between the ages of 16 and 74 have at least basic digital skills (compared to 58% in the EU) and only 22% have higher digital skills than basic skills (33% in the EU). Moreover a recent report of Istat (2019) shows that 3,4% of internet users has no digital skills(One million 135 thousand users). While it has risen to 2.8% of total jobs, the proportion of ICT specialists in Italy is still below the EU average (3.9%). Just 1% of graduates have a degree in ICT disciplines (the lowest in the EU).

In Italy, 74, 7% of the families have the wide band; but the digital divide tends to confirm the historical disparity between the northern and southern areas in terms of economic growth and infrastructure. The highest percentages of wide band users are registered in north regions according to the ISTAT report on People and ICT, which examines the percentage of households with broadband connectivity (Istat, 2019).

The centrality of Internet stressed by the "Covid" emergency, which has imposed an accelerated process of digitization services and economic activities in all the world, has brought to light the urgent need of Italy to boost its investment in the digital economy and facilitate the wide deployment of digital technology.

Furthermore, the perceived disadvantages of online learning may hinder the transition to distance education. For decades, scholars have argued if online education is less effective than traditional face-to-face. A 2013 Gallup polls in America emphasized that overall evaluation of Internet-based college programs is tiepid at best. Although they appreciate the greater range of options available relative to conventional face-to - face education, the majority indicated that it offers poorer quality teaching and less rigorous grading and testing, and that it is less credible to employers (Saad et al 2013). Opponents of online learning maintain that online courses' quality is compromised because teaching and learning are dynamic processes that benefit from non-verbal cues present only in traditional face-to-face settings. Several university professors (e.g. Barbera, 2004) have misgivings on online learning. Some studies have shown that online courses were perceived as inferior to face-to-face ones (Allen & Seamen, 2013). Other research (Summer et al., 2005; and Kartha, 2006) has shown that online courses' student satisfaction was lower than students on the ground learning environment. Recent evidence suggests that face-to-face courses have higher course completion rates than online courses (e.g.Simpson, 2003). Other research has indicated that online delivery does not achieve the same effectiveness (Xu and Jaggers, 2013). Analyzing data from about 24000 students in 23 institutions in the Virginia Community College system Jaggars and Xu (2010) underlined that students were more likely to fail from online courses that from to face to ones. Moreover, students who took online courses in the first semester tended less to come back to school in the following semester. A recent report (Protopsaltis & Baum, 2019) underlines that despite the strong growth of e-learning in the last years, a wide range of faculty members (Allen et al. 2012), but also employers (Amanda et al. 2016) are doubtful about the quality and value of e-learning, which they perceive as inferior to face-to-face. Underprepared and disadvantaged students tend to underperform and experience poor results, on average (Protopsaltis & Baum, 2019; Figlio et al.2010).

The debate on the quality of e-learning continues since other studies, instead (Brown, 2016; Neuhauser 2010; Murdock et al. 2012; Pai, 2013; Katy and Anderson 2006; Nguyen, 2014), have reported that the performance of online students was very similar to that of face-to-face ones. Farmakis and Kaulbach (2013) indicated that accurately-structured online offered the same quality as traditional courses. Several empirical studies have revealed that online courses are as effective as traditional ones (McLaren 2004; Summers et al. 2005; Larson and Sung 2009; Cavanaugh and Jacquemin 2015, Nguyen, 2015). Navarro and Shoemaker (2000) comparing on line and face to face students participating to a graduate-level MBA course in introductory macroeconomics found that outcomes of online students were as good or better than face to face students regardless of their background. Also Harmon & Lambrinos (2006) comparing learning outcomes of online and face to face students of macroeconomics courses, found that online students had higher scores (Harmon & Lambrinos, 2006). Bowen & Ithaka (2012) comparing students performance in a traditional format course and a hybrid interactive online course did not find significant differences. A team of the Stanford Research Institute International conducted a systematic research in the literature from 1996 to 2008 comparing on line learning with traditional format and revealed that online students performed modestly better that Face to Face students (Means et al., 2010).

One of the main criticism of online learning is the loss of contact and collaboration among learners and the social compact. The typical online education concerns the organization of learning objects for mostly self-regulated forms of individual learning. According to several authors students in this context miss out on direct, mutual feedback of co-present social interaction. The lack of physical and non verbal cues denies students relevant information about partner's characteristics, feeling and attitudes resulting in less sociable and effective communication (Walther, Loh & Granka, 2005). In their recent review on online education Protpsaltis & Baum (2019) emphasize interaction is essential in online education

to ensure quality and student success (e.g. Bernard et al. 2009; Swan, 2002). Also a recent research of Jaggars & Xu (2016) based on 23 online courses of two community colleges underline that the quality of interpersonal interaction is positively associated to student academic performance. Moreover frequent and effective student–instructor interaction encourages students to commit themselves to the course and perform better academically (Jaggars & Xu, 2016). Also another research (Balaji & Chakrabarti, 2010) found that perceived quality of of courses's online discussion was positively associated to student's participation and self perceived learning.

Computer-Supported Collaborative Learning (CSCL) has emerged as a mean of learning and teaching that can promote the social aspects of learning through a variety of technical and pedagogical techniques (Dillennbourg et al. 2009; Stahl et al. 2014). CSCL is based on cooperative and constructivist learning theories concentrating on social interdependence and learning through students who teach each other (Alavi, 2004; Hiltz, 1994; Ragan, 1996. Several theorists from Vygotsky (1978) to Lave and Wenger (1991) have maintained social interaction's relevance for an effective learning process. The applications of cooperative and constructivist models online was made possible by new computer technologies that have been configured to faciliatate social interactions between students and teachers and among student and favor collaborative learning and collaborative argumentation (Ligorio, 2001, de Vries er al 2002).

OBJECTIVES

This chapter aims to contribute to the ongoing debate on the quality of e-learning in Psychology. It builds on the authors' extensive review of the CSCL literature to examine the comparative efficacy of traditional and innovative on line courses based on Collaborative Learning in helping students master Psychology knowledge and professional skills.

INTRODUCTION

Collaborative Learning

Several authors (Panitz, 2001; Roberts; 2005; Johson & Johnson, 1996) maintain that collaborative learning can offer different benefits both academically and socially. It encourages critical thinking: it allows students to explain concepts through conversation, improves listening and communication skills, promotes metacongition and strengthens skill-building. It engages students directly in the learning process, promotes student responsibility for learning, it helps students wean themselves away from considering teachers as the primary source of information and understanding, supports a learning goal rather than a performance orientation, it enables students to exert a sense of control over objective. It promotes a positive attitude towards the subject matter, a higher achievement and class attendance. It increases student retention, enhances self management skills, helps student to persist and keep on the job more and it promotes innovation in teaching. It allows assigning more demanding assignments without excessive workload and tackles the disparity in learning style between students (Panitz 2001; Roberts, 2005).

Collaborative learning provides also several social benefits.

It develops a social support system for students promoting: student-faculty interaction, constructive societal approaches to issues, interpersonal relationships, positive management of conflict resolutions, it

develops social interactions skills. It promotes appreciation of diversity, builds sympathy, offers majority and minority members an incentive to work together. In addition, it develops learning groups, encourages individuals to critique ideas rather than people, facilitates team building and a team approach to problem-solving while retaining individual responsibility, improves leadership skills (Panitz 2001; Roberts, 2005)

Collaborative learning promotes several psychological benefits.

It can increase student's self esteem, it can help reduce anxiety, it can encourage students to accept help from their peers, it can develop a more positive attitude of students towards and of teachers towards students.

In the collaborative problem-solving framework, Liu and the collaborators (2015) suggest three separate social interactions that are effective for learning. The first refers to exchanging ideas or knowledge, It's beneficial for creating and retaining mutual representation and comprehension of the problem (Roschelle & Teasley, 1995), and for improved decision-making and problem-solving (Liu et al.2012). The second: negotiation, refers to the willingness of the learner to critique, elaborate and challenge the contributions of their colleagues (Liu et al. 2015). It supports individual 's comprehension and learning (Chi & Wyle, 2014). The third Coordinating problem solving refers to meta-cognitive activities such as: assessing strategies, regulating motivations and emotions, setting goals (Liu et al. 2015). These activities are crucial for efficient, effective and enjoyable learning (Järvelä, & Hardwin, 2013).

Computer Supported Collaborative Learning

The new technologies offered by software platforms, including multiple communication modalities, made possible the application of cooperative and constructivist models online. Computer Supported Collaborative Learning (CSCL) refers to learning situations mediated by technologies where collaboration, discussion among peers, and between students and teachers help achieve the goal of knowledge sharing and knowledge creation, or working on a common project or problem (Kirschner et al. 2008; Johnson, Johnson, & Stanne, 2000). Correctly applied CSCL can create an optimal environment in which interaction among students plays a relevant role in the learning process. Interpersonal communication can help reduce the transactional gap and reinforce students' psychological connection to the course by strengthening the "social presence", the degree to which an individual is viewed as a real person in mediated environment (Gunwardena & Zittle, 1997;

Zittle; Moore, 2013; Sherer, 2013). Roberts (2005) emphasizes a variety of positive aspects of the asynchronous environments: meaningful dialogues can take place at any moment, promising ideas are less likely to be missed, viewpoints can be considered for their own without the influence of stereotypes that can be superimposed in face-to - face environments based on gender or physical appearance.

Supporters of CSCL underline that social experiences available online can create interpersonal effects. Several researchers (Gay, Stefanone, Grace-Martin, & Hembrooke, 2001) point out that CSCL maintains on one side the advantages of flexibility and adaptability of individual-based e-learining and on the other side avoids the deficiencies of limited learner interaction and absence of feedback. Researchers have identified essential elements that characterize the learning process of CSCL: copresence, awareness, communication, collaboration and coordination (Kreijns, Kirschner, & Jochems, 2003).

Online collaboration is positively associated to academic performance (Nan 2018). Furthermore, CSCL can offer educational opportunities to develop professional skills, typically taught in face to face settings (Rudesstam, 2004). The CSCL also functions as a platform for students o learn in a collabora-

tive atmosphere that may offer an incentive to improve teamwork, communication and higher-order of thinking skills (HOTS) that are considered important in the twenty-first century (Othman and Zain, 2015)

Several research have shown that CSCL can be used to facilitate argumentative knowledge construction (Norozi et al. 2013). A recent meta-analyses over a 16 years period (2000-2015) revealed that mobile-computer supported collaborative learning has a positive effect on collaborative learning (Sung et al. 2017). Several researchers, have underlined that, however, just giving a collaborative task and offering learners communication tools may not be enough to promote effective computer-supported collaborative learning (Kobbe et al. 2007). Other research have shown that scripts for CSCL have a positive effect on learning, engage learners in beneficial collaborative practices and promote the development of collaboration skills (Fischer et al. 2013). Scripts foster collaboration by ordering the activities, structuring the interaction, and guiding the discussion (Kirschner & Erkens, 2013; Kollar et al., 2006; Vogel et al., 2016). In fact several researchers have maintained that without guidance, learners may have difficulties in engaging in collaborative activities, engage in higher level argumentation (Radkowitsch et al. 2020; Bell, 2004) and this could explain why in certain courses collaborative learning did not work.

Scripts for CSCL can be designed to provide scaffolds to structure an sequence collaborative learning activities (Radkowitsch et al. 2020). Ramirez et al. (2019) show in their empirical research that CSCL with scripting had a positive impact on logical thinking in earth science. A recent meta analysis on the effects of unguided collaborative learning compared to CSCL script including more 5600 learners revelas that CSCL scripts have positive effect on collaboration skills and also small positive effect on learning and no negative motivational effects (Radkowitsch et al. 2020).

DISCUSSION

Computer supported collaborative learning (CSCL) via online has become an important and appealing mode of learning across disciplines emerging learning paradigm.

Understanding if CSCL can transfer academic and professional psychological skills is particularly important in the Italian context where the distrust of online training in Psychology is widespread, and the Miur threatened in the year 2020 that telematic universities will no longer be able to activate courses in Psychology, Educational Sciences, and Pedagogical Sciences.

The academic skepticism towards online psychology teaching is shared also by the the National Council of the Order of Psychology that was mostly in favor of the closing of online psychology degrees. The president of the National Council, in fact, defined the closure as an important victory for the profession and reiterated how their efforts to restore dignity to training were rewarded by this decision.

To increase the quality of online psychology educations, It is relevant to evaluate if CSCL that can be effective and promote students' processes to understand better the psychological learning domains, academic knowledge, professional psychological skills, and promote social capital. The university la Sapienza (Francescato & Mebane, 2015) conducted a series of innovative studies to evaluate of the efficacy of CSCL in the field of psychology. The main aim of this research project was to compare the efficacy of face to face and CSCL setting in teaching community psychology knowledge and professional skills. These series of studies were conducted using different platforms from yahoo groups, to moodle or facegroups. Though they varied, all of them offered tools that allowed students to interact with the teachers and with their colleagues and to share materials. In the online courses the Forum area was used for asynchronous discussions. The Documents area was used by students and teachers to consult

theoretical materials, articles but also to modify the material working together. The polls area was used to vote on different issues.

