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FOREWORD

The International Journal on Optimization and Applications (IJOA) is an open access, double blind peer-reviewed online journal aiming at publishing high-quality research in all areas of : Applied mathematics, Engineering science, Artificial intelligence, Numerical Methods, Embedded Systems, Electric, Electronic engineering, Telecommunication Engineering... the IJOA begins its publication from 2021. This journal is enriched by very important special manuscripts that deal with problems using the latest methods of optimization. It aims to develop new ideas and collaborations, to be aware of the latest search trends in the optimization techniques and their applications in the various fields..

Finally, I would like to thank all participants who have contributed to the achievement of this journal and in particular the authors who have greatly enriched it with their performing articles.

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Wellbeing at work in the digital age: Between opportunities and threats

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Abstract—Currently, the world of work is facing a profound mutation, and is confronting numerous social, economic, sanitary and regulatory changes, bringing with them a host of transformations in the professional sphere, with remarkable consequences on working conditions and human capital's attitudes and behavior.

This destabilizing context has profoundly changed management methods, and has also accelerated the digital transformation of companies. The use of digital technology has become a fundamental solution to face the current crisis. However, this technological mutation has had a deep impact on the wellbeing and the quality of life at work. The use of digital tools has been both a generator of discomfort for some and a source of wellbeing for others, a factor of psychosocial risk for one category and a facilitator of communication and collaboration for others.

In this theoretical study we will explore the positive and negative effects of digital transformations on the wellbeing at work

Keywords—Digitalization, Wellbeing, Work, Risk, Ill-being.

I. INTRODUCTION

Currently, the world of work is facing a profound mutation, and is confronting numerous social, economic, sanitary and regulatory changes, bringing with them a host of transformations in the professional sphere, with remarkable consequences on working conditions and human capital's attitudes and behavior.

This destabilizing context has profoundly changed management styles, and has also accelerated the digital transformation of companies. The use of digital technology has become a fundamental solution to face the current crisis. However, the massive diffusion of digital tools and the different changes it generates, can have a diverse impact on employees' wellbeing at work.

In that regard, we will try to expose, through this bibliographic research, the positive and the negative correlation between digitalization and wellbeing at work and we will explore the twofold consequences of digitalization on wellbeing at work. The main objective of this study is therefore to answer the following question: what are the double effects of digitalization on the employee's wellbeing at work?

In order to provide a detailed answer to our question, we will firstly present the conceptual framework of our study. Then, we will try to understand the different effects of digitalization on the improvement or deterioration of employee's wellbeing at work.

II. DIGITALIZATION AND WELLBEING AT WORK: TWO MULTI-FACETED CONCEPTS

We begin our bibliographic research by defining the key concepts: wellbeing at work and digitalization

A. *The concept of wellbeing at work*

How can we define the concept of wellbeing? The answer is far from being easy, as it is a multidimensional concept, vast and difficult to define, but schematically, we can predict that it refers to a feeling of pleasure, stability, satisfaction or comfort both on the psychological level as well as the physical level.

The concept of wellbeing is frequently confused with other related terminologies, such as quality of life, happiness, health, pleasure, wellness, life satisfaction, fulfillment and material comfort (Ayang-Ono,2020; Hassani, 2017; Baudelot and Gollac, 2002). These notions are used as strict synonyms without respect for their conceptual meanings (Abaidi, 2017).

From an academic point of view, many attempts to define the concept of wellbeing are present in the scientific literature. Hereafter, we present some definitions.

During the international health conference held from the 19th of June to the 22nd of July 1946 in New-York, the World Health Organization defined health as "*a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*".

The above definition links health directly to wellbeing, and indicates that health is based on the intersection of the different dimensions of wellbeing (physical - mental - social). However, even if the concept of wellbeing is included in the WHO official definition, it remains unclear and incompletely defined.

René Dubost completed the definition of the World Health Organization by specifying what can be understood by the notion of "wellbeing": "*A physical and mental state relatively exempt from discomfort and suffering that allows the individual to function as long as possible in the in the environment where chance or choice has placed him*" (Dubost, 1978)

According to Breda and Goyvaerts wellbeing is "*the state in which not only 'primary' needs such as food, clothing, health and housing are satisfied, but also the state in which the individual participates in social life, takes part in the culture and values, and is able to develop an autonomous personality, in order to cope with social constraints.*" (Breda and Goyvaerts, 1999)

The National French Center of Textual and Lexical Resources, insists on the multidimensionality of the notion of wellbeing. It is first of all "*a pleasant state resulting from the satisfaction of the needs of the body and the calm of the mind*", and also designates "*material comfort allowing a pleasant life*" (Larousse Dictionary). Therefore, wellbeing in French refers to three complementary dimensions: the physical, the mental, and the material.

For Mondo, wellbeing is "*an unstable balance between the satisfaction of material needs and the satisfaction of the individual's spiritual needs*" (Mondo, 2016).

From the above definitions, we can see that wellbeing is a multifaceted concept with many definitions.

In addition, and in contrast to the concept of general wellbeing, the scientific literature on wellbeing at work is not very abundant (Kiziah, 2003). Workplace wellbeing remains a less studied and developed notion (Bernard, 2019).

Researchers' interest in the concept of wellbeing at work is relatively recent, and it dates back to the 1990s (Bernard, 2019). This notion has been influenced by several disciplines (economics, psychology, philosophy...) over the years. Some

researchers consider wellbeing at work as an extension of the concept of general wellbeing (Diener, 1994), yet other researchers believe that the two concepts are not conceptually identical, and that workplace wellbeing should be considered as a specific and distinct construct from general wellbeing (Massé et al., 1998).

Hereafter, we will list different definitions for a better understanding of the notion of well-being at work:

Among several definitions of wellbeing at work in the scientific literature, we find the one proposed by Danna and Griffin who define the concept as "*a construct that includes both physical and psychological symptoms, general life experiences and work-related experiences*" (Danna & Griffin, 1999).

