Preface

The present moment of social development can be described as the global digital transformation of several fields of society (science, finance, management, creative and social areas, education, etc.), requiring new professionals with new skills such as digital thinking, new areas of specialization and new ethical systems. According to the World Economic Forum (2016), digital transformation offers enormous potential for innovation at a trillion-dollar rate and can be applied to several industries (logistics, health, car industry, etc.) and social trends (science, government etc.). The digital transformation of society not only means significantly changes in industrial and economical structures, but also to the society as a whole.

However, its application in the various economic sectors is not easy. For instance, Frenkel (2017), presents a study where 91% of executives interviewed believe that their company is aligned with the definition of digital transformation. Yet, 25% refer that the lack of agreement on what practical digital transformation means is a key obstacle to a full implementation. On the other hand, 39% of senior executives interviewed confessed they resist to these new ways of working and they feel overwhelmed by the complexity of digital transformation efforts.

Digital transformation and disruptive innovation describe the reorientation of an industry, including its business models, because of the age of digital technologies: the digitization of products, services and processes (Herrmann et al., 2018). It can also be labelled as the process of using technology to change a company by refurbishing its business or digital strategy, models, operations, products, marketing approach, objectives, among other factors, by adopting digital technologies (Stolterman and Croon, 2004; Khan, 2017). It means "transforming an organization's core business to better meet customer needs by leveraging technology and data" (Clark, 2018). For instance, in education, the target customer is often students, though it could also be faculty, staff, alumni, and others. Digital transformation determines the transition to the massive use of digital technologies in the various sectors of the economy and society, improving or replacing traditional products and services.

Digital transformation is notable for the exponential growth in the volume of information generated and transmitted, preserved, analyzed and processed. These

technologies must correlate with present problems and develop adequately, meaning that organizations (educational or other), must transform themselves at the same rate of technology adoption that leads to disruptive innovations in all areas of the economy and society.

Although a lot of attention is being paid to the technologies for this digital transformation, as the Deloitte report stresses that it is not the technology, but the strategy, that drives digital transformation (Deloitte, 2015). In fact, technology changes every year, thus meaning that it is vital that the way companies implement the technology is watertight to prevent any problems along the way. According to the report, it is the technology that enables the processes to be fulfilled, but it is the way it is implemented that will have the impact on the success of a company. Moreover, the strategy needs to bridge the gap between the online and offline worlds – for instance, a museum needs to offer a physical experience but also to prolong that experience through mobile and social platforms. In education, a digital transformation might include items such as recruiting students digitally, using social media, allowing students to register via their mobiles phones, providing a variety of online learning options, working with faculty and programs to convert courses to flipped and blended models, using technology to monitor students' progress and success metrics, partnering with industry to provide digital badges and certificates to enhance career opportunities (Clark, 2018). The success of this change requires a shift in the skills of collaborators, as well as the development of a collaborative culture, where people are willing to pool ideas and share expertise. It means changing the way people work, their mindsets, the daily processes and strategies.

In this scenario, higher education has become a pillar of the knowledge economy (Chan, 2018). Although globalization is not a new occurrence, it has had, and continues to have, an impact on shifting to a knowledge-intensive economy, bringing together technology, communication, and information. Demographic pressures, global demand for talent, the highest number of high school graduates worldwide, the notion of lifelong learning, and the delay in retirement age have stimulated rapid demand for higher education (Chan, 2018).