Courses on line may vary in the degree of collaboration (from low to high). In these series of studies (Francescato & Mebane, 2015) the courses were planned to promote a high degree of collaboration. The possibility of free collaboration offered by new platforms does not systematically produce learning, therefore to enhance collaborative learning in all the studies of the research group of La Sapienza students were asked to complete tasks that required cooperation and their individual final assessment was tied to members of their group. Moreover, to increase the effectiveness of collaborative learning, collaboration scripts prescribed how students in groups should interact and collaborate. The students in online and face to face courses received the identical theoretical material, practiced the same exercises and receive feedback from the same teacher-tutor. All the micromodules were designed with precise learning objectives that could be done F2F in three hours meeting and online the same week. The sequences of group tasks, the pedagogical methodology exercises were held constant. Below it's and example of the weekly worksheet of the Community Profile seminars.

Weekly Objectives

- *By Monday read the theoretical attachments*
- *From 9am on Tuesday to 9pm on Wednesday prepare the map of your personal network and send a comment to your subgroup*
- *From 9am on Thursday to 8am on Friday discuss with your subgroup members and choose the three key witnesses to interview. A subgroup member will send an email to the enlarged group specifying: the three key witnesses chosen and the motivation for the choice.*
- *By Sunday, read the Theoretical Attachment 10. In this theoretical attachment you will find the information on how to create an interview. In the coming week in your subgroups you will have to build the interview to the key witnesses.*

The first pilot research on CSCL (Francescato et al. 2006) involved fifty psychology majors, homogenous for gender, age, grade average. They were assigned randomly to online of fact to face learning settings. The teacher programed collaborative learning activities that could be completed both in F2F and online settings. The same instructor over a two month timeframe taught in two seminars the same professional skills: community profiling. This technique allows users to find out what particular problems and strengths characterize a local community. Eight profiles (territorial, demographic, economic, service, institutional, anthropological, psychological, and future) are analyzed through a variety of data gathering techniques (hard data such as: rates of employment, demographic changes, air pollution levels ; soft data: movies script of the community, emotional snapshots of how residents feel). All participants divided in ten small groups did a final community profiling in a local community of their choice. At the end of the seminar participants in both seminars achieved similar level of professional competence. Student in both learning settings met the require standards. Face to face students did as well online students in terms of both perceived and actual learning. Online students, however, seemed to be more efficient in working together, since the majority of the online groups submitting their final profiling analysis before FTF groups. Moreover the post course evaluation showed that there were no significant differences between online and face to face seminar participants in perceived social presence, coopera-

tion and learning satisfaction, providing evidence that even asynchronous online environment could offer also the conditions for the development of positive interpersonal relationships.

A second study (Mebane et al. 2008) aimed to compare the efficacy of face-to-face and online affective education seminars, based on collaborative learning, in the professional training of psychology majors and in promoting social capital and sense of community. Training in affective education had be done exclusively only in face to face groups, this innovative study wanted ascertain whether it could be taught effectively also online. Forty four university students, balanced by gender, academic achievement and age, were divided in two groups online and face to face, taught by the same teacher. Micromodules were designed with precise didactic goals and group assignments, which could be completed face-to-face or on-line within the same week. The pedagogical methodology was based on collaborative learning, the group assignments and activities had been kept consistent in both classes. Students in both groups studied the same theoretical content, performed the same activities and received feedback from the same instructor. Students were evaluated using a range of assessment procedures (e.g. multiple-choice test, competency-based performances, and written essays). Success in facilitating circle times was judged in the second half or the seminar, when students were expected to develop this ability. Students knowledge was measured: through the perceived knowledge questionnaire that analyzed how students thought they knew specific subjects of the seminar and the actual knowledge questionnaire. The acquired competence in facilitating circle times and observing and understanding group dynamics, was judged by two professional psychologists that acted as silent observers. They evaluated how well students carried out functions related to task completion such as: give procedures, give or ask information, clarify the aims, summarize, keep group on task, integrate and evaluate how the group is proceeding. They also evaluated how students performed on the functions that promote group process such as: introducing people, participating and observing, helping to verify hypothesis, mediating and checking group feelings, controlling the level of comprehension and supporting and giving help. To assess the promotion of social capital and sense of community the personal observations about the seminar of each student were analyzed independently by two trained observers. Social capital was also measured through a follow up study carried out nine months later after the end of the seminars. The follow up assessed whether relationships formed during the seminars lasted months later. The findings of the study indicated that online students acquired theoretical knowledge on affective educations as their online colleagues. Moreover, students of both groups were evaluated positively on the professional competence of facilitating circle times and observing group dynamics. Online students, however, outperformed face to face colleagues in observing and understanding group processes, nuances and details. These findings could be in part explained by the structural advantage of e-learning platforms that keep record of every dialogue. Both seminars increased social capital and sense of community: 85% of online students wrote at least one remark on social bonds and 70% on the sense of community, 52% of the face to face group of students remarks related to social capital and sense of community. After nine months both groups acknowledged that they developed friendships, kept in touch and studied together with people. Online members, also met more often the new friends that they made through the seminars.

In a third larger study (Francescato et al. 2007) 166 psychology master level students were randomly assigned to four F2F and online seminars on community psychology. They were homogenous for age, grade average and gender. The same instructor, expert in both face to face and online taught the seminars for two months. The seminaries varied from developing psychological skills of organizational and community analysis to understanding group dynamics and facilitating team work. The seminars went on for two months. FtF students met weekly for three hours and were divided in smaller groups for their

collaborative activities. The online students also were divided in smaller groups and performed the same activities. Participants were administered the following measures before and after the seminar: the perceived knowledge questionnaire, the actual knowledge questionnaire. The competence acquisition was evaluated through a small group final paper showing how they used the techniques learned in the seminars in an environmental context of their choice (volunteer groups, community organizations). External evaluators rated the final papers on the basis of seven criteria. For each criterion evaluator could give a score from 0 (inadequate) to 5 (very good). Moreover also the academic self efficacy, the perceived self efficacy of problem solving, the perceived social efficacy, the empowerment were measured. Pre and Post course scores showed that both modalities were effective in increasing their perceived and actutal knowledge, empowerment, social self efficacy and self efficacy for problem solving. There were no significant differences between the two learning settings. With respect to competence acquisition all groups of students did at least an adequate job, showing that professional competencies can be learned both online and face to face; how ever online students performed better. Eight of 10 highest ranked papers (total 33) were carried out by the online groups. Collaborative learning promoted new friendships in both settings, however the social ties built in the online groups lasted longer, after 9 months 75% of the online students still saw their friends met during the seminars with respect to 59% of the face to face colleagues.

In a different study (Francescato et al. 2009) aimed specifically to compare the efficacy of face to face and online seminars in promoting sociopolitical empowerment. Several community psychologist have underlined the importance of promoting political empowerment (e.g. Kellu, 1986), especially in the Western countries where there is a decline of young people participation in politics. Two hundred and sixteen psychology majors, divided in 10 small groups were randomly assigned to on line and face to face community psychology seminars (Francescato et al. 2009). All seminars were taught by the same instructor expert in both settings. The timing and sequence of tasks and exercises were held constant for both experimental techniques. The seminars lasted 2 months. In all 10 seminars students learned. the same professional skill: community profiling. This technique allows users to identify problems and strengths of the local community. Results of Anova indicated that community psychology principles and community analysis skill, taught through collaborative learning methodology, increased the sociopolitical empowerment of both online and face to face settings.

Several authors have underlined that having a favorable attitude towards new learning technologies, being competent in their use has a positive impact on online learning (Klobas & Renzi, 2001). A fifth study (Solimeno et al. 2008) aimed to investigate the impact of teaching experience in the efficacy of collaborative learning seminaries. This research (Solimeno et al) compared the efficacy of F2F and asynchronous online settings in increasing graduate student's academic and professional performances, taking in consideration different levels of teaching experience and technical competence of teacher (e.g. having a Master or PH.D's, shorter or longer experience in teaching on line and face to face). One hundred and seventy psychology majors, divided in 10 small groups, homogenous for gender, age, grade average, were randomly assigned to online or face to face community psychology seminars. Five teachers taught one on line and one face to face seminar. They differed in education and job credential and years of experience in teaching collaborative learning online and face to face (ranging from teaching assistant to doctoral student, low and high experience in teaching). Each seminar, lasted two months and was divided in eight modules. The modules were designed with specific learning goals. The research confirms that both learning settings were effective in raising students' knowledge. Competence evaluation was measured by the evaluation of 37 final group papers. All small groups did at least an acceptable job, confirming the professional competencies can be learned in bot online and face to face settings. The

different teachers characteristics did not influence students' learning. These findings could be due in part to highly structured collaborative methodology that utilized in the small learning groups the same activities and instructions. They confirm previous studies that underline that script can facilitate CSCL by sequencing the activities, structuring the interaction and guiding the discussion (Vogel et al. 2016).

CONCLUSION

In Italy there is still a diffused academic distrust the e-learning can transfer academic and professional skills especially in the filed of psychology. The research of la Sapienza (Francescato & Mebane, 2015) has made a relevant contribution in the field showing that CSCL can be an important tool, not only to increase knowledge on psychology, but also teach professional skills. Overall these findings have practical implications since they reveal that CSCL can be used to provide innovative educational opportunities in Psychology University settings. These results confirm that CSCL was as effective as in F2F seminars as on line. It is important to underline that professional and psychological skills taught in these seminaries (e.g. constructing in depth interviews, facilitating focus groups, facilitating circle times) could have benefited from the physical presence of the teacher. Opponents of online teaching underline that teacher's physical presence represents a "modeling asse", when transferring professional competencies which are also based on nonverbal behaviors, however as Rudestam (2004) hypothesized the characteristics of asynchronous CSCL may compensate the lack of non verbal cues. This research also reveals that colloborative learnig was effective in both learning settings, even with teachers with more or less experience. Partially these findings could be due the higly structured collaborative methodology and confirms in part previous studies the highlighted the relevance of CSCL scripts. Furthermore the finidings indicate CSCL can promote not only academic and professional learning, but al also social capital. This results is very interesting since one of the main criticism of online learning is the loss of contact.

Overall these studies, though with their limits, show that in Italy, to avoid psychology slipping behind other disciplines in online learning, CSCL could be applied to transfer knowledge and professional skills and social capital in the field of psychology.

FUTURE RESEARCH

Several opponents of on line education in the field of psychology point out that the quality of education in online courses can be diminished since teaching and learning are dynamic processes that benefit form non-verbal communication. As described from our literature review (e.g. Francescato & Mebane, 2015) recent studies have shown that collaborative learning methodologies are effective in increasing knowledge and professional skills in Community Psychology both in face to face traditional settings and online ones. These findings underline that collaborative learning online should not be considered a "series B" educational but improve professional training and students' social efficacies, empowerment,

Further studies are need to confirm these findings also in other fields of Psychology. Future research should explore more how students' personality characteristics and learning strategies are associated with better outcomes in online and face to face learning contexts. We need to gather more data to understand which learning strategies, and which psychological variables differentiate students who perform better in asynchronous online or in F2F collaborative learning contexts. The research on the efficacy of CSCL

will have to be duplicated with different samples, especially with males, since the university psychology population was primarily of female students.

Another line of research could also explore the major obstacles to the effectiveness of CSCL in boosting academic and social outcomes in the field of Psychology.

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ADDITIONAL READING

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Chapter 24
Universal Design for Learning to Support Integrated Digital Teaching

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ABSTRACT

With the implementation of Integrated Digital Teaching for all school orders (DM 39/2020 and DM 89/2020), learning and digitization settings can be combined with the design of frontal and remote educational actions, allowing for better accessibility and inclusion. Universal Design for Learning is a model for building products and environments accessible to anyone as widely as possible, without the need for specialized planning or adaptations. In the pedagogical field, UDL is also a methodology that can be used to promote a fully inclusive curriculum, through a new interpretation of teaching-learning processes and strategic and reasoned use of technologies. The authors believe that Universal Design for Learning can support the implementation of integrated digital teaching.

INTRODUCTION

The progression of digitization in the educational systems of many countries of the world has led to the issuing of regulations and plans useful for the implementation of digital technologies in teaching-learning practices. However, it should be noted that the process of integration between teaching and new technologies - as well as the reflection on this integration - is still ongoing. This process has undergone an unexpected acceleration this year due to the health emergency from Covid-19 which has led, on a general level, to the immediate adoption of measures to allow schools to deliver educational and didactic activities in remote mode.