According to the International Labour Organization (ILO), "*workplace wellbeing relates to all aspects of working life, from the quality and safety of the physical environment, to how workers feel about their work, their working environment, the climate at work and work organization*"

Wellbeing at work is also "*a two-dimensional construct: an emotional dimension linked to pleasure and all the positive effects and a cognitive dimension related to the meaning of work for the individual*" (Richard, 2012).

Wellbeing at work is therefore an amalgam of different factors susceptible to influence quality of life at work. It is a multi-dimensional concept that combines satisfaction, fulfillment and balance between the physical and mental health of employees at work.

Through the different definitions cited above, we conclude that general wellbeing and wellbeing at work are two similar concepts, still there is some variability between them.

Hereafter we will discuss the second concept of our study: the digitalization

B. The concept of digitalization

The concept of digitalization is currently presented as an indispensable and inevitable tool. This term, which is frequently used in public discourse during the last years, is very often confused with other related concepts such as digitization (Gorenšek and Kohont, 2019).

The Larousse dictionary defines the term "digitalization" as a perfect synonym for "numérisation" in French or "Digitization". The two terms are indeed related, but they are conceptually distinct.

Before defining the key concept of our study "digitalization", it seems important to understand what digitization is, in order to clarify the distinction between these two concepts and to remove this ambiguity.

The Oxford dictionary considers digitization as: “*a process of transforming data into a digital form that can be easily read and processed by a computer*”.

Brenner and Kreiss define the concept of digitization as “*the material process of converting analogue streams of information into digital bits*” (Brenner and Kreiss, 2014).

Therefore, digitization is a technical process that aims to encode or convert physical data to digital data through the binary (0,1) language.

After these brief clarifications of the concept of digitization, we outline below some definitions of the concept “digitalization”.

Etymologically, the word digital comes from the Latin “digitus”, and refers to fingers. While in English, the term “digital” refers to the use of numbers

In their conceptualization, Belvaux and Notebaert define the term “digital” as follows: “*digitalization is all about using fingers*” (Belvaux et Notebaert, 2018)

For Fitzgerald and his colleagues, digitalization is “*the use of new digital technologies to enable major business improvements such as enhancing customer experience, streamlining operations or creating new business models.*” (Fitzgerald et al, 2013).

Westerman and his colleagues define the concept of digitalization as: “*the use of technology to radically improve the performance or reach of enterprises.*” (Westerman et al.,2014).

For Autio, digitalization is: “*the application of digital technologies and infrastructure in business, economy and society*” (Autio, 2017).

Benedetto-Meyer and Anca Boboc define the notion of digitalization as follows: “*the introduction of digital tools into work activity (new equipment such as smartphones, tablets, instant communication tools, applications allowing documents, videos, and schedules sharing, ...)*” (Benedetto-Meyer et Anca Boboc, 2019).

According to Cijan et al., digitalization is “*the increasing use of information and communication technologies (ICT) in all areas of our lives*” (Cijan et al., 2019).

From the previous, we can conclude that digitalization and digitization are in fact distinct but related and complementary concepts. Digitalization refers to the use and implementation of new technologies and digital tools, while digitization refers to the transformation of physical data into a sequence of digital characters.

After these brief explanations, we will try in the following lines to understand the implications of digitalization on wellbeing at work.

III. DIGITALIZATION: A DOUBLE EFFECT PHENOMENON

The technologies and tools that shape digitalization are very diverse, ranging from computers and instant communication tools, to tablets and smartphones. The massive introduction of digital and high technologies in work activities has accelerated the transformation of people's daily lives (Delahaye, 2019), and it has significantly reconfigured the managerial processes (Cabin and Choc, 2005) and the work organization (Dorn, 2016).

The emergence of digital technology has profoundly changed the work environment, by both changing the way employees think about work, and influencing their physical and psychological wellbeing (Ter Hoeven et al., 2016).

In the present section, we will try to answer the main objective of this study. We will provide clarifications concerning the duality and divergence of the consequences of digitalization on wellbeing at work.

A. Digitalization: a risk generator

Digitalization - despite its advantages and benefits - has brought with it a number of challenges and negative effects.

The massive diffusion of digital technologies and tools can lead to feelings of anxiety and discomfort and can generate the so-called “technostress” (Pfaffinger et al., 2021). This term was introduced for the first time in 1984 by the American psychologist Craig Brod, who stated in his book “*Technostress: the human cost of the computer revolution*” that it is “*a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner*” (Brod, 1984). In another words, technological stress is “*a type of stress related to the permanent and excessive use of digital technologies*” (Chiappetta, 2017).

This feeling of anxiety associated with the excessive use of digital tools has also been mentioned by other authors, among them Gérard Valenduc, who believes that the permanent connectivity and the continuous use of new technologies and digital tools (e.g. computers, social networks, instant communication tools, ...) cause an informational and psychosocial overload (linked to the infinite volume of information available) disrupting the wellbeing at work and leading to negative effects on employees’ mental and physical health (Valenduc, 2017).

The consequences of technostress are diverse and undesirable, ranging from disturbances and concentration

problems to distress and burnout (Bunjak et al., 2021; Stich et al., 2018; Wiederhold, 2017).

Besides technostress, relational isolation threatens employee wellbeing. According to Mann and Holdsworth, working remotely can lead to feelings of loneliness (Mann and Holdsworth, 2003), in other words, hyperconnectivity significantly reduces social interactions and weakens interpersonal and physical contact at work (EU-OSHA, 2021), which can cause social and physical isolation (Oakman et al., 2021).

The consequences of social isolation are severe, and can lead to employee disengagement, increased ill-being, and decreased job satisfaction (Marshall et al., 2007). The deterioration of interpersonal relationships can also cause burnout, and adversely affect employee performance and personal and professional development (Smith & Scott, 1990).

In addition, Christophe Degryse's study revealed that the virtualization of the relationship between employees can increase the risk of psychosocial disorders such as stress, social anxiety, psychological fatigue and emotional exhaustion (Degryse, 2016).