The changes in higher education institutions, such as the rise in non-traditional over traditional student enrollment and online learning requires IT teams and teachers to adopt more modern, integrated approaches. A possible key to success comprises both reducing IT complexity across student learning, faculty teaching, advanced research and collaborative work environments, while protecting student privacy, financial data and transactions, health services data and the other sources of sensitive information in higher education. "Investment in digital transformation enables academic institutions—from community colleges to research universities—to introduce better ways of learning, new experiences, and inventive business models that drive successful outcomes" (VMWARE, 2017, p. 3)

Based on a study published by the British Council (2013), by 2020, enrollment in world higher education is predicted to increase by 21 million, with a stable population prospect for the 18-22 age group. On the other hand, Bohm et al. (2002) showed that by 2025 it is estimated that 7.8 million higher education students will be enrolled in foreign countries. These results clearly show that today, higher education faces a great challenge that can be understood as the need to create a new culture and a new "smart space" to train "digital" and essentially "adaptive" professionals (Kaminskyi et. al, 2018). This change forces digital transformation throughout the higher education "building", through infrastructure, pedagogical methods, research centers and the collaboration of leading companies in the various areas. In this context, higher education requires the development of a strategy for the digital transformation and the formation of new information and communication skills, being fundamentally oriented to be networked and flexible, in order to adapt to existing and are coming (Moreira et al, 2017). This system should provide mobility for teachers and students, and also adapt the educational content to the new reality (Kaminskyi et al., 2018).

According to Chan (2018), the new reality referred above, have made it possible to provide online teaching materials available from some of the world's best universities in the 21st century. Allen & Seaman (2014) showed that approximately 7.1 million students took at least one distance learning course and 69.1% of US authorities noted that distance learning is central to the long-term strategy of their higher education institutions.

The theoretical and practical aspects of the digital transformation of society and the higher education system in particular are dealt with in detail by Berman and Bell (2011), Wißotzki and Sandkuhl (2015), Rozanova and Yushyn (2015) and Kuntzman (2016). As per Kuntzman (2016) and Rozanova and Yushyn (2015), the main directions of the influence of digital transformation on the evolution of social and economic systems are (1) to increase mobility to meet consumer needs, allowing overcoming territorial restrictions and dependence on the location of service providers; (2) obtain the possibility of collecting, storing and processing large volumes of information, which leads to a reduction of transaction costs in decision making and conclusion of transactions; (3) proliferation of network effects, which modify the chains of profit generation and underpin new business models; (4) change the system of relations between consumers and service providers for the participation of consumers in the process of creating a new value for the consumer.

Wißotzki and Sandkuhl in (2015) address two aspects of digital transformation: the transformation of products and services offered by organizations and the transformation of business processes into the supply of these products, in both aspects, are distinguished by three stages. In the area of transformation of products and services, the following moments stand out: improvement (aggregation of additional services), expansion (aggregation of new resources of existing products

or services through digital components) and redefinition (creation of new products or services that replace the previous ones). In terms of business processes, the stages are: creation (the emergence of new IT-based business processes), leverage (the emergence of new opportunities to achieve greater efficiency of business processes) and integration (the combination of new and traditional business processes in a single infrastructure).

Assuming that the overall goal of digital transformation in the higher education system is the transformation of educational services and the business processes that accompany them, based on the main directions of the influence of digital transformation on the evolution of social and economic systems defined in Kuntzman (2016) and Rozanova and Yushyn (2015), there are three possible different directions according to Kaminskyi et al. (2018): (1) transformation and redefinition of educational services to meet changes in the business process system of higher education; (2) transformation of business processes aimed at creating new and improving existing IT-based business processes as a basis for analysis and transformation of educational services; (3) combining the first and second directions to integrate the simultaneous transformation in both directions.

The future projection of higher education supported by digital transformation and the need for disruption can be observed through the convergence, according to Hammershøj (2018) of three tendencies: (1) the crisis of the university as an organization; (2) future employment needs of society; (3) the emergence of new digital information and communication technologies. According to this author, the convergence of these three trends is likely to result in a perfect storm scenario for higher education, i.e. the disruption of higher education.

CHAPTER SYNOPSES

This book has four sections. Section 1, "ICT and Educational and Social Dimensions of Digital Transformation," Section 2, "Cases of Digital Transformation in Higher Education and Organizations," Section 3, "The Use of Distance Learning and Pedagogies to Achieve Digital Transformation," and Section 4, "The Future of Digital Transformation: A Reflection." Each section and the respective chapters will be introduced next.