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BACKGROUND

Guidelines for Integrated Digital Teaching

Starting from experience matured even during the lockdown, in our country the Minister of Education provided a reference framework for planning the resumption of activities for the new year 2020-21, by Ministerial Decree no. 39 of 26 June 2020. Below, with DM 89/2020, the *Guidelines for integrated digital teaching* have been issued, with operational indications so that each school can equip itself with a suitable school plan.

The Guidelines define Integrated Digital Teaching as an "innovative teaching-learning methodology", complementary to the school experience both in presence and at a distance, which must be integrated and strengthened through the support of digital devices and new technologies. The DDI has the primary objective of ensuring sustainability of the so proposed activities and particular attention to fragile students and inclusive processes.

Integrated Digital Teaching primarily involves secondary school students, but also pupils of all school orders, should it be necessary to contain the sanitary emergency.

The school plan for DDI must be integrated with the triennial plan of formative offer (PTOF); it provides, from an organizational point of view, for a preventive research of technological devices and connectivity needs, the adoption of transparent application criteria and the protection of personal data.

The plan for DDI must take into account the needs of all pupils, first of all safeguarding situations of difficulty at any level, guaranteeing school attendance in the presence and promoting the planning of home educational paths shared with the competent local structures. For this purpose it identifies the principles and methods for redesigning methodologies, learning environments and specific activities.

The educational programming is thus optimized respecting the learning rhythms, integrating the didactic activities in presence with those at a distance, in synchronous and asynchronous mode; it can therefore understand that distance teaching is just one of the tools that DDI use to promote a structurally inclusive formative offer.

MAIN ELEMENTS OF INTEGRATED DIGITAL TEACHING

The essential elements of a digitally integrated educational-didactic plan can be identified above all in a flexible classroom setting: furniture that is not fixed but mobile, chairs and benches with wheels so as to easily create various group aggregations, desks with unusual shapes, use of colors in the furnishings to make the environment pleasant, motivating and engaging.

Obviously, the possibility of using - by students and teachers - any personal electronic device (smartphone, tablet, portable PC) in integration with the technological equipment of the school, is implicit, thanks to BYOD (Bring Your Own Device) perspective expressly provided by the *National Digital School Plan* (introduced by Law 107/15).

There is an evident need to adopt active teaching methodologies, typical of a pedagogical approach based on reality tasks and concrete experiential practices, which require interdisciplinary skills as well as collaborative and cooperative skills.

The strategic methodological support is given by Web Based Learning (WBL), which indicates a teaching-learning process that uses the resources available on the Web as educational offer tool, permit-

ting to open traditional classroom activities to flexible formative courses, placing the students at the centre of the educational process.

Additional elements of the DDI can be identified in an essential curriculum and in the need for changes in the processes of assessing the knowledge, skills and competences that students will be able to acquire while moving in unconventional learning environments.

Fundamental is the organization of methodologies for recovery and deepening of knowledge, which must be carefully considered to ensure a global vision of the effectiveness of the learning process.

The teacher who practices DDI must possess technical and methodological adequate skills, as well as particular attention to the new intersubjective aspects of the educational relationship.

The DDI is to be considered an effective and concrete solution at 360 degrees as it having the capacity to promote teaching strategies alternative to classical educational practices, both in presence and at a distance, in both synchronous and asynchronous modes, thanks to the integration of digital.

MAIN FOCUS OF THE CHAPTER

The Contribution of Universal Design for Learning to Integrated Digital Teaching

The organization of a didactic plan integrated by the digital modality must avoid a mere transposition of what is provided in the presence, since different learning models intersect according to educational needs (Milito, Tataranni, 2019).

The most appropriate methodologies are different but all aimed at the active and shared construction of skills and knowledge by the students, including the use of didactic proposals useful for increasing transversal and multidisciplinary competence; among the methodologies most used and suggested by the DDI Guidelines, short teaching, cooperative learning, the overturned classroom, debate and project learning should be mentioned.

The authors believe that Universal Design for Learning (UDL) can be considered an all-encompassing and articulated methodology, capable of supporting the implementation of integrated digital teaching, considering that already in 2018 the Department for the Education and Training System of the Ministry of Education has indicated the UDL as a model for the construction of a fully inclusive curriculum (see the document "School autonomy for educational success").

In the pedagogical field, Universal Design for Learning was first deepened, starting from the early 90s, by the CAST - Center for Applied Special Technology of Massachusetts, which defines as an innovative approach to didactic design, based on the assumption that in knowledge processes diversity connotes the norm and that it is necessary to respond to this diversity, from the beginning, with a flexible and pluralistic training offer (cfr. CAST, 2011, 2018).

Universal Design for Learning therefore helps to prepare educational plans capable of coping with the variability of students, recommending flexibility and customization in the objectives, methods, materials and evaluation system.

In this way the school would be able to satisfy the needs not so much of a hypothetical "average" but of each distinct student, allowing each to progress from where they are to where they would like to arrive, preparing them for learning throughout the vita (CAST, 2011, 2018; Hall, Meyer and Rose, 2012; Savia, 2016).

In essence, it is a way of planning and managing teaching practice that is attentive to the different learning possibilities and conditions that may arise in different contexts, with the primary objective of providing educational products and environments accessible to all and such as to guarantee a anyone the same opportunities for educational success, regardless of the presence or absence of difficulties.

Universal Design for Learning connotes «a set of principles for the design and development of paths that offer all individuals equal learning opportunities [...] not a one-size-fits-all solution [...] but the use of flexible approaches that can be customized and adaptable for the individual needs of each student» (Savia, 2016, p. 23).

The key word of the UDL methodology is therefore "flexibility", understood as a tool for adapting, supporting and modifying the information, contents, knowledge offered to students, in such a way as to guarantee everyone the same conditions for their educational success.

Theoretical and Scientific Roots of Universal Design for Learning

UDL methodology draws from the evidence provided by various research fields of cognitive psychology and learning sciences, in particular from the theories of cognitive and psychosocial development developed by Piaget, Vygotskij, Bruner, Bloom, Gardner, who through fundamental concepts for the psychopedagogy sector – such as proximal development zone, scaffolding, mentoring, modelling – have highlighted the importance of understanding and considering individual differences and of developing adequate strategies to cope with them (Savia, 2015).

The UDL assumes its imperative the individual differences connected to the multiple intelligences, to specific structuring of the mix of cognitive and learning styles and personalization of teaching, supporting teachers in the construction of curricula suitable not only for particularly vulnerable or disabled students but for all pupils, since they may not have satisfied their educational needs or have enhanced their skills, due to ineffective educational-didactic design.

The UDL approach has its roots also in the contributions of neuroscience, starting from the first studies by Luria (1973) on brain functioning in learning situations up to the neuroscientific evidence of the last twenty years (e.g., Cytowic, 1996; see the compendia, among others, by Gazzaniga, Ivry, and Mangun, 2015 or Postle, 2016), which play a specific and fundamental role in the processes of acquiring information and developing knowledge.

In particular, UDL refers to the identification of three primary brain networks, spatially distinct but interconnected, each involved in the learning processes:

1. *affective network* (limbic system), responsible for assessing the meaning or importance of the behavioral patterns we encounter or generate, helping us to decide which action strategies to pursue. Damage to the affective networks can impair the ability to prioritize, to select what we value or desire, to focus attention or prioritize some actions over others;
2. *recognition network* (posterior cortical area) responsible for recognizing objects or patterns in the external environment; when recognition systems are damaged or undeveloped, the brain's ability to know "what things are" - e.g., recognizing the meaning of objects, symbols, or signs - is impaired;
3. *strategic network* (anterior cortical area) responsible for generating patterns of action or effective responses, includes mainly the networks responsible for "how to do things": how to hold a pencil, ride a bicycle, talk, read, plan a trip, write a story, etc.. Frontal brain systems generate executive models for enacting actions, skills, projects;

The neurobiological framework helps to identify the best pedagogical-didactic procedures to guarantee fair learning opportunities for all students. It is worth underlining that this framework is entirely in line with the intuitions of scholars and theorists who inspire the UDL, primarily Vygotskij, Bruner and Bloom.

Structural System of Universal Design for Learning

Considering the theoretical approaches and contributions of neuroscientific research mentioned above, CAST (2018) has set three principles to the fundamental assumptions of the UDL, in turn articulated in as many connected universal design practices for the learning, summarized as follows:

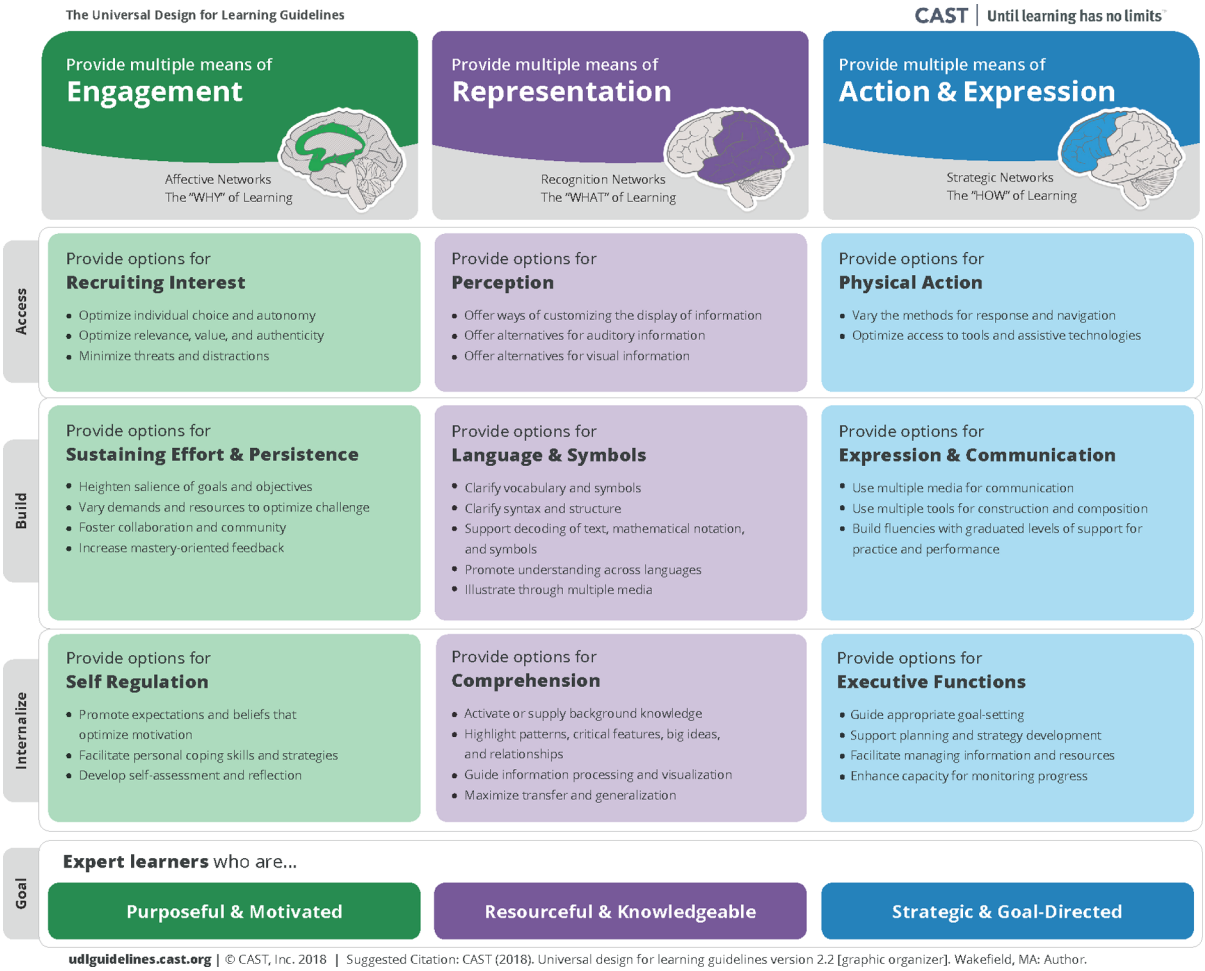
1) First Principle: UDL encourages teachers to provide different means for involvement (affective networks the "why" of learning), i.e. to look for more ways to motivate students. An example is making skill development feel like a game and creating opportunities for students to get up and move around in the classroom. Other common strategies include the explicit learning of control strategies that allow pupils to self-regulate in the moments in which they experience a difficulty in the activity they are carrying out, or letting kids make choices and giving them assignments that feel relevant to their lives.
2) Second Principle: UDL recommends offering information in more than one format (recognition networks: the "what" of learning), i.e. provide different modes of representation. It involves making available a plurality of ways in support to perception and understanding of information through different languages. For example digital books with expansions, in which the written text is accompanied by audio, video and images files that can be activated by the students, gives all pupils a chance to access the material in whichever way is best suited to their learning strengths.
3) Third Principle: UDL suggests offering students different ways of interacting with the material and showing what they have learned (strategic networks the "how" of learning), i.e. providing various modes of action and expression. A concrete example is the free choice of students to narrate in written rather than oral form, up to video format. Or students can choose between a pencil and paper test, an oral presentation or a group project.