Other than psychological and social consequences, several researchers have highlighted the serious effects of the intensive use of digital tools on the physical wellbeing, namely: the appearance of musculoskeletal disorders and other physical pains. The constant and increasing use of computers and the internet is a source of various pathologies such as muscle and articular pains in the neck, back and shoulders, headaches, and physical fatigue (Borhany et al., 2018; Valenduc, 2017; Ellahi et al., 2011). Similarly, over-use of smartphones and continuous exposure to computer screens or tablets and phones can trigger visual problems varying from ocular irritation and dryness to eye pain and to eye pain and fatigue. This pathology is known as "computer vision syndrome" or "digital eye strain". This condition can have serious repercussions on individuals' wellbeing, namely: headaches, sleep disturbance, concentration difficulties, shoulder pain and neck pain (Sheppard and Wolffsohn, 2018; Ellahi et al., 2011)

From the previous paragraphs, we can conclude that the excessive and irrational use of digital tools can harm the physical and the psychological wellbeing of employees. Hyper-digitalization is therefore a generator of physiological and psychological risks.

B. Digitalization: a lever of wellbeing at work

After talking about the negative side of digitalization, we will now discuss the opportunities and advantages that this technological phenomenon provides.

The advent of digital technology has facilitated the accomplishment of repetitive and complex tasks, and it has also contributed to time-saving (Bhattacharje et al. 2009; Joling and Kraan, 2008).

The use of new digital technologies has profoundly transformed working mode and rhythm. Firstly, it has accelerated activity (Greenan et al., 2012) by relieving employees of low-value-added tasks and missions that costs company money and time, and secondly, it allowed employees to complete complicated tasks more quickly and also to develop new skills (Joling and Kraan, 2008; Loup, 2016).

The introduction of digitalization has favored the development of "soft skills" and professional skills of employees, and it has contributed significantly to the rise of their knowledge (Ardalan, 2011). This growth in skills and abilities strongly impacts employees' level of flexibility and autonomy. (Westerman et al., 2014 ; Aral & Weill , 2007).

Many researchers have stated that the use of digital technologies offers more authority, autonomy and freedom to staff, (ter Hoeven and van Zoonen 2015; Ninaus et al., 2015; Rallet and Wolkowiak, 2004), which leads to increased motivation, job satisfaction, and wellbeing at work (Morgeson and Humphrey, 2006).

Furthermore, Rallet and Wolkowiak's study showed that "*the use of information and communication technologies give employees more autonomy and responsibility by providing them more freedom in the organization of their work*" (Rallet & Wolkowiak, 2004). This combination - freedom and autonomy - in turn favours the "work-life balance" (Ninaus et al., 2004).

Remote working, for example, has transformed employees' daily lives for the better, in a way that it has brought more flexibility to work, by allowing teleworkers to enjoy variable and more flexible working hours (International Labour Organization, 2020), which has promoted work-life balance (Eurofound, 2017; Ninaus et al., 2015; Haddad et al., 2009). Breugh and Farabee have also pointed out that remote working reduces significantly work conflicts and improves the management of personal and professional responsibilities and job satisfaction (Breugh & Farabee, 2012).

In addition, among the most noticeable effects of the use of digital technologies is the improvement of communication and the fluidity of exchanges between employees (Eurofound, 2017). The advent of digital technology offers the possibility to communicate more quickly (Aral & Weill, 2007), at any time and from several different locations. This instant accessibility promotes information sharing and exchange (Ninaus et al, 2015), enhances collaboration and interaction between teams (Medzo-M 'Engone, 2017) and also increases

engagement and wellbeing at work (Ter Hoeven and van Zoonen, 2015).

From the above, we conclude that the implementation of digital tools can be a source of wellbeing at work.

IV. CONCLUSION

A series of studies have shown that the use of digital tools can be both a generator of wellbeing at work and a source of psychosocial risks and physiological pain putting the personal and professional life of employees at risk.

There is no general agreement on the impact of digitalization on wellbeing at work. Some authors define digitalization as a "double-edged sword" (Diaz et al., 2012). On the one hand, it facilitates exchanges and the execution of complex tasks and can participate in the improvement of professional and individual satisfaction (private/professional life balance), and on the other hand, it can lead to certain physiological pathologies (musculoskeletal disorders, computer vision syndrome) or psychological disorders (technostress, anxiety, social isolation).

The introduction of digitalization in the workplace is a decision that can affect negatively or positively employees' wellbeing, for this reason employers must take into account the threats and opportunities that digitalization can bring, in order to eliminate the risks and profit from the benefits.

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Artificial Intelligence (AI): A potential for reinventing electronic administration

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Abstract

Over time, the development of public services has undermined the emergence of e-administration by launching panoply of online digital services. Electronic administration remains a key e-Government strategy aimed at ensuring the effective management of government institutions and organizations in order to improve the efficiency and adequate delivery of services and to connect with citizens. Indeed artificial intelligence is one of the recent dimensions of electronic administration, which presents a set of specificities in the context of improving non-market relations between public administration and citizens.

The objective of this paper is to present the projects of digitalization of Moroccan public services launched by the state, to show the importance of using AI in electronic administration and its link with the quality of electronic public services, which lead to the satisfaction of Moroccan users. This report consists of proposing actions to improve online public services in order to establish a digital culture and trust in e-administration.

Keywords— *Artificial intelligence, E-Government, Electronic administration, Public service, Digitalization*

I. INTRODUCTION

In recent years, governments around the world have modernized their administrations and committed to electronic administration initiatives, which improve the quality of public services, transparency and accountability.

The cost-effectiveness of service delivery and government operations and the improvement of citizens' quality of life. However, technology has become central to the strategy of public administrations, and one of the key aspects of strategies in the 21st century world is e-government. This is the application of information and communication technology (ICT) to enhance administrative processes and departmental internal operations within a company [1].

In Morocco, the citizen become an influential axis of government concerns. The development of e-government is a priority for every government and one of the most crucial directions in the modernization of public administration.