Section 1: ICT and Educational and Social Dimensions of Digital Transformation

Companies are using technologies to improve performance. Digital transformation is the profound transformation of business and organizational activities, processes, competencies and models. According to Lima and Pacheco, and chapter "New Trends and Tools for Customer Relationship: Challenges in Digital Transformation," in terms of customer, it means changing the way business interaction occurs during the customer journey. In digital Era there is a tremendous growth of customer empowerment, so companies need to find news ways to be innovative in terms of customer support, anytime, anywhere and with the adequate device and media – text, video, instant messages and unexpected ways.

In this context, "Collaborative Environments Based on Digital Learning Ecosystem Approach to Reduce the Digital Divide," prepared by Mendoza, Arteaga and Broisin, constitutes a new educational paradigm approach to encourage different learning communities to use new ICT allowing them to be more competitive in today's world and thus shortening the digital divide problem. As education can divide countries and people, information and communications technologies can go either way. So, it is very important "Facilitating Inclusive Teaching and Learning Spaces Through Digital Education Technology: Teaching and Learning Though Digital Technology." In this third chapter, Makoelle and Somerton discuss some of the challenges universities are facing. As more universities move towards a distance mode of teaching and learning there are increasing opportunities to enroll students from a greater diversity of backgrounds. Thinking in a deeper way, it is necessary to produce an innovative curriculum. The use of a Learning Management system is viewed as the technical support for learning. Finally, in the chapter, "LMS Tools and Data Analysis Approaches: Similarities and Differences," Al Amoush and Sandhu discuss that LMS is a necessary and important tool and well suited as a learning tools and activity at higher educational level. Thus, this may be one of the reasons why a lot of universities these days are using the LMS tools. This chapter discusses the main useful tools and data analysis approaches helping the user to decide which one to choose.

Section 2: Cases of Digital Transformation in Higher Education and Organizations

In the chapter "Organizational Knowledge Sharing and Enterprise Social Networks: A Higher Education Context" (Corcoran and Duane), the authors showed that knowledge is a vital strategic asset for organisations but is surprisingly not well

managed in public higher education institutions, with a number of negative effects. A new wave of social-media driven knowledge management techniques may have a transformational effect on these institutions, potentially leading to increased intellectual capital and competitive advantage in ever expanding, global marketplaces. Enterprise social networks and virtual communities of practice are at the heart of this new type of knowledge sharing environment, and provide a significant opportunity for higher education institutions to significantly change the way that staff interact and communicate with each other, generating a number of individual and organisational benefits. Gaetano and Boldi presented in "Artificial Intelligence Applied: Six Actual Projects in Big Organizations" chapter some real applications of the most advanced information technologies in complex adaptive systems, as for-profit companies and organizations. In particular, they presented the application of Machine Learning and Artificial Intelligence to support some of the activities that are strategical for an effective management of Human Resources. For each project, they provided a description of: a) the context, b) the problem, c) the solution implemented, d) an analysis of the advantages and the limits of the solution. All these cases offer also quantitative and qualitative data to sustain their thesis: Artificial Intelligence is a tool that can help humans managing the complexity levels of the so-called Anthropocene era we live in. To conclude this section the "Assessment Approach of Enterprise Readiness to Digital Transformation" (Zotova and Mantulenko) chapter is devoted to the information technologies use in the organization activities in the context of its readiness for change. This chapter presents the analysis results of specific features of the information technologies integration with various business processes in Russian companies and the methodology developed by the authors for a comprehensive evaluation of companies' readiness for change. Particular attention is paid to the aspect of developing a complex system of indicators for each factor that determines the effectiveness of the integrated information system formation and use.