These principles are the basis of an inclusive, flexible and fair training path, through which all students are guaranteed the possibility of achieving high learning standards, thanks to the involvement and motivation, to the proposal of different and diversified tools to represent the information, such as action and expression of knowledge. Therefore, the ultimate goal of Universal Design for Learning is to support teachers and educators for elaboration of curricula that guarantee equal learning opportunities for all students, or to identify objectives, methods, materials and evaluation models according to a flexible approach which allows an adaptation to individual needs.

As anticipated by authors, the three principles constitute the pillar of the UDL methodology; from them are articulated as many guidelines, declined overall in thirty-one operational verification points and in numerous examples of implementation (figure 1).

The guidelines and their declinations will not be illustrated here, the level of detail of which is not necessary for our purposes (for further information see Rose *et. al*., 2006; Savia, 2016); here it is sufficient to say that the operational framework of the UDA structural model is a useful tool for the work of teachers, as it supports the awareness processes inherent in the design and implementation of one's

Figure 1. Structural model of the UDA (retrieved from CAST 2018 - http://udlguidelines.cast.org)



own educational actions (as preparation of lessons or curricular design), providing prospect for the effectiveness of one's intervention that make the curriculum flexible, integrated and therefore inclusive.

Universal Design for Learning and Digital Technologies

A few words about the role of digital technology in the theory and practice of UDL, which has made it possible to design flexible learning environments able to adapt to the individual characteristics of students, consenting new visions and innovations for learning projects.

However, it should be noted that the tout court use of ICT does not guarantee the automatic realization of the methodological-didactic system of the UDL, because an inadequate digital application could be source of additional difficulties in the educational path, also of discrimination or exclusion. The technology's use does not necessarily improve learning and many technologies have the same accessibility problems of non-technological options. In other words, technology must be carefully planned in the curriculum as a means to achieve objectives.

The possibilities of using new technologies in educational paths are numerous and differentiated: from the use of interactive whiteboards or tablets to the use of digital apps, software or specific and specialized technological devices. The use of information and communication technologies in the application of the UDL principles allows to obtain an easy and effective personalization of the curricula, even in a very short time.

Digital technologies on the one hand and the progress of the learning sciences on the other make it possible to effectively customize curricula, in an ergonomic and economical way with respect to time and use of resources. Digital technologies respond to the need of the UDL approach to integrate supports, structures, challenges to help students to know and understand, as well as to be guided in their involvement in learning both in real (face to face) and virtual (distance) environments. But as already mentioned, digital technology is not automatically synonymous with UDL, even if it plays an important role in its implementation and also in its conceptualization in a feedback mechanism of choices and operations.

CONCLUSION

Digital technology is proving to be an increasingly strategic resource in supporting the design of integrated and inclusive educational paths, to encourage and facilitate multimodal educational proposals by teachers and at the same time to accompany students to the expression of actively constructed knowledge, shared and suited to personal possibility.

In our opinion, the methodological-didactic approach of the Universal Design for Learning well crosses the innovative system proposed by Integrated Digital Teaching considered as a complementary modality to the face-to-face- and remote- school because it – through support of digital technologies – ensures sustainability of teaching-learning and inclusive processes, as well as particular attention to fragile pupils.

Universal Design for Learning more than others appears to be capable of effectively contributing to the educational context, thanks to the methodological strategy of placing individual differences at the centre of the design of learning environments, which "represent the founding element of universality" (Sgambelluri, 2020, p. 246).

UDL, expanding to digital and the massive use of new media and providing for the construction of a flexible and equally effective curriculum for all students according to a truly inclusive pedagogical vision, "forces" the school to review not only the teaching methods but also environments and learning spaces.

UDL facilitates the personalization and individualization of educational path through a differentiated proposal offered to all and justified by the possibility of using various means for teaching to enrich the learning of students from the very beginning.

The multiplicity of tools, materials, teaching methods provided by the UDL methodology concerns both a quantitative differentiation, inherent in the complexity of the learning tasks, and a qualitative differentiation, possible thanks to the consideration of operative-expressive and affective-motivational modalities, essential for some but useful for everyone (Savia, 2015; 2016).

In conclusion, education policies increasingly highlight the potential of digital technology to reform or even transform teaching and learning practices in school settings.

The need for full access to digital technology by students and teachers is to be considered a question of democracy; it comes from that the orientation towards consolidated DDI practices is fundamental and urgent so that children and students are able to participate, develop and contribute to an active citizenship in the digitalized society of today and tomorrow.

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Chapter 25
Triple Helix Model:
A Device for Social Construction of Knowledge and Innovation

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ABSTRACT

Knowledge is the main tool for removing the obstacles that prevent a full equality between the social actors in order to compensate forms of social and economic disadvantage. In the authors' perspective, a social fabric organized on reticular models, capable of bringing together different organizations between people, artifacts, and social institutions, represents a system intrinsically rich in opportunities, for the creation of new knowledge and technology but also for the processes of dissemination of such knowledge. They try to reflect on how the triple helix model can represent a device for social construction of knowledge and innovation.

INTRODUCTION

Second modernity, late modernity, risk society, sur-modernity, network society, liquid society ... Whatever definition is attributed to current Western societies (post-industrial, post-fordist, post-modern), the signs of the fracture with the past are traced back to the accelerated technological change (ICT revolution), to the economy globalization, to the increase in the competitiveness of the large industries (Gherardi, Nicolini 2004).

Particularly, new information technologies have changed the ways of working, learning and communicating on a global level, with obvious impacts on the relationship between economy and society. The information society has now given way to the *knowledge society*, in which "the key factors are represented by knowledge and creativity and, therefore, the formation of human and social capital becomes

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the most powerful investment to produce value and respond to the challenges of global competition" (Vespasiano, 2005, p. 23).

In this scenario, individuals and organizations have had to review and refine their psychosocial behaviors and seek completely new strategic practices.

As is known, for example, the creation of innovations takes place more and more within networks of enterprises, universities and other national and international bodies, as well as through stable collaborations between producers and users (Wagner, 2018).

"The added value offered by the network is to facilitate the meeting between the innovation needs expressed by enterprises and the offer of innovative methodologies and technologies by research organizations. This reticular system is rich in potential, not only with respect to the creation of new knowledge and the management of technological knowledge, but also with respect to the process of circulation and dissemination" (the authors think about communities of practice - Wenger, 1998) (Martini, 2011, p. 16).

Obviously, carrying out the transfer of knowledge through very different cultural, social and political systems is not a very simple thing. The sociological nature of the problem highlights difficulties related to the possibility of creating a shared culture and the ability to establish relationships between partners, ensuring that "mutual learning becomes a useful resource for the entire network-system, where learning does not it means only the cognitive activity that produces images, representations, causal attributions but also that objectified learning in norms, procedures, routines and standards" (Gherardi & Nicolini, 2004, p. 10).

Therefore, the sense of identity and collective development produced by the network becomes relevant here; and it is what allows the network to grow beyond spatial boundaries that are not always well defined. Hedberg & Holmqvist (2001) speak, in this sense, of 'imaginary organizations' referring to a way of looking at organizations that goes beyond physical boundaries and real forms of exchange and where the distinctive feature is the idea of sharing and sociality.

For these reasons, the concept of technology also takes on a new role: it is not simply a tool that must be introduced into a given production cycle, but it is a process that needs to be developed through reciprocity and interchange mechanisms. In other words, what characterizes technological innovation is not so much and only the centrality of knowledge and information, but also the cultural processing and the social effect that it will cause within the community in which it will be adopted and spread - already in 1988 Ardigò sensed that society was destined to be more and more pervaded by cognitive information systems and invited to dwell more on the broader theme of the "sociality" of science and technological creativity (Martini, 2011).

On the other hand, the social constructivist approach (of psychological origin) not only emphasizes that the shape of technical objects is influenced by the social dimension, but also supports the 'strong sociality' of each object: natural phenomena, social interests, technical artefacts are socially constructed. In this constructivist perspective (basically common to the socio-constructionist perspective, of psychological origin) even knowledge is no longer analyzed as the representation of an objective reality, but as an interpretation and therefore construction of it, linked to processes of sense making of the collective (the authors think about SCOT or ANT).

These considerations, combined with the constraints of the global market and those generative of new technological knowledge, suggest converging towards an ever greater socialization of knowledge and towards the synergistic integration of the three worlds of research, business and government (Viale, 2001, p. 56; 2008). In this triple angle, knowledge is the main tool for removing the obstacles that prevent

a full and substantial equality between the social partners, in terms of balance between opportunities and positive actions in order to compensate for forms of social, cultural and economic disadvantage.

It is possible to socially build knowledge and innovation starting from the awareness that "the generation of knowledge, its being encapsulated in a professional competence or in a technology and its becoming innovation, is a process that is socially constructed, since each component it brings with it a social dimension, that is the contribution deriving from the participation of a community and the relationships that it manages to activate" (Martini, 2011, p. 20).

Therefore, sociability (Simmel 1983) becomes the critical variable of the entire process that is analysed here and therefore it becomes necessary to identify a model that makes this sociality the starting point for analysing and supporting a type of three-way relationship.

Considering the current economic context - increasingly knowledge based - the objective, here, is to try to identify this model with what in the international literature goes by the name of Triple Helix Model (THM) (Etzkowitz 2004, 2008; Leydesdorff 2005a, 2005b, 2006, 2010; 2013; Etzkowitz & Leydesdorff 1995, 1998, 2000, 2001, 2003). The model is considered as a new paradigm of socio-economic development and innovation for the analysis of relations between universities, enterprises and governments, i.e. those relationships that offer an infrastructure network for knowledge-based innovation systems (graphically, the figure of the Borromean knot is used to illustrate this type of mode (also used in Lacan's reflections). When we talk about a Borromean knot we mean a knot formed by three rings that remain united because they are tied to three: just one is cut and the bond that unites them dissolves. It is a very nice metaphor to explain a particularly complex bond and how the well-being of this bond depends on the balance between the parts).

Starting from the analytical description of the model, the authors will try to reflect on how innovative processes, that is the concrete application of new knowledge, develop on an essentially local basis. "In fact, it is on the restricted territorial scale that the collaboration processes between subjects are most effectively triggered, leading to the creation, hybridization and, finally, to the transfer of knowledge and technologies from the world of scientific research to that of industries" (Boschma, 2005).

In this perspective, the formation of a community, of a territory, can be interpreted as the result of a dynamic of interactions developed by individuals, families and organizations within a system of defined constraints and defined rules governing the social and economic activity in and of the territory. In this perspective, the notable social, economic and cultural dynamism of the last times imposes a more and more organized management of knowledge in order to guarantee the development; this involves ample and complexes processes of social interaction, in which the individuals redefine the acquired knowledge, activating and supporting innovation processes (Martini & Vespasiano, 2012, 2015).

This underlines the importance of the social capital nets and it induces to review the models of governance, according to a reading key that involves the cognitive socialization and transfer of competences among all the local helices: government, university, enterprises (Triple Helix) but also the civil society and the natural environment (Carayannis *et alii*, 2012).

KNOWLEDGE, TECHNOLOGY AND INNOVATION: A PROCESS THAT IS SOCIALLY BUILT

The individuals create knowledge while the organizations create the environmental conditions so that the same individuals can produce and to reproduce it (Nonaka & Takeuchi, 1995).

The creation of the knowledge by an organization is the result of a process much complex of social interactions, in which the individual put it available to other subjects, with different degrees and modalities. The members of these various groups redefine the acquired knowledge, metabolize it, enrich it, exchange it with the others priming circular processes of creation and innovation (Davenport & Prusak, 1998). Between the individuals inside the organization and the external users, an exchange of demand and offer of new knowledge is created in the form of technology and of innovation.

It isn't always easy to translate a knowledge in a technology, for which the knot of the matter is to find again in the connection knowledge-technology, proposed in literature as technological knowledge and synthetically defined as all of the knowledge that is shared by the community of the technologists with their norms, values, traditions and practices.

It is possible to define the technology in two ways:

1. a rationalized application of a technique to one or more fields of the social life, of the economy and of a system (Gallino, 1978, 1993[2], pp. 690-694 and 699-705),
2. as an integrated entirety of technical, organizational, managerial, economic, commercial, legal, cultural, relational knowledges, that together with an opportune amount of financial resource, it allows to whom possesses them to realize an innovation (Vespasiano, 2005)[1].

In this optics, the attention is concentrated on the social dimension of the technology: the transformation capacity of a technology cannot be picked if the social horizon in which the technology is planned, produced, commercialized, sold and used isn't considerer.