The digital transformation of the Moroccan administration is a long-term process, carried out by progressive stages, aiming at the generalized access of users to dematerialized

administrative procedures. His majesty the king does not cease to incite and sensitize in his royal speeches on the importance of e-government and the numerous advantages granted to Moroccan citizens.

In his speech of July 29, 2018¹, on the reform of the administration, HM King Mohammed VI emphasized in addition to the development in the functioning of public services, the importance of adopting new technologies in the exchange of information between administrations themselves.

Indeed, Big Data, information and knowledge are fundamental concepts in our daily activities, and are the results of the digital transformation of today's global society. Smart connected products extend the physical components by adding information services and connectivity using the internet. Influenced by the transition to digitalization, many organizations are currently transforming their strategy, culture, processes and information systems to become digital and adopt artificial intelligence-based systems and services [2].

The introduction of artificial intelligence in public administration is in full swing. This technology offers many advantages and possibilities for organizations and aspires to improve the effectiveness and efficiency of services offered to citizens.

In our research, we focus on the integration of artificial intelligence as a lever for e-government and its impact of improving electronic administration services.

II. STATE OF THE ART OF DIGITALIZATION IN MOROCCO

A. Conceptual framework for digitalization

Digitalization, digital transformation, e-transformation, and digitalization: are the concepts most often used in articles to present a certainty, digitalization has become a vital concept for any organization, private or public. It integrates into all areas and saves time and energy by automating tasks that have proven to be complex in the past.

¹ <https://www.maroc.ma/fr/discours-royaux/sm-le-roi-adresse-un-discours-la-nation-loccasion-de-la-fete-du-trone->

It is also seen as a competitive advantage in certain sectors where the digital shift has not yet been fully achieved.

Most researchers agree that digital transformation is the use of technology to rebuild business processes based on customer needs. Digital transformation is a gateway to innovation and new organizational, work, and operating models. According to Mignot [3], digital transformation is the integration of digital technology into all levels of the organization in order to change the way it operates and bring value to its customers.

However, based on the scientific articles on the same subject, there is an ambiguity between the terms “digitalization” and “digitization”, as proved by Varenne [4]. This last one tried to compare the two concepts: Since 1990, digitization has been about archiving and storing documents in a digital format and then reusing those documents in an Enterprise Resource Planning (ERP) or an Electronic Document Management. While digitalization is characterized by the transformation of the organization and its digital maturity, which allows it to transform its business model.”

Gartner² explains digitalization as the use of ICT to transform the organizational model and to bring new opportunities for creating value from increasing revenues; it is a process of transformation towards a digital organization.

According to this, the idea revolves around two major challenges of the digitalization of administrations: on the one hand, the use of new technologies by administrations to get closer to users and integrate them into administrative processes stakeholders, and on the other hand, ensuring the effectiveness and efficiency of public services through the modernization of administrations.

B. Morocco's digital strategies

Since 1996, Morocco has been involved in the restructuring of the ICT sector through the adoption of Law no. 24-96, which made it possible to take the first step towards liberalizing the telecommunications sector. In this regard, Morocco has adopted several digital strategies. A five-year plan from 1999 to 2003, e-Morocco 2010 from 2005 to 2010, and an MN2013 strategy for the period 2009 to 2013.

After «Maroc Numérique 2013», Morocco has launched a new digital development plan «Maroc Digital 2020» for the years 2013 to 2020, with a view to further boost the sector of the digital economy. In this plan, three pillars have been proven³ [5].

- Digital Transformation of Administration (E-administration).
- The implementation of a strategy for digital transformation of the national economy through the abatement of the digital divide for the benefit of citizens (connectivity for all, primary, secondary, and higher education programs, public WIFI access) and businesses, including Small and Medium Enterprises /

Very Small Enterprises (SME / VSE) (regions disadvantaged in connectivity).

- Integrated transformation of important sectors of the economy (PortNet, Health).

The Digital Development Agency (ADD), was created in 2017 as a catalyst for Morocco's digital transformation, The ADD's main mission is the implementation, of the State's strategy for digital development by 2025, which based on these reflections. It defines Morocco's digital development prospects with three major challenges: improving the quality of public services, improving the productivity and competitiveness of the national economy, and reducing social inequalities [6].

Therefore, to accelerate the digital transformation, ADD set the goals to be achieved by 2025:

- A digital administration that serves citizens and organizations by increasing their satisfaction rates and reducing the rate of interaction with public administrations.
- A competitive and efficient economy in a digital and innovative ecosystem, through the installation of a network of 2,500 startups.
- Inclusive society through digital, health, and education.

The agency also aims to contribute to the launch of an Ecosystem IA program for research on artificial intelligence themes. It is based on sectoral use cases, with the objective of coordinating around the research topic that targets and customers, private and public training organizations, and innovative start-ups. This project aims to create an AI Ecosystem on the Natural Language Processing and Natural Language Generation streams for digital inclusion with a conversational AI engine.

III. THE DIGITIZATION OF PUBLIC ADMINISTRATIONS

The concept of electronic administration appeared between 1990 and 2000. It is known under different designations: E-administration or E-government [5]. The Organization for Economic Co-operation and Development [6] defines electronic administration as “the use of information and communication technologies to improve the efficiency of the administration and the level of services it provides, in particular via the Internet”.

A. Electronic Administration: Generalities

Electronic administration is the use of ICT to improve the administrative performance and internal functioning of public services. It is based on different types of management work, such as internal routines, digitalization of administrative tasks and the creation of strategic links between departments [7].

The resulting benefits are reducing corruption, increasing transparency, more comforting, increasing revenue and reducing costs.

Indeed, in order to reap the benefits of digitalization and make public administration more effective, kinder, more efficient, more transparent, and accessible to users, the state

² American consulting and research company in the field of advanced techniques.

³ <https://en.unesco.org/creativity/policy-monitoring-platform/strategie-maroc-digital-2020>

must constitute plans for reform, modernization factors that seek to change administrative procedures extremely, and the quality of public services provided to citizens. The evolution of ICT will allow significant progress in terms of simplification and quality of services provided to users and in reforming the administration itself.