Section 3: The Use of Distance Learning and Pedagogies to Achieve Digital Transformation

The chapter "Managing the Presence and Digital Identity of the Researchers in a Distance Learning Community" (Oliveiraa and Morgado) intends to show the importance of the presence of junior researchers on the social web in establishing contacts with other researchers or specialists. Researchers give great importance to the development of their digital skills to strengthen their online presence and which gives them credibility and recognition in the scientific community. In the chapter "A Pedagogical Model of Distance Training for the Continuous Training of Magistrates" (Caldeira and Pedro), a case study of lifelong learning is presented. Being aware

of the importance of e-learning within existing training structures and in different professional contexts, this work aims to contribute to the modernization of the training practices implemented in the continuous training of magistrates, through the design of a pedagogical model of distance training, using a hybrid regime, to be implemented in the continuous training of magistrates. To conclude this section, "A Framework for Self-Regulated Project-Based Learning in Higher Education: Requirements, Model, and Architecture Suitable for Student-Centered Learning Environment," presented by Zarouk, Restivo and Khaldi, is described. The 21st Century requires the acquisition of new skills to keep pace with drastic and continuous changes enabled by the technology on our lives. Hence, this transformation causes a gap between the skills people learn and the skills people need. Consequently, today's labor force need to hire candidates being able to collaborate, communicate and solve problems. For this propose, this chapter presents a Framework for the Self-Regulation of Project-Based Learning suitable for a Student-Centered Learning Environments in Higher Education. The Framework is defined by a set of General Requirements, based on a Theoretical Model, whereby Strategies, Practices, Principles, Tools and Actors are defined to conduct the Project's processes. Moreover, this framework can be operationalized according to a series of cyclical and reciprocal activities as well as a Functional Architecture. The Integrated Framework guides and helps learners to effectively benefit from the emergence of some educational digital tools and strategies such as Gamification, Portfolio, Learning Analytics and digital Mind Mapping etc.

Section 4: The Future of Digital Transformation – A Reflection

The chapter "Creative Disruption in Higher Education: Society, Technology, and Globalization" (Lemoine and Richardson) intends to show that the globalization and the mushrooming of digital technologies accelerated tremendously during the last decade, and higher education faces its greatest combinations of challenges: economic uncertainty, accountability and globalization: overlaid by emerging technologies. University leaders face the twin trials of dramatic decreases in public financial support and the increasing cost of resources to avoid technological obsolescence. Nothing has effected education as profoundly as the advent and implementation of technology in higher education. The focus of society in the 21st century will be knowledge-based: learning will be critical and information will continually become obsolete. To conclude this section, "What Does the Future Hold for Innovation Management Education?" presented by Širok and Jääskeläinen, intends to identify and describe emerging trends that will most likely put additional pressures on innovation management education in the short- and mid-term. Based on the presented change-driving trends, a concept of a future-oriented innovation management course

will be presented. Additionally, the hypothetical implementation of the innovation management course concept will be presented. In the conclusion, the challenges that innovation management education should address will be outlined and discussed.

FINAL WORDS

The field of Digital Transformation is a growing one and with impact in all dimensions of human life. It entails challenges in the way we work, relate, communicate, collaborate and even spend our leisure time. One might compare this situation to the one we lived a few years ago with the advent of technologies. Yes, it can be similar but in a bigger scale as we do not realize yet, its full impact. New (buzz) words appear such as Industry 4.0, Work 4.0, e-skills, Skills 4.0, Higher Education 4.0, 4th Industrial Revolution, just to name a few. Our objective was to contribute to this discussion and help readers to be aware that this digital transformation is more than just introducing technologies in our lives. It will change the way we work, we relate, we communicate, collaborate, study and even our skills and necessary attitude. We cannot talk anymore about the focus in the development of technical skills, as technology changes every year, but focus on the soft skills, on the development of a curious, proactive and thinking attitude. And this, of course, challenges the way we teach. Are we ready for the future?

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