The social component of the technology and the innovation is the object of study of the social-constructionist approach (Berger & Luckman, 1966)[2], that considers the social structures and facts like the product of the human activity and, therefore, of the production of the individual and collective actions. If in the engineering approach the technology was an independent and external variable; in this context of studies it becomes a variable conditioned by economic and social forces and influenced by the context in which it is placed; in this way, the importance of the human component - that intervenes in the process of development, appropriation and change of the technology - comes outside[3].

Since the finality of a new knowledge turned into technology is the insertion in an innovative process, it is inevitable to also speak about "socialization of the innovation", with reference to which the roles covered by both the research system and the political and cultural guide are decisive (d'Andrea, 2006).

However, the literature on scientific and technological innovation puts in evidence that, only a research system is not able to activate processes of scientific and technological innovation. It is necessary, in fact, that the innovation have to be socialized.

The socialization process transforms the innovation, from technical issue in an object of diffused social action, that it is involved the single individuals, the families, the institutions, the great part of the enterprises or the informal social groups, carrying them to adopt guidelines that support and facilitate the innovation.

The political and cultural guide of the innovation concerns all the norms, the policies and the measures - realized in international, national and local fields - which want to orient, towards clear goals, all the elements that are involved in the innovation processes, from the tangible aspects (infrastructures, deep, technologies) to intangible ones (knowledge, resources, relations among actors of the innovation).

The contemporary presence of an advanced research system, elevated levels of socialization of the innovation and of a strong guide of the innovation, delineates an ideal case that could be defined like *in-*

novation social shared, that is highly socialized, strongly guided and supported by an advanced research system (Martini & Vespasiano, 2011).

THE INNOVATION SYSTEM

Many studies have shown that the networked form of organization favors the sharing of common cultural forms, the transfer of tacit knowledge and greater, a more balanced cooperation and a useful knowledge and innovation socalization.

It has also been seen how learning in the network arises from external communication processes: communication allows for the coordination of relationships between subjects and favors the production of information and knowledge. In essence, the relationships between organizations and their reference environments feed competitive methods based on the supervision of some key skills and on the exchange activity between the members of the organizational community (Lipparini, 2002).

A social fabric organized on reticular models, capable of bringing together different organizations between people, artifacts and social institutions, represents a system intrinsically rich in opportunities, both for the creation of new knowledge and for the management of technological knowledge, both also for the processes of circulation and dissemination of such knowledge. In these organizational contexts, in fact, alliances must be created and used in a collaborative way; the parties must focus on protecting the benefits from the joint activity, using them for continuous innovation and mutual benefit, so the key factor becomes the collaborative meta-capacity (Chiesa, 2001).

Within this analytical perspective and as a consequence of the need for socio-economic systems to continuously produce innovation, the concept of an Innovation System is born (IS). An IS is developed over a specific physical space: international, national, regional, local. The experience of recent years allows us to state that it is not possible to state that one of these spaces is more suitable than another. It is currently recommended to develop and co-exist different subsystems (local subsystem, regional subsystem, etc.) within a national system.

An IS is made up of a group of actors whose common goal is the production and dissemination of knowledge and technology within a physical space (international, national, regional, local), whose actors are represented by industries (public and private, small and large), universities and research centers.

The main function of an IS is to develop a shared culture of innovation, through a correct management of resources dedicated to strengthening the science-technology-business-society system. To do this, the system must establish rules to generate and disseminate technology / innovation, as well as to purchase and adapt imported technology / innovation. According to this definition, the innovative performance of an IS does not depend only on the performance of individual organizations but on their interactions and their ability to act as a collective system for the development and dissemination of new technologies. The role that different organizations play in an IS and the quality and intensity of their relationships determine the differences between one IS and another one.

In fact, the challenges to be overcome, are many and complex: building knowledge socially and carrying out its transfer through very different cultural and socio-political systems is not easy; just as it is difficult to create new knowledge by putting together complementary skills through mechanisms of mutual adaptation, with the certainty that knowing how to cooperate is as necessary as knowing how to compete.

THE TRIPLE HELIX MODEL

The research and innovation system has undergone profound changes of an organizational, sociological and managerial nature over the last century, particularly in the most industrialized countries, finding itself interacting more and more strongly to promote knowledge and economic development.

The academy, not always voluntarily, has progressively permeated itself with values, organizational models and social roles typical of the entrepreneurial and financial system, becoming a key element in innovation policies all over the world, both as a source of new technologies for start-ups and for existing industries (Etzkowitz, 2008). "On the other hand, the industrial system seems to have recently rediscovered the existence (and importance) of the university; in particular, since a part of the industry found itself in the need to recover the lever of innovation as a factor of competitiveness, after years in which the cost of labor, protected markets or the weakness of the currency have unfortunately represented levers of competitiveness extremely more effective" (Calderini, 2005, p. 28 our translation).

More and more, in recent years, it is argued that the "complex relationship between the organization of knowledge and technology could be better addressed with a federal approach, that is, with the decentralization of power to universities and research centers, thereby strengthening the possibility of an evolutionary self-organization from below" (Viale, 2001, p. 58 our transaltion). As Etzkowitz says, this involves carrying out continuous experiments on the relationship between science, industry and government, in order to find the right fields of application for the innovations of the future: the *Endless Frontier* model is gradually replaced by that of the *Endless Transition"* (Etzkowitz, 2008).

The environmental and selective constraints of the global market on the one hand, and the cognitive ones of the generation of new technological knowledge on the other, increasingly have the effect of integrating public research, business and government.

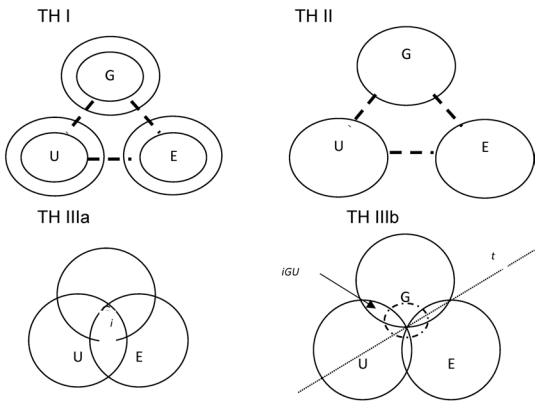
In fact, the initially bilateral relations between government and business and between university and business have now transformed into trilateral relations of the university-business-government type, thus creating the emergence of a tri-vector development model.

This relational mechanism between the three actors just mentioned, useful for triggering and supporting development dynamics based on innovation and technical progress, better known as the sociological metaphor of the Triple Helix, it wants to be the sociological expression of a new social-economic-political order based more and more on knowledge. The social-world system (in Luhmannian thought) becomes more and more complex than the biological one: just two helix are no longer enough, but the need arises to involve other actors. The latent presence of a third dimension within the system network can reduce the uncertainty related to the interaction of the first two actors.

The model presents the same elementary actors of the Sábato triangle and of the National Innovation System, but postulates a different dynamic of relations between them. In fact, they are not static, since they are continually in a state of transition and the succession of interrelations develops according to a spiral model that presents different types of relations between the public sector, the private sector and the university, depending on the level of capitalization of knowledge.

In other words, and unlike what happened in Mode 2, there are no concrete elements to speak of a blurring of the boundaries between academic, political, technical and social institutions; the supporters of the Triple Helix point out that the relationships that were valid in the past between government, industries and universities are still valid today but with the formulation of a new institutional model characterized by the presence of specific groups, within the academic, business and administration world public that meet and confront each other to solve the new problems posed by economic and social changes (Shinn, 2003).

Figure 1.



Source: Our elaboration by Etzkowitz, 2008; Leydesdorff, 2008

G: Government

E: Enterprise

U: University

i: common ground

t: time line

One could imagine the evolution of this model through at least three phases (Figure 1): in a premature version of Triple Helix (I) the three spheres are defined as communication sub-systems that interact through market operations, technological innovation, national governments and related interfaces. Triple Helix (I) can be displayed with three independent circles connected by dashed lines.

In a more developed version of Triple Helix (II) the three spheres are defined institutionally, they maintain a certain autonomy but interact through strong, well-defined boundaries. In this second version the three independent circles are connected by solid lines representing intermediary organizations such as technology transfer offices or legal offices.

In an advanced Triple Helix (III) the three institutional spheres, in addition to carrying out their traditional functions, also assume the role and perspective of the others (think of universities that can play quasi-governmental roles as local organizers of innovations). This latest version appears in the shape of three overlapping circles with the internal communicative core, represented by a small circle superimposed on the three intersecting circles.

In the Triple Helix (IIIa) configuration the three helices share a common ground indicated by *i*. Under certain conditions, however, this overlap can also become negative. This eventuality is represented in the Triple Helix (IIIb) configuration, where the center becomes a cavity that can be considered as a negative entropy within the system. This system works, over time (t), in terms of different communications with respect to its interfaces. When all the interfaces communicate, it is possible to hypothesize the birth of a hyper-cycle that integrates the systems in a differentiated way. Integration is not unique because there is no center where it can develop; this is why, in this situation, properties of autopoiesis, selection and re-differentiation will be necessary (Leydesdorff, 2006, pp. 402, 403).

On a more in-depth reading dimension, the model also postulates that relationships between subjects trigger a spiral of development, the dynamics of which imply a: "vertical evolution and horizontal circulation". The extension of bilateral university-industry relations to trilateral university-industry-

government relations was essential, since the model of a hypercycle is only meaningful in the case of three (or more) subdynamics. The "hypercycle" provides ametaphor for the supra-individual dynamics that give intersubjective meaning to the meanings provided by the carrying cycles. In other words, the emerging next-order-level "overlay" can contain a meta-representation of the individual representations and their interactions. This meta-representation in the hypercycle feeds back as a regime on the underlying dynamics which evolve historically along trajectorie (Leydesdorff, 2021, pp. 23-24).

"The triple helix circulation occurs on macro and micro livels. Macro circulation move among the helices while micro circulation take place within a particulat helix. The former create collaboration policies, projects and networks while the latter consist of the outputsof individual helices. Lateral social mobility, introduction of expertise from one social sphere to another, can stimulate hybridation invention and innovative of new social formats. Horizontal circulation is thus more likely to have a radicalizing effect than vertical circulation withi its inherent conservative bias. Vertical circulation occurs through upward movement of indivduals within an institutional sphere typically through recruitment of talented people from lower strata, revivifying an elite" (Etzkowitz, 2008, p. 21).

More specifically, it can be said that "the convergence of the three worlds corresponds to the interaction of three factors: actors, institutions and rules. The actors represent the micro level, within which the evolutionary characteristics of the model are clearly visible. The performances of the actors bring together roles and models that involve various and different cultures, previously separated: university researchers become entrepreneurs of their own technologies; entrepreneurs work within universities and related technology transfer offices; public researchers invest their time working within industries; industrial and university researchers manage regional agencies responsible for technology transfer. The meso level is represented by the institutions: it is that level that organizes production and makes use of technological knowledge. It can be divided into three sub-categories: hybrid innovation agents (high-tech spin-offs, venture capital); the innovation interfaces between businesses and research; the innovation coordinators, responsible for the coordination and management of the various phases of the innovative activity. Finally, the rules represent the macro level, which essentially has the function of guiding political incentives: the actors will make decisions in compliance with the regulatory framework and the tax incentives already available (think of the legislation on property rights)" (Viale & Ghiglione, 1998, p. 3 our translation).

THE SOCIO-RELATIONAL IMPLICATIONS OF THE TRIPLE HELIX MODEL

For several years an evolutionary trend towards convergence and integration between public research, business and government has been manifesting. The industry is faced with an increasingly difficult technological challenge due to the number of potential competitors in the world market, due to the greater complexity and riskiness of the innovations to be introduced, and due to the increasing cost of R&D. Universities and scientific research find themselves competing with more and more different actors who contribute to the increasingly scarce public funding. The central and peripheral government, pressured by numerous social and economic demands, is obliged to select, finalize and strictly monitor the resources it has available to support research.

What is the answer to this scenario of things? The Triple Helix model tries to clarify the complex relationships that exist between the protagonists of technology transfer - university, business and government - assuming that today the interaction between the three main subjects of technology policy is considered a crucial issue for technological competitiveness. of the industry and the balance of the market

in general: a strong interconnection between the subjects involved involves a joint action favorable to the creation of innovative environments in which it is possible to experiment new and more effective methods of cooperation (spin-offs, alliances, public laboratories and private individuals), without any of the three components having a real power of control over the others; paraphrasing Leydesdorff's words, a knowledge-based type of economy must recombine three functions in the dynamics of communication: 1) interpenetrations of economic exchange; 2) new productions that upset the balance of the market; 3) political (public) and managerial (private) control when confronted with the first two mechanisms. Functions are performed by institutions such as governments, industries and universities. Structural coupling networks can be studied in terms of how communicative functions are fulfilled.