In this wake, e-government is part of dynamic economic development of knowledge and the introduction of new ICTs into all segments of people's daily lives. In this sense, IT is an essential vehicle for modernizing and reforming the public sector with the aim of more efficient administration, bringing it closer to users, and restoring citizens' confidence in the use of the Internet to provide high-value-added services. To carry out this project, e-government aims to put users at the center of management concerns and to demonstrate a quality service with transparency.

In addition to the online availability of administrative services, e-administration must also be the opportunity to thoroughly modernize structures, to deploy the tools for increased exchange and work, but also, above all, to allow the different directorates to interoperate so that e-administration is not a purpose but a means of rendering a service to the public.

Therefore, certain actions are necessary to improve the service provided to users:

- Simplify administrative procedures;
- Offer original and innovative services;
- Improve the reception and sense of caring for citizens in public services (reduction of waiting times, one stop shop, handling of complaints);
- Improve access to services by developing platforms;
- Establish a barometer on the effectiveness of public services;
- Supported the principles of transparency, accountability, and governance;

The improvement of digital administrative services requires a greater openness of mind by those in charge of users and a greater speed of action. It would therefore be wise to deploy listening devices, to reinforce proximity, and adapt the provision of services to the different social and geographical situations of citizens in order to make access to services equitable.

B. The reinvention of electronic administration in Morocco

The last decade has known a digital revolution that challenges states and has led to radical changes in many sectors around the world, while Morocco is not part of this revolution. The Ministry of Public Service has qualified this strategic choice as it and Administrative Reform will allow our country to reduce the cost of public services, bring them closer to citizens, and modernize public administration⁴ [10].

In this context, in an interconnected world, speed, efficiency, and effectiveness are the keys to

competitiveness. In order to win the digital race, the Moroccan administration must simplify the digital landscape to ensure perfect visibility for the public. In addition, the effectiveness of services provided and their functioning, also to facilitate access to daily services for citizens and businesses, to protect citizens' private information and inform them in order to improve the channels for listening to and handling complaints.

With the aim of simplifying access to its services, the Moroccan administration has put in place a variety of digital communication tools long before COVID19 would be a global anxiety. These tools have been very important because they have allowed citizens to send their papers and to follow their files without moving, without resorting to any institution, and especially without problems of confrontation with another person.

Thus, since the declaration of the health emergency in Morocco, most administrations have favored and sometimes demanded the exchange of online documents to face the pandemic and to guarantee the stability and continuity of state services with the consideration of health measures.

Here are some electronic services for the public:

- Service-public.ma: Guide to Administrative Procedures.
- chikaya.ma: management of complaints and user observations
- passeport.ma: biometric passport
- rokhas.ma: management of planning authorizations and economic authorizations.
- casierjudiciaire.justice.gov.ma: Request for an extract from a criminal record
- cnie.ma: Electronic National Identity Card
- eparapheur.gov.ma: validation of electronic documents
- consulat.ma: e-Consulate
- watiqa.ma: Electronic window for ordering administrative documents
- rcar.ma: Management of public and private pensions
- bodigital.gov.ma: Digital order desk
- ompic.org.ma: Online trade register
- badr.douane.gov.ma: Customs services

Note that some national police and customs services, the Central Bank of the Kingdom, the Directorate of Taxes or communal services, are all cases of use of AI, which could soon emerge in all Moroccan administrations. On the one hand, supporting AI in these applications will relieve managers of repetitive tasks where humans are often less good and less effective than AI.

However, the President of the Economic, Social, and Environmental Council (EESC), Ahmed Reda Chamia, stresses that the various initiatives launched and appropriate efforts made are clearly insufficient to guarantee the preconditions for a successful digital transformation and to reduce the digital patent divide that the Covid-19 crisis has only exacerbated. A number of fragilities and weaknesses could explain this situation, including the delay in implementing previous digital transformation policies in multiple sectors such as administration, health, education,

⁴ <https://uclgafica-alga.org/wp-content/uploads/2019/05/unpan002395.pdf>

and industry, as well as the fragmented and sometimes inadequate legislative and regulatory frameworks, in particular, in the following aspects of teleworking, low geographic coverage of broadband and ultra-broadband Internet infrastructure⁵.

The board president explained, "This could ultimately save around 718 million hours of work per year, or about 1% of GDP (over 10 billion dirhams), due to the productivity and efficiency gains brought by dematerialization.

He stressed that it is also a problem that the ICT sector contributes more than 10% of GDP and launches at least one Moroccan unicorn in the field of artificial intelligence, fintech or agtech within five years.

To this end, Morocco has made remarkable progress in the digitalization of public services, with the aim of concretizing the principles of a qualified, transparent, and fair local administration.

Although these electronic administrative services are established, we question the application of marketing principles in the launch of these digital products as well as user training. The launch of a product, whether by a company or by a public administration, requires the consideration of at least two fundamental components: the quality of the product launched, and the good communication to push people to use it. In other words, marketing is not an exclusive domain of private companies the offer of public administrations has a marketing particularity where the quality of the proposed service is paramount [8].

IV. ARTIFICIAL INTELLIGENCE-BASED ADMINISTRATION: A FRESH AND CRUCIAL TOPIC

Technological advances, new information technologies, business intelligence, the modernization of public services, and the use of artificial intelligence are all current topics, projects and challenges that can reshape the administrative landscape. Ensure that, it meets the daily expectations of citizens, and businesses that rely on the best services provided by digital technology in an effective and efficient manner.

A. Definition of Artificial Intelligence (AI) and Robotics

a. Definition of artificial intelligence

Various definitions of artificial intelligence (AI) have emerged over the past few decades Technological advances and human perceptions of what intelligent machine action is before 20 years, can now be considered very rudimentary given the technical advances made (Task Force IA, 2019)⁶ [12]. However, AI can be defined as the ability of machines to reproduce human behavior such as thinking, learning, planning and creativity [9]⁷ [13].

Based on the literature, we have noticed many times that researchers confuse robotics with artificial intelligence.

However, is it the same? The answer is no. Robotics is part of artificial intelligence, and there are two kinds of robots [14]:⁸ Robotics is part of artificial intelligence in which we can distinguish two types of robots. The first type seen daily in industrial companies performing repetitive tasks, are programmable machines capable of performing a series of actions autonomously or autonomous, and the second type is the type of robots that are based on artificial intelligence and it is able to think and make decisions like the famous humanoid inferior « Sophia »⁹ [15].

In short, AI is "an autonomous system that can perform complex tasks previously thought to be reserved for natural intelligence". It processes large amounts of information, performs calculations and predictions, learns and responds, adapts to changing circumstances, and recognizes and classifies objects [10].

b. Types of artificial intelligence

According to J.C. Heudin [11], it is necessary to distinguish between two types of artificial intelligence according to the capabilities of the tasks envisaged: narrow AI and general AI. Narrow is that of the present systems, it shows high performance, often equal or superior to those of human beings, but in restricted domains well defined as (image recognition, games, diagnosis, identification of speech, etc.) for which precise learning has been conducted.

The AI General is similar to a human being, having the ability to understand and reason about various topics and rely on the experience gained. It is also able to learn driving complex tasks in different areas. The basic components are self-awareness and emotions. Research on strong AI in laboratories is ongoing and it is very difficult to say when it will emerge... (J.C. Heudin, 2021).

For Jean-Claude Heudin¹⁰, we can also distinguish between three types of AI, divided into six levels, four of which have been and two not yet¹¹ :

- i. Weak artificial intelligence:
 - Inferior to human ability, it is used for specific tasks (example: voice recognition, chat boots, and virtual assistant).
 - Similar to humans but just for specific tasks (example: expert systems, classification of objects, images...).
- ii. Average artificial intelligence:
 - Superior to most human intelligence for specific tasks (example: the new world chess champion 'Deep Blue').
 - Superior to any human intelligence, for specific tasks (example: Alpha GO: the first program to win Ke Jie the world champion of the game of Go).
- iii. Strong artificial intelligence (Until 2022 not yet deployed):

⁵ <https://www.ecoactu.ma/intelligence-artificielle-transformation-digitale-cese/>

⁶ <https://www.defense.gouv.fr/sites/default/files/aid/20200108-NP-Rapport%20de%20la%20Task%20Force%20IA%20Septembre.pdf>

⁷ https://www.europarl.europa.eu/doceo/document/TA-9-2020-0275_FR.pdf

⁸ <https://robotsmali.org/fr/quelle-est-la-difference-entre-la-robotique-et-lintelligence-artificielle/>

⁹ <https://www.neozone.org/robotique/sophia-robot-humanoide-social-bientot-commercialise-serie/>

¹⁰ French scientist specialized in artificial intelligence and deep learning

¹¹ <https://www.iim.fr/lintelligence-artificielle-enjeu-emploi/>

- Superior to human intelligence for a majority of tasks
- Extreme artificial intelligence

B. *The crucial role of artificial intelligence in public administration*

“AI will make life easier for citizens, modernize public administration and services, improve participation in public life and foster economic development through better availability and easy sharing of information... As well as AI will also improve information technology and the persistence of a digital economy, overcome the hesitations that may exist within the administration...” said the Minister Delegate for the Reform of Administration and the Public Service, Mohamed Benabdelkader¹² [18].

The proliferation of artificial intelligence (AI) technologies has potential benefits not only for public services but also for other sectors. More precisely, AI has the potential to improve the relationship between public administration and users [12]. This relationship is based on four aspects: ensuring the security of the deployment process (control), reducing costs (cost), adapting to the needs of users (convenience) and strengthening the link between public administration and users (connection), in the expansion of the already observed favors of e-government for public service [13].

AI can improve use cases for managing the relationship between citizens and administration by automating answers to questions (e.g. chatbot), intelligent and immediate information retrieval (e.g. for automatic form filling, etc.), managing routine queries (e.g. automatic request routing), eliminating recurring tasks, doing translations or to writing custom and automated answers [14]. In general, research on AI in the public sector affects all areas of public administration, although it is still flourishing [15].¹³

At the same time, there is a risk of deviations that must be foreseen and managed to guarantee the development of reliable AI in order to put humans at the center of interest [16]¹⁴. Therefore, special attention should be given to automated decisions that may affect the lives of citizens. In particular, the digital evolution in Morocco and especially the electronic administration already brings risks of neglecting the users' educational capacity and the appearance of a social disparity between the populations at the level of ICT use¹⁵ and should not be aggravated by AI [24].

A study by [17] of three Quebec public organizations found that the integration of AI solutions into public organizations led to remarkable changes in relationships between colleagues and in work organization. With AI tools, managers no longer need to focus on this monitoring task or

evaluate the work of employees. This allows the middle management role to evolve and place more emphasis on the relational aspect with the employee, to help correct errors quickly. The relational aspect takes precedence over surveillance tasks, as they no longer need indicators to evaluate the work of employees, however are now provided by artificial intelligence systems. This can improve communication skills between managers and employees. In this new work environment, managers' communication skills are very important for interacting with team members, supervising them, and coaching them (coaches). For all these reasons, it is important to adopt an e-government equipped with artificial intelligence in public services based on a proven theoretical framework for the adoption of innovation.

C. *Factors supporting the development of electronic administration*

Artificial intelligence (AI) is one of the major advances in the last decade. It offers today, above all to public administrations good practices. The wave of robotics creates key opportunities to solve problems, changes in use and a lot of fear. Between fantasies, hopes, and worries. It is in this context, its deployment in the public administration must bring regulatory and strategic aspects.