When all functions are operational the system can be integrated, but in a redundant way as a three-stream system is a-centric, but an overlap between different types of communication can function as a hyper-cycle that supports problem solving and innovation at a lower level (Pitasi, 2004).

Each actor in the model, in fact, assumes roles and tasks by continuously reformulating the agreements with the others. These interrelationships are also realized simultaneously within each individual actor, continually reformulating structures, characteristics and objectives. "The movement across helices is sometimes viewed as a creating conflicts of interest due to too close association of roles in different spheres. But the bright side is istitutional cross-fertilization, whereby each helix is infused with new ideas and new perspectives from the others through the circulation of individuals. The emergence of conflicts of interst, until viewed solely for their negative implications, may also be an augur of the invention of innovative roles and new organizational designs, especially ones that cross-cut traditional spheres" (Etzkowitz, 2008, pp. 21-22).

In other words, the necessary relational mechanism imposed by the model implies that each of the three systems involved gradually assumes functions and connotations historically associated with the other two, resizing its role within society and giving rise to co-evolutionary processes of doing research.

As claimed by Viale (2001, pp. 58-59), industry, failing to satisfy the demand for scientific expertise within its R&D laboratories, is increasingly turning to universities and public research to find answers to its technological goals. In addition, it calls for help from the public hand to share the financial burden, especially when it comes to high-risk and long-term research programs. At the same time, public research finds itself increasingly obliged to resort to resources in the business world and, therefore, to finalize its activities towards industrial objectives. Finally, the university, driven by economic needs, becomes an economic player, promoting spin-offs of new hi-tech industries and giving rise to the start-up of industries using technologies and university capital. Finally, the same public funding for academic research today is increasingly tied to the fulfillment of functions of a social and economic nature.

For the latter aspect, political communication takes on particular importance, which regulates the relations between the scientific community and political society in relation to all those entities (political institutions, public administrations, political organizations, political movements) capable of affecting public policies relating to science and technology. In the case of scientific and technological research, public policies help to define the objectives of the research and to guide the use of the results of scientific activity: therefore, the intervention, is twofold, in relation to what happens upstream (funding and investments, major orientations of science policy, ethical compatibility) and downstream (economic exploitation and management of the social and political impacts of scientific discoveries) of research activity. For the community of scientists, confrontation with political society constitutes an important element of the entire creative process: political leaders, through their choices, define the environment in which researchers operate, which transcends the single laboratory or the single industry. In this regard,

it is necessary to clarify that political communication does not develop only in parliamentary halls or in ministerial commissions, but rather, it seems to find its maximum expression in those areas in which attention is focused on general research strategies, as it can be the process of preparing the research framework programs.

As you can guess from what is written above is that an aspect that cannot be underestimated when discussing the Triple Helix is that relating to the role of sociality in the networks of relationships, through which knowledge travels. Social research cannot limit itself to studying only the impacts of science and technology on society, but must focus attention on the ways in which the networks of actors oriented towards scientific and technological production are formed as well as on cognitive-operational strategies and on social factors that allow its diffusion.

Promoting the cultural development of innovation therefore means adopting strategies and policies that are concerned, first of all, with promoting the common construction of a cultural environment that is receptive to technological innovation, precisely because new technologies are processes that must be developed through mechanisms of reciprocity and interchange. The importance assumed by the cultural context and the social component in the socialization process of a technology highlights the concept of technological artifact, as an intermediary object of interpersonal relationships (Strati 2004) which is based on the idea of negotiation of co-constructed meaning. It would be like saying that "non-trivial interpersonal relationships are also incorporating technologies, in a dimension of humanistic sociability" (Ardigò, 1993, p. 37 our translation) and therefore the same "must be included in such relationships to avoid the weakening of society and to groped to make coexistence among people more human" (Zurla, 2010, p. 215, our translation).

The Triple Helix makes sociability possible (Simmel, 1983), understood as a "sort of cunning of reason that pushes humans to open up to others, to continuously intertwine reciprocal actions and communications" (Ardigò, 1988, p. 46 our translation).

Sociability facilitates the spread of a climate of trust and collaboration that makes it easier to create new collaborative forms for the socialization of knowledge, intelligence and technology transfer processes present in a territory, with the natural consequence of impacting in significant way processes of generation and accumulation of intellectual capital, innovation and competitiveness[4] (Martini, 2011).

On base of these statements, in the Triple Helix dynamic is very important the socializing role; in other words, tha authors underline the importance of the capital social nets. In fact, the social capital facilitates the spread of a confidence and collaboration climate to render simpler and effective the learning (individual and organizational) than in its turn generates intellectual capital, innovation and the competitiveness. An elevated intellectual capital could create greater job opportunities, to decrease the unemployment rates and to favour the social inclusion (Livraghi, 2003, p. 108). A greater active participation of the all social members to the productive processes - a smaller social exclusion - could favour the formation of social capital, revitalizing and recomposing internal relational dynamics to the circuit of the Triple Helix. From there it comes a virtuous circle of development and social well-being.

The relational governance of the Triple Helix, favours collective learning forms and to make easier the economic and cultural exchanges necessary to the development and the social inclusion.

However, there are also critical observations.

If in a theoretical perspective, the not-centric dimension is guaranteed, the situation is opposite in a practice plan.

It is possible to say that the university covers an importance detail in the model: with the public research centres, it is considered the main source of production of scientific knowledge and it has enormous responsibilities in terms of spread and circulation of the knowledge.

Interpreting this role, the university transfigures itself towards a model that is defined Hybrid University (Etzkowitz & Leydesdorff, 2001), assuming entrepreneurial nature and strengthening the relationship with the system of the enterprises: so that, the third mission of the university is to contribute, through processes of technological transfer, to the economic development and to social well-being (Etzkowitz, 2004; Etzkowitz & Viale, 2010).

If it's true, the technological transfer[5] policy could be considered the tool in order to favour processes of social construction of knowledge and innovation.

However, the technological transfer can represent a tool of application of the Triple Helix when in the generation of an innovative enterprise (product, service, process) technical-scientific feasibility; economic-financial feasibility and government financial support are realized at the same time, that is with the active presence of scientific talents, managerial competences and financial support.

The technological transfer does not have to be meant as a physical movement of a something but as process of communication of the knowledge, finalized to satisfy needs of users and to create added-value. It is also necessary to consider what to transfer, the characteristics of the involved actors and the modalities with which it is moved.

In this perspective, the role of a fourth actor is inserted: the *public* or rather all the private and public subjects that are not referable to the three already inserted in the Triple Helix Model (for example: private citizens, because users or applicants of new technologies; social or cultural associations, because expressions of collective affairs; professional organizations, because they are places of exchange of knowledge, etc.). In their comparisons is necessary to reflect on the problem of the credibility of what to transfer, on the quality ethics of the involved actors, on the sustainability (environmental, social and economic) of the modalities with which it is moved and, therefore, on the format to use in order to lead to good outcome the innovative communication.

For these reasons, many of the difficulties that is possible to see in this articulated process of trans-tech are generally of sociological nature: cultural, organizational, of affairs and objectives differences ask enormous efforts and, above all, ability to establish relationships among the partners, planned on the perception of equity in the exchanges, doing so that the profit results mutual and, therefore, useful to all the involved parts.

To observe the technological transfer process from a sociological point of view finds an obvious justification also in the crescent attention that social dynamics are assuming in the possibilities of scientific production and technological application.

In fact, is now famous the tendency of the research to develop itself through the involvement of more and more complex nets of actors. These favour the processes of innovation and valorisation of the existing social and scientific relations, and that support the formations of new relations among subjects not gotten used to enter relationship among them. To this is joined that the network organizational system favours the sharing and the transfer of scientific and technological knowledge and concurs a more effective trade exploitation of the scientific discoveries and a wider spreading of the research output.

The Triple Helix as a Tool for Technology Transfer

The Triple Helix model can be declined in terms of technology transfer, understood here as a relationship policy tool whose adoption aims to favor the generation of an innovative company (product, service, process) with the active presence of scientific talents. and research, managerial skills and state financial support (central and local government).

This concept not only recalls the idea of the plurality of the subjects participating in it (which is certainly important but valid in general for every type of innovative process), but it also refers to the belonging of these subjects to different contexts, internal and external to the innovative company.

The emphasis placed on the relational problem can be useful both for the orientation of scientific and technological policies and for addressing the study of innovation processes.

It is not easy to give a single definition of the technology transfer process. Generally it can be said that it is a fundamental component for the transformation of scientific knowledge into professional skills and innovation. Often we hear about it in terms of "flow that moves technology (or knowledge) from the source (public and private research bodies, universities, etc.), to the users (companies producing goods and services), in a certain interval of time, through specific channels (communication, logistics, distribution). In this sense, then, technology, technical knowledge and more generally knowledge have communication and interaction processes as fundamental determinants "(Coccia, 2000: 10).

First of all, the game tends to focus around two main players: the university, as a community that produces and offers scientific and technological knowledge; the company, as a community that asks for and applies, in specific areas, scientific and technological knowledge as social and cultural capital.

However, technology transfer can represent a tool for applying the Triple Helix model only if it involves the government actor, thereby overcoming the limit of concentration of power only in the hands of the university. The social construction of knowledge and its transformation into professional skills finds the engine of innovation in technology transfer, the mechanism of which can work completely in the presence of the perfect harmony of its elements.

That is, the generation of an innovative company can only take place if technical-scientific feasibility and economic-financial feasibility materialize simultaneously

For these reasons it is said that the concrete transfer of material technology must - first of all - rely on a communication and information exchange network woven by the actors in question; once innovation is triggered, the relational dynamics will undergo the necessary changes to cushion it and manage its impact.

In support of these considerations, among the various definitions of technology transfer present in the literature, the one provided by the Federal Laboratory Consortium for Technology Transfer (FLC), which better than others seems to describe the process in question: "the transfer of technology is a process through which knowledge, skills and methods developed thanks to state funds for research and development are used to satisfy public and private needs and requirements".

This definition makes it possible to highlight, on the one hand, the differentiation between the different components or forms of a technology (knowledge, skills or methods); on the other hand, it underlines the central role of public institutions, engaged in the production of technology, in welcoming the problems of other public and private organizations involved in the same process.

In other words, it could be argued that technology transfer is like a process of building change in which people from different socio-economic fields take part.

The elements that characterize this process are represented by:

- the objects of innovation, identifiable with the tangible and intangible technologies that will have to be transferred;
- the subjects of innovation, those who make the process possible through the creation of networks of relationships and strategic alliances;
- the context in which the transfer takes place, constituted at a "micro" level by the enterprise that welcomes innovation and at a "macro" level by the broader economic, political and social system in which all the actors of the process are immersed.

These semantic and theoretical assonances make it easy to compare with the Triple Helix model, whose characteristics make it possible to establish itself as a tool for technology transfer and consequently as an expression of a policy of action and communication within a network of different actors.

Beyond these necessary specifications, it is also necessary to consider that technology transfer must not be understood only in terms of the physical movement of something, but as a process of communication of knowledge aimed at satisfying the needs of potential users and creating added value. Obviously it is necessary to ask ourselves the problem of what we intend to transfer, what are the characteristics of the actors involved and the formats to be used to ensure that the communication process is successful.

As can be seen, many of the difficulties involved in this complex transtech process are mostly of a sociological nature: cultural, organizational and interest differences require enormous efforts and, above all, the ability to establish relationships between partners, based on the perception of fairness in the exchange, making sure that the gain is reciprocal and, therefore, useful to all the parties involved.

Therefore, upon closer consideration, technology transfer can be analyzed in the logic of translation, that is to say that simultaneous process of "displacement" and "translation", in which the transfer of an object (material or immaterial) from one subject to another implies a necessary transformation that makes it acceptable for the context that welcomes it. The actors participating in the process are considered translators who, as negotiators of meanings, modify and reconstruct the object of the transfer.

In a Triple Helix perspective, the construction of technological innovation involves:

- the subjects, with their choices,
- the objects, with their essential physical characteristics that pose both obstacles and opportunities to the transfer
- the complex reticular structure of relationships, which is considered a fundamental entity in the work of producing change.

THE TRIPLE HELIX SPACES

An element that must necessarily be taken into consideration is that of the space (international, national or regional) of application of the Triple Helix model. At the regional level, we can look at this model of superimposition of institutional spheres as a generator of spaces of knowledge, consensus and innovation.

These spaces are created as a consequence of an exchange of values between promoters of economic development, focused exclusively on an interest in business, and subsidies to businesses to create the conditions useful for the development of a knowledge-based economy.