- Implementation of legislative rules organizes electronic administration and strengthens the texts relating to data governance, and especially open data etc. This last point is one of the key levers of digital transformation in a country and an important element in building trust between citizens and their administrations. It also allows the creation of innovative ecosystems around data across the territory [18]¹⁶.
- In addition, electronic administration must be promoted through an integrated approach that allows for common access to information by different departments and services. (HM King Mohammed VI, 14 October 2016)¹⁷ [26].
- Invest heavily in new technologies from kindergarten onwards, whether in terms of teaching technologies or subjects to teach, by introducing young apprentices to the world of digital, artificial intelligence, and robotics.
- Create a digital culture within public administration and citizens through awareness raising, education through media and training.
- Each public administration must have its own coherent and well-identified digital strategy, through the implementation of a real action plan for the development of new skills within the teams, especially those directly attached to the IT department and the human resources managers.

¹² <https://maroc-diplomatique.net/lintelligence-artificielle-une-opportunite-pour-lamelioration-du-service-public/>

¹³

<http://actions.trends.levif.be/actions/trends/publicsector/ducoteduprive2.jsp>

¹⁴ <https://futurium.ec.europa.eu/en/european-ai-alliance/pages/altai-assessment-list-trustworthy-artificial-intelligence>

¹⁵ <http://www.omap.ma/userfiles/files/Rencontres/Actes-de-la-journee-d-etude-L-administration-electronique-au-Maroc-Realite-et-perspectives-04-07-2019.pdf>

¹⁶ https://add.gov.ma/storage/pdf/Avril_NOG_ADD_fr_SITE_VF.pdf

¹⁷ <https://www.mmmp.gov.ma/fr/actualites/circulaire-du-chef-du-gouvernement-n-%C2%B0-2020-relative-%C3%A0-la-mise-en-%C5%93uvre-des-dispositions-de-la-loi-n-%C2%B0-5519-relative-%C3%A0-la-simplification-des-proc%C3%A9dures-et-formalit%C3%A9s-administratives>

Morocco's tendentious commitment to a digital connectivity model presupposes the development of administrative ethics and the appearance of a specific project for the organization and its activities. This ethic places collaboration, exchange, sharing, and communication as catalysts for administrative functioning. This also implies that the administration is involved in the dynamics of sharing resources with external operators with specific interests. This appears strongly with an administration that acts in the general interest and retains control over all computer data design, production, and distribution processes to protect them and preserve the public interest.

Finally, most administrations have been digitized; so the challenge now is not the digitalization itself but to transform the existing taking into account the more practical and innovative possibilities. The centralization of data (project currently running for some administration), geolocation, exploitation of large volumes of digital data (an approach called big data), integration of decision support tools (business intelligence), portability, secure and fast data exchange, interoperability, mobility.... etc.

CONCLUSION

The digital transformation of administration, public services, and government agencies is now a top priority for all governments around the world.

To sum up, it is clear that digitalization is not a fashionable thing but has become a fundamental obligation for the development of ecosystems. That is why Morocco must review, reorient, and reconsider the obstacles and inadequacies that have emerged in previous development models and build a new development model better suited to global technological progress based on automation and artificial intelligence. Admittedly, the Covid19 crisis is seen as an opportunity, especially a challenge, to draw lessons for the world in the digitization of public services. It is also an opportunity to change mindsets and adopt more perspectives: globalization of skills and qualifications.

However, Jean-Claude Heudin says that artificial intelligence does not replace man but increases his intelligence, forming a kind of "third hemisphere".

The aim of this work is to highlight the importance of thinking and integrating AI into public electronic administration in Morocco. This administration must meet the needs of citizens and ensure good functioning. Thus, it must also respond to political, social, and economic conditions fundamental to the advancement of the state and the well-being of citizens. As a result, the failure of its functioning can create enormous obstacles with direct impacts on development.

Morocco has great potential to be one of the major digital actors in Africa. As early as 2005, it adopted the e-Morocco 2010 strategy, followed by the Digital Morocco 2013 plan,

Digital Morocco 2020, and Horizon 2025. In 2020, the digital transformation provided Morocco with the opportunity to position itself as an African Digital Hub and took fourth place in the «Digital Risers» in the competitiveness of MENA countries in terms of digital.

On the other hand, in order for Morocco to achieve its goals, it is necessary to adopt new management styles that put the citizen or user at the center of the action, and that allow for structural changes in the organizational culture within public administrations. In this sense, several interesting research avenues remain to be explored.

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Literature review on organizational change and digital transformation

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Abstract—In a fast-moving environment, digital transformation appears to be the main concern of researchers and practitioners worldwide. In order to seize the opportunities offered by new technologies, the organizations must update their organizational strategies by making them agile through digital transformation practices in order to adapt to the context of constant change. As such, we consider digital transformation as a very complex and difficult process to implement. It should be recognized that the objective of our scientific article is to know the relationship between organizational change management models and those resulting from digital transformation. Through this scientific article, we will attempt to research the models of organizational change in a context of digital transformation and this through the establishment of several key success factors to drive organizational change in the digital era.

Keywords— Digital transformation, Organizational change, Change management models, Key success factors.

I. INTRODUCTION

Today, organizational change is one of the most pressing issues facing organizations. We note that more than 60% of change projects have failed. To this end, the best approach is the digital transformation, which is becoming increasingly important for researchers and practitioners on a national and international scale. The current context is characterized by its rapid and unpredictable change, characterized by the evolution of technology which is considered as a major source of disruption without forgetting the soaring demands of users who accentuate more and more the competition. In order to remain competitive, organizations are called upon to adapt to the context of change by taking the path of technological innovations or what is called digital transformation. Digital transformation is characterized as the integration of technological innovations into the organization's business model to create value and improve performance (Stolterman & Fors, 2004). This means that digital transformation impacts all aspects of human life and remains a fundamental determinant of change at all levels, whether political, economic, etc. Morocco is one of the first African countries that have resorted to digital transformation, whether in its public or even private structures, with the aim of modernizing its structures by making them more agile in the face of the often opaque context of change.

In addition, the latest global health crisis, the Covid19 pandemic, has demonstrated the importance of using digitalization to facilitate access to services under any circumstances. To this end, we can note that digital transformation is one of the major concerns of all decision-makers since it provides a strategic leverage effect allowing a radical improvement in the functioning of an organization with a high added value for all its stakeholders (Gong & Ribiere, 2021). In order to better seize the opportunities of digital transformation, organizations are called upon to change their current model to make it more agile in order to face the context of increased disruption. This continuous evolution of the environment makes organizational change as a complicated project to implement, but one that remains essential to ensure the sustainability of organizations and create value (Kotter & Schlesinger, 2008). The literature proposes different models of organizational change and our objective is to determine their capacity to lead this very complex change in a more complex context, that of digital transformation. Through our scientific contribution, we will seek to provide a solution to the following research question: Do the organizational change management models proposed by the literature allow to drive the digital transformation?

It should be recalled that the main objective of our scientific contribution is to establish a link between the different models of organizational change from the literature and their ability to drive change in a context marked by the industry (4.0). To meet our objective, we will try to validate the following two hypotheses

H1: Digital transformation gives rise to organizational change;

H2: Organizational change models are able to drive the industry (4.0).

II. MOTIVATION & METHODOLOGY

A. Motivation

The main goal of this literature review is to clarify and shed some light on the concept of organizational change and digital transformation. To do this, we will start by identifying the definitions in the literature, and all challenges of digital transformation.

Based on what we said before, the value of this paper can be presented as follows :

- In the first part, we will review the literature on the concept of digital transformation, with its opportunities and challenges.
- In the second part, we will deal with the concept of organizational change to weave its link with digital transformation.
- The third and last part will be devoted to the comparative analysis of the different models of change management, as well as their ability to drive digital transformation.

B. Methodology

In order to identify the models of organizational change, we conducted a literature review on organizational change, following a comparative approach. The question of this literature review seeks to answer: do the organizational change management models proposed by the literature allow to drive the digital transformation? After determining the research question, we conducted a search on the Scopus database, using the keywords: digital transformation, organizational change, change model, change management. The result of the search showed a diversity, to section the most relevant articles for our research, to this end we adopted a refined search taking into consideration criteria such as, the keywords of the search, the type of document concerns only peer-reviewed articles, the reference authors and the number of citations. This selection process leads us to build a database composed of 120 documents. In addition, we performed further searches on other databases.

III. LITERATURE REVIEW

A. Digital transformation

In this first section, we will try to understand the definitions related to the concept of "Digital Transformation" with a presentation of its scopes and constraints.

- Definitions :

No one can deny that digital transformation is a universal phenomenon and a major source of concern for all managers regardless of their profile. It has revolutionized the organization of public and private sector entities. It should be emphasized that digital transformation is no longer an option but rather an imperative that determines the performance of organizations. It is an excellent lever for competitiveness at all levels. Therefore, it becomes judicious to take stock of the starting point of digital transformation by shedding light on its history. The concept of digital transformation was born in the 2000s, but it's one of the most discussed concepts in the literature review at the moment. However, this concept lacks a universally accepted definition by theorists. We will try to define it in our opinion by putting it in a broader sense, more extended to a simple digital support but a primordial lever allowing a very deep remodeling of the organizations in their globality (all processes). Regarding the (Lemoine,2014), he defines digital transformation as "a combination of automation, dematerialization and reorganization of intermediation schemes. (Reis et al,2018) in turn categorize the definitions of digital transformation as follows. This definition refers to technology, and which is based on "the

use of new digital technologies such as social networks, mobile technology, analytical or integrated tools" (Fitzgerald et al.,2013). A second definition has been proposed but this time is related to the organization that "requires a change in business processes or the creation of new business models" (Ross et al.,2016). In fine, there is a last definition that touches the social dimension by defining it as "a phenomenon that influences all aspects of human life" (Matt et al.,2015). It is worth noting that this definition was supported by the words of (Fors and Solterman,2004), and they argue that digital transformation is defined as "changes, which digital technology causes or influences in all aspects of human life".

- Summary of the definitions :

By way of synthesis, all the definitions allow us to give birth to a global definition of digital transformation that calls for the use of digital solutions to make the organization's activity highly efficient while impacting all dimensions of the lives of individuals . According to the advances of (Badri,2018) he perceives the digital transformation "as a major asset that operates on three essential levels namely the Business model, The business process and the customer journey which are based on three essential steps namely: Involvement of the government to put in place an adequate regulatory framework; Establishment of an active and responsive ecosystem; Optimization of access to tools and technologies enabling digital transformation. Thus, the digital transformation passed by two levels. The first level concerns "external transformations centered on customers and internal transformations centered on products and processes". It is worth mentioning that this definition highlights the context of disruption that organizations are facing. More clearly, it is about confronting a context of "rapid and radical change due to the maturation of digital technologies and their pervasive penetration in all markets" (Ebert et al.,2016). In the face of fierce competition, organizations are obliged to remain competitive by developing a capacity for adaptation and renewal in a context of digital transformation, while "seeking to exploit the contribution of digital transformation" according to (Bharadwaj, 2010). By way of consolidation, the concept of digital transformation has become central to all new policies based primarily on technological innovations.

- The scopes of digital transformation:

The digital transformation allows unquestionable and unprecedented opportunities for organizations, whatever their field of activity, to make them more efficient. In addition to reducing costs, we can cite the increase in productivity of several entities and consequently increase the economic development of countries. Today, (Colin and All, 2015) argue that "Communication has become two-way and interactive, it no longer goes only from the company to the customer, but the latter also has the opportunity to respond, react, speak, express an opinion, an opinion or dissatisfaction. The demands of citizens are increasing and they want answers to their requests, and digital transformation allows "a better digital interaction modifying

both the relationships, and the interactions between customers and the company" (Li, 2005). There are also other benefits of new technologies "that are less costly and offer more advantages, allowing for an overall reduction in organizational costs" (Bharadwaj et al., 2013). Add to this the fact that employees today are allowed to "share their knowledge via virtual platforms thus reducing costs" (Huang et al., 2012; Nambisan,2002).

- Challenges