A first indicator of this change is the greater involvement of universities, as well as the first step in building a knowledge-based economy is the development of "knowledge spaces" or, in other words,

concentrations of R&D activities at the local level. The existence of such reticular agglomerations, in fact, has been considered as a precursor to the development of knowlege-based regional economies (Casas, de Gortari & Santos, 2000).

Space of Knowledge

The concept of the knowledge space was developed by Rosalba Casas as a way of conceptualizing the decentralization of some research institutes from Mexico City to other Mexican regions.

This provided a basis for the development of research and new technology projects in social contexts that had never previously had this potential.

Some of these decentralizations took place due to the earthquake. Others because it was thought that the best solution was not to keep everything concentrated in one place but to move part of the technical-scientific resources to other social contexts. In any case, just as the presence of the university in the United States in the 1920s and 1930s represented a potential for regional economic development, in the same way these research institutes moved to other parts of Mexico represent a potential that has not yet been fully utilized.

Consensus Space

How can knowledge spaces be transformed from potential to concrete source of economic and social development?

The second phase of the creation of a space of consensus must intervene, that is, that neutral ground that brings together people from different organizational contexts and with different perspectives with the aim of generating new strategies and new ideas.

Space of Innovation

The third step is the creation of an innovation space, a new organizational mechanism that allows for the achievement of the objectives articulated in the space of consensus. From the analysis of resources in a region and the creation of a space of consensus that involves a set of different actors, the space of innovation is born.

The hybridization of roles and organizational functions, which arise within the space of consensus, is one of the results of this mechanism. What emerges is typically known as a "hybrid organization" which synthesizes elements of theory and practice from different spheres. For example, in the case of the American Research and Development Corporation (ARD) the building blocks were drawn from academia (MIT and the Harvard Business School), the financial industry (mutual funds), and the government (changes in regulatory practices) which define the investment risk.

The construction of the Triple Helix regional spaces is not a linear process. Innovative development can start from the knowledge space, pass through that of consensus to arrive at the definition of the innovation space or start from one of the latter. At the same time, it is possible to start directly from the space of innovation, with the development of a project or other initiative.

"The regional spaces consists of the set of political organizations, industrial entities, and academic, insitutions tha work togheter to improve the local conditions for innovation, forming the regional triple helix. These three key elements in a regional space play their specialized roles in a regional organizing

process. However if one of elementi s missing or constrained from partecipating another may take ist part" (Etzkowitz, 2008, p. 82). For these reasons, "multinational entities such as the European Union encourage university-industry-governament collaborations as a source of regional renewal and as a method of overcoming the barriers to regional development inherent in national boundaries" (Etzkowitz, 2008, p. 76). The objective therefore would be to be able to build "blocks of new territories" (transcending traditional borders) and leveraging the presence of supporting axes: "a source of knowledge, a consensus building mechanism and an innovation development project" (Etzkowitz, 2008, p. 76).

CONCLUSION

The development of the relations among university and enterprise and among these and the government institutions, can meet a series of cultural and fiduciary obstacles.

The European Commission (2003) and the National Academy of Sciences (1999), think that it is difficult to create fiduciary relations among university and enterprise for the lacked coincidence the respective institutional objectives. The enterprises are oriented to maximize own value, while the university to maximize the knowledge like public good. The two objectives must therefore find a land common around an innovation model that is socially shared. Cultural problems are recovered also in the political-institutional dimension. Often remarkable difficulties are manifested to prime tri-directional fiduciary mechanisms, than are not only formally cooperatives. Moreover, there are problems with the finding and the procedures of management of the resources financial institutions, than not always they consider the three actors in the times of distribution and expense synchronized, and in the modalities of final appraisal in agreement.

These statements make to understand that the process of construction of the knowledge is a complex mechanism. The Triple Helix Model, in fact, demands continues social-territorial adjustments and integrations. It cannot be considered a closed model to apply to any local context, because every context has its relational network - weak and strong - that give form and substance to the relative social capital.

The sociology writes it from years: the territories are various, the social, cultural and economic pre-existence are ballast to the development programs and their various abilities to create social capital nets and institutionalized confidence can be powerful motors in order to accelerate the realization of development programs (Bagnasco, 2006).

Although these attempts to favour forms of sustainable - beginning from the confidence and the collaboration among the present actors on a territory - they still represent an experimentation of a real governance based on nets of spread of the knowledge.

In fact, the effective transfer and valorisation policies demand long times of performance and *ruotine* of system. As an example, in the Italian system[6], it would be necessary that the evaluation of the university researchers is not alone founded on the number of scientific publications, but also on the number of collaborations that the same ones have with the industry and the administrations, finalized to develop ideas and technologies applicable to the production process and to the innovative one (of the entrepreneurial system and of that social one). In this way, the existing methodologies of transfer by head (or rather all those forms of interaction confrontation among academic and industrial researchers as the separation of university near industrial laboratories, the consultations, the seminars, the interviews) would be strengthen and the inside initiatives to creating spin-off high-tech would be rewarded.

With the realization of this process it is possible that also not particularly developed territories can have the chance to experiment and spread own knowledge. A territory, in fact, can start and to support processes of development if it succeeds to use, in the more opportune forms, all the resources available, supporting the culture of human capital of excellence (concerning ability to innovation) and the socialized knowledge, and observing the attention on the importance of the mechanism of the confidence and the collective participation of all the actors involved.

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ENDNOTES

1 Technology can be also a consultation or an economic-financial feasibility study.

2 The proposal social-constructionist appears like an attempt to integrate in an only theoretical perspective the conception of the social realty like external fact (already anticipated by Durkheim), and the conception of the society like a product of the interaction of the social actors (of Weber).

3 For a close examination on the theme is seen, among the other contributions, the Social Construction of Technology (SCOT) and the Actor Network Theory (ANT).

4 "The sociologist Simmel argued already in 1902 that the transition from a group of two to three is a qualitative one: another awareness of space becomes available. In a triplet, the realization of one or the other relation may make a difference for the further development of the triad as a system. According to Simmel (1902), a dyad remains a private relation; the triad introduces "sociality": each third person canwatch the other two and thereby have the advantage of the tertius gaudens ("the third who benefits"); that is, the third person may see options in the relations between the other two which s/he can use to her advantage. If the third person actively participates in breaking the tie between the other two, one can consider this as an instance of divide et impera ("divide and rule")" (Leydesdorff, 2021, p. 95).

[5] In the literature there are various definitions of technology transfer but the definition by Federal Laboratory Consortium for Technology Transfer (FLC), better than others, seems to describe the process in issue: the technology transfer is a process through which knowledge, abilities and methods - developed with the funds for the R&D - are used in order to satisfy public and private requirements.

[6] For an interesting perspective, see also Leydesdorff 2021, pp. 115-135

Chapter 26
Importance of Virtual Reality (VR) Tools in the Processes of University Orientation for Technological Degrees:
An Application to the Degree in Digital Business

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ABSTRACT

This chapter analyses the use of the virtual reality (VR) digital tool in the processes of university orientation, especially for those degrees that have important training on technologies in their curricula. To do so, a study on pre-college students through an experience with digital tools, like the use of VR headsets, was done. After that, the students completed a questionnaire to assess this activity. A total of 3,680 satisfaction surveys were taken, before and during the COVID-19 pandemic period. The obtained data demonstrate that when the satisfaction degree increases with the activity, the rate of students who eventually choose technological degrees like Digital Business improves.

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INTRODUCTION

Nowadays, there are several applications and technological tools that aim at developing capabilities and skills for students, whether cognitive or digital, especially useful for the changes that the new disruptive scenarios have brought.

Concretely, for some time there has been evidence of the potential of Virtual Reality (VR) in education. And it is because education represents one of the most interesting sectors for the design and use of RV applications, due mainly to its capability to introduce the student to immersive and multisensory environments, in which they can interact in an artificial context that stimulates their learning process.

In this way, Jiménez et al. (2019) point out that VR has become one of the most emerging technologies that have revolutionized experiential and active teaching and learning through the experiential participation assumed by students.

Among other skills and competencies, these new tools allow to empower critical thinking, creativity digital alphabetization, and multimedia production in students. Nevertheless, these digital instruments can also be used for university orientation, aimed at choosing higher education studies.

This paper focuses precisely on the orientation process that ESIC University carries out with the high school students that visit the university along the academic year. These visits' aim is that the students have a college experience, working for a day as if they were real undergraduates. This day, students experience how is a class, solving in teams a case prepared ad hoc and preparing a group presentation of the given solutions for that case. The aim is to introduce them to the didactic methodology of challenge-based learning (CBL), by which, students analyze a problem of their environment and propose ideas in an autonomous way that can make solve it.

Besides, and as a part of this visit, pre-university students have the opportunity to visit the virtual space called ESIC TECH, a classroom equipped with state-of-the-art technologies, destined to test new VR and immersive digital tools, 5G technologies, 3D impression, besides presenting them with essential aspects of the use of robotics in business and social environments. In this leg of the day, students can test VR headsets under the supervision of professors and professionals. These glasses have content that allows, among other options, present products, and brands in an impact way, through pictures and 360º videos. Moreover, among the content proposals, students can take virtual tours, that make them acquire a closer knowledge of the possibilities of this technology and get inspiration on how to use this methodology differently in other business or social scenarios.

It was precisely this visit to the ESIC TECH facilities that inspired this chapter. This paper aims to analyze whether through this immersive experience of the high school students, from their interaction with these new technologies, and concretely with VR, on the one hand, makes increase the satisfaction rate with the visit, and on the other hand, if this experience makes increase their interest on the university degrees whose curricula have a bigger content in technological traits, and if this can provoke a higher number of tuition reservations.

To find evidence on these hypotheses a quantitative study with the students of first and second year of high school who came to the ESIC university orientation sessions has been done. The study has been carried out during the academic years of 2019/2020 and 2020/2021, two significant periods due to the COVID-19 pandemic, that deprived several students of having the immersive experience in situ. In this way, if during the course 2019/2020 a total of 3,060 students visited the university, in the course 2020/2021 they were 620, what makes a significant decrease. Nevertheless, and despite this fall, the satisfaction rates are still high, because they did not go below a rating of 9.4 out of 10.

These results could have implications about orienting the students to choose their college studies. On the one hand, using VR can improve the results of the orientation tests and provide students a closer experience to their future profession. This way, the interest of the high school students to study at ESIC University can be increased, and the university dropout percentage can be reduced. The main limitations of the study come precisely from the lack of studies on the phenomenon, and the possibility to extend the results obtained to the great offer of university degrees existing nowadays.

Background

University orientation has had capital importance over the years (Gil, 2002). In the present, and taking into consideration the changes that society in general and the university are going through in particular, this orientation process becomes a key factor for new university students to can make effective decisions about the studies to be carried out. A decision that is not easy to take considering the wide number of degrees offered. In this sense, as the report of the Ministry of Science, Innovation, and Universities (2019) states, during the academic year 2017-2018 the different university centers offered a total of 2,864 undergraduate degrees. Of which 734 corresponded to private universities and 2,130 degrees could be studied in public centers. According to said study is the branch of Social and Legal Sciences the one that had for this mentioned course a greater number of degrees (1,007), with Madrid, Catalonia, and Andalusia being the autonomous communities where the most degrees were given (573, 530 and 385 respectively).

These are data that suggest the importance of academic guidance to allow students to face a large amount of informative inputs on the offer of studies, that can allow them to choose those that most closely match their expectations, lifestyles, and personal projects.

As Echevarria et al. (2008) indicate, career guidance seeks to enhance discovery of personal possibilities by identifying, choosing and/or redirecting academic, professional, and personal alternatives, according to the potential and vital project of the people and contrasted with those offered by the environment.

In this sense, the orientation should offer systematic help so that the youth and adults of the university can cope with all the requirements of their personal and social development, and not only those related to their academic results (Gil et al., 2001).

The question to ask is whether virtual reality VR can provide an effective solution when it comes to informing, suggesting or presenting the academic offer to students, so that they can choose with greater criteria and based on content related to those said degrees.

VR, defined as the creation of immersive environments, realistic and three-dimensional, involves the visual feedback of the body motion (Aarseth, 2001).

For its part, VR is an emerging technology that has already found successful application in a variety of different fields, including simulation, training, education, and games (Beti, Al-Khatib & Cook, 2019).

VR is used through a combination of technologies that allow multi-sensory interaction and in 3 dimensions with a virtual environment. The large number of scenarios that VR can represent makes it widely applicable to numerous areas of education, enabling effective learning and immersive (Christou, 2010).

There is evidence that virtual reality can address educational challenges such as achieving that the most passive and disconnected students get to see the relevance that knowledge can have for their lives (Gee, 2009). Virtual reality allows creating authentic learning contexts that are difficult to achieve with traditional teaching methods. Virtual reality helps in the development of important skills for 21st-century students such as empathy, systems thinking, creativity, computer literacy, and abstract reasoning. There

is evidence that virtual reality can help solve these challenges in the age of experience (Dalgarno & Lee, 2010).

As pointed out by Valenti et al. (2020), currently, the application of VR in learning environments is the subject of research in various educational settings. However, and despite its positive effects, the impact of this technology as a tool for the orientation of new students in the university has not been examined in detail. At this point, it should be noted that according to the study (U-Ranking, 2019) 33% of students do not finish the degree they started, and 21% drop out without finishing university studies, while 12% decide to change their studies. Although dropout rates are due to different causes, one of the main causes, according to the same study, is due to deficiencies in the orientation and prior training of students. Dropout is concentrated in the first year but also in later courses.

Virtual reality is presented as an immersive, hands-on learning tool and can play a unique role in addressing these educational challenges. VR opens up new opportunities that support students (Hu & Lee, 2017). In addition, virtual reality, unlike traditional teaching methods, leads to greater participation by students, increases the engagement of said students by providing a strong sense of presence and immersion. (Bailenson, Yee, Beall, Lundbland, & Jin, 2008). Virtual reality also allows constructivist learning, that is, students can build their knowledge from meaningful experiences. The virtual environment allows students to control their learning in one consequence-free way since the scenarios are not real, and from this technology, they acquire empowerment and commitment (Crosier, Cobb, & Wilson, 2000).

On the other hand, one of the benefits analyzed in the development of augmented reality tools, within a service environment such as education, is that they can generate a measurable improvement in key performance indicators (Key Performance Indicator - KPI) related to quality, productivity, and efficiency in the development of said services and activities (García, Mosteo & Murillo, 2018).

MAIN FOCUS OF THE CHAPTER[1]

The main objective of this chapter is to analyze some of the academic works that on Emerging virtual reality (VR) technologies in university orientation processes have been presented. In this sense, it is intended to shed light on the main points and topics addressed by said works, as well as the main results and conclusions of this methodology in its application to university orientation.

Issues, Controversies, and Problems

The results obtained have important implications when it comes to guiding students in the choice of their university studies. On the one hand, the use of VR can improve the results of orientation tests and offer students an experience closer to their future profession. Through the experience in augmented reality, we seek to find relationships between the interaction with this technology of the high school students and their subsequent choice to study at ESIC University. Previously, a survey is carried out to all the participants in the study about the valuation of said activity. We assume that if the experience is positive and has a high valuation, this index can positively correlate in the subsequent conversion of the candidate student in the election of a postgraduate degree and if they will do it at ESIC University. In addition, we would be in a position to be able to analyze whether there are those that have a high technological component among the chosen degrees.

On the other hand, it is also interesting to analyse in the medium term whether the experience with reality virtual (VR) allows reducing the percentage of dropouts from university studies.

The main limitations of the study derive precisely from the lack of studies on the phenomenon and the possibility of extending the results obtained to the wide range of university degrees that exist. Despite the interest shown by the literature in the implications of these tools in the development and improvement of education, there are not many studies that focus on relationships between VR technology and college counseling activity.

Besides the lack of studies in this direction, the importance and need for developing ad hoc content that favors this university orientation should be added. In this sense, one of the main problems raised is precisely the adequacy of the contents (photos, tours virtual, immersive 360º videos) for effective orientation.

1. **Key Term (KT):** Virtual reality, Interactive exhibitions, university orientation.

    a. Multimedia.
        i. Augmented reality glasses
        ii. Web communication

- **Key Term (KT):**

    - Virtual classroom
        § New Techonologies
        § Classroom
    - Interactive exhibitions.
        Step 1: Ask a question

Do high school students who visit ESIC and get in touch with virtual reality with VR through the ESIC TECH virtual classroom increase their interest in learning in this institution?

Step 2: Do background research

To build this research from a methodological point of view, we have started searching for bibliography in the Dialnet Plus database, to access those journal articles, chapters of books, and doctoral theses that could be related to the field of study, circumscribing the period referred to those coinciding with the real data of the visits to ESIC TECH (2019 to 2021) and two specific concepts: virtual reality and higher education.

Virtual Reality, which in recent years has had a great transcendence, since it has been shown to positively influence student motivation and, at the same time, for the improvement of their attention. (Alteridad, 2020)

In the same referenced article, Campos Soto, Ramos Navas-Parejo, & Moreno Guerrero (2020) summarize that in the previous two decades (1998-2018) the interest shown in SCOPUS publications on VR

applied to higher education grew by around 15 percentage points. All according to these authors from the University of Granada.

It is possible to improve educational quality thanks to the use of new methodologies such as Virtual Reality. (Alteridad, 2020)

The second part of the fieldwork consists of the analysis of the results of the questionnaires answered by the 3,680 pre-university students who came to ESIC TECH in the two said courses.

Step 3: Construct a hypothesis.

Hypothesis One: The experience of high school students who visit ESIC, and their interaction with new technologies and, especially, with virtual reality within the ESIC TECH space, increase the valuation rates of said visit.

Hypothesis Two: A high valuation level of satisfaction on the university experience day and on the visit to the ESIC TECH virtual space increases the number of these students who decide to enroll in ESIC Degrees that have a more technological component.

Step 4: Test your hypothesis by experimenting.

For the design of the research and the contrast of the hypotheses raised, we have started from an analysis exploratory on the works that address the aspects of vocational guidance and virtual reality. From a bibliographic review, the aim is to press the interest of the topic, while obtaining information on the different methodologies used and the results obtained. At the same time, it seeks to analyze the methodologies for applying VR to the different studies and degree families.

We begin from a quantitative study with the middleschool (1st and 2nd of Secondary) who have come to the ESIC informative day in the 2019/2020 and 2020/2021 courses. During these days, students can see all the ESIC campus facilities in Valdenigriales Av. s/n in Pozuelo de Alarcón (Madrid). Besides, and so that they can have an approach to the methodology used in the training of students, they are invited to carry out a group activity on a business case, where attendees must carry out a group defense of the same. During the day, it is intended that they know experientially the technologies that ESIC makes available to all students, during the completion of any of its training programs in the areas of undergraduate, postgraduate, and higher cycles of Professional Training.

Attendees take a guided tour through their own experiences through the ESIC TECH department. This department offers the possibility for all visitors to handle various cutting-edge technologies, which are being used by companies and which are part of innovative value proposals in the development of new business models. Among these technologies, we can highlight robotics (humanoids and personal assistants), 3D technology for both scanners and additive printers, autonomous driving simulators, 5G technology simulators, as well as a specific area of virtual reality. About the least, students live the experience within a space especially sensorized, called UX, in which they can know in-depth three of the reality technologies virtual that exist: immersive reality, mixed reality, and augmented reality.

During the visit to this UX space, students receive demonstrations of various technologies from three types of glasses. They can learn about the possibilities offered by the immersive reality glasses of the manufacturer HTC thanks to its VIVE model, which allows a digital recreation of the room and turns it into a flight inside a helicopter cockpit over New York City. They can appreciate the images and sound

Figure 1. Students in ESIC TECH
Source: ESIC University, 2021

that this technology provides and that generate sensations very close to the reality of flying, such as the sensation of height and sound.

Another virtual reality technology that students can experience is mixed reality. This technology allows experimenting with glasses from the manufacturer Microsoft, and specifically, with its Hololens 1 model. This technology, totally wireless and with the ease of use they offer, only using hand gestures, students can have an approach to the possibilities of these glasses for exclusive use by companies and thus appreciate the fact of incorporating virtual elements into the UX physical space such as simulators of motors in motion and even others of application in tourism such as the HOLOTOURS application, where architectural spaces such as the Colosseum in Rome are recreated with the possibility of superimposing digital images on current images and allowing to recreate the same space in 100 BC.

In addition, virtual reality technology enables life-size and 3D recreation of objects and places with which you have a different perspective, immersive and that increases the approach to the real elements in a small space since it is a wrapping technology. Finally, the Students also have an approach to augmented virtual reality technology, through the devices of the manufacturer Magic Leap. This technology, unlike the previous ones, allows the creation of virtual elements within the real space that, in turn, can interact with each other. In this case, spaces related to the retail sector and specifically with fashion and decoration can be recreated. This technology allows the generation of scenarios with an almost unlimited number of elements when recreating multiple spaces, interchangeable in terms of their shape and size,

Figure 2. A student with augmented reality glasses
Source: ESIC University, 2021

which, thanks to this technology, allows them to be recreated within the real physical space of the UX space. All in all, the recreation of this said UX space and its exposure to high school students, allows to collect their opinions on the matter, as well as the value it provides them with a view to the positive evaluation regarding the possibilities of choosing ESIC as a future institution to continue their training.

To carry out the collection of evidence, the preparation and completion of a questionnaire has been developed to collect the assessment of the students. This questionnaire is answered by all attendees as an exercise at the end of the day.

Step 5: Analyze your data and draw a conclusion

Figure 3. A student experiencing the feeling of visiting Rome
Source: ESIC University, 2021

In view of the following table, 3,680 university students valued their experiential visits to the ESIC TECH space, during the two courses concerned (2019/20 and 2020/2021) by the pandemic of COVID-19 with an average grade, using academic terminology, of A/ A+, respectively.

Figure 4. Hololens glasses
Source: ESIC University, 2021

Table 1. Results of the valuation of Pre-university students (PREUS) on ESIC TECH space

Course	Attendees to Days PREUS	Assessment of experience in ESIC TECH de 0 a 10
2019/20	3,060	9.4
2020/21	620	9.5

Source: ESIC University, 2021

Considering the data analyzed in the table below, we find the paradox that despite the reduction in the number of visiting pre-university students who took admissions tests in ESIC, the percentage of the same students who enrolled not only did not decrease but increased slightly in the referred period.

Step 6: Communicate your results.

Once the data from the last two years have been analyzed, it can be inferred, according to Table 1, that both the average valuation of the students who visit the ESIC TECH technology space and the conversion rate has increased slightly between the 2019/20 to 2020/21 courses, reaching an average of 9.5 points out of 10, and with a conversion of 0.704, which is equivalent to 7 out of 10 students who passed through the ESIC TECH space, ended up taking a degree at ESIC University. Therefore, the hypothesis of the authors that have a previous experience with virtual reality increases the degree of satisfaction of Secondary Education students who visit ESIC facilities is confirmed, from the experiential and immersive viewpoints.

In addition, despite the impact that the COVID-19 pandemic had on face-to-face classes between March and June 2020, and given the data in Table 2, the conversion rate of Secondary Education students who visited ESIC and finally decided to enroll in the institution, experienced a slight growing trend, after visiting ESIC and coming into contact with ESIC TECH virtual reality.

SOLUTIONS AND RECOMMENDATIONS

This simple, purely numerical investigation, although based on very specific real data, has the firm vocation to last over time, course by course, implementing more complex questionnaires that can help about how determinate tools such as virtual reality are going to be successful in selecting a higher degree that does not end in dropping out due to factors such as prior ignorance on the part of students.

Table 2. Results of enrolled students who went to the PREUS days

Course	Attendees to PREUS days	Pre-university students who took admission tests	Pre-university students who enrolled	Conversion rate
2019/20	3,060	144	101	0.701
2020/21	620	61	43	0.704

Source: ESIC University, 2021

FUTURE RESEARCH DIRECTIONS

If we had a much more accurate structured data corpus, which allows crossing variables with the studies that the students finally end up carrying out, and foreseeing 4 years, with their academic results in the selected higher studies, after having passed through ESIC TECH, and having the immersive experience of VR, a more logical educational path could be mapped out, both attracting future undergraduates, as well as guessing what are the obstacles that prevent a part of those students who finally do not enroll in ESIC University even despite their visits to the ESIC TECH space.

CONCLUSION

The world of education faces great challenges as a result of the passage of the Information Age to the Age of Experience (Wadhera, 2016).

VR enables new undergraduate and graduate students to undertake career guidance work. Thanks to these tools, young people can get immersive learning, where they can experiment with the exercise of a profession. In short, it is about making students experience in a more real way what the exercise of that profession would be like, and avoiding in a certain way university dropout rates.

Regarding future advances with the use of this technology, we must highlight the possibility of generating digital simulators of real elements in which it is possible to recreate situations by sharing telemetry of images and data. These situations are capable of being modified depending on possible assumptions and offer the possibility to see the results. These features make new tools for decision-making available to students and teachers.

As future lines of development, the main manufacturers of this technology already offer the possibility to generate "avatars", that is, the digital recreation of people, which, through software such as MESH and GUIDE, allow sharing the same physical space where several virtual participants can be placed, who can communicate with each other and share virtual elements. These new applications open a world of possibilities since they offer the possibility of connecting from anywhere in the world to people who can share virtual elements, who can communicate, and can make decisions.

In recent cases such as the one caused by COVID-19, which forced a significant part of the population to confine themselves to their homes, with these new technologies it would be possible to continue working remotely without being a problem not being present in the same place.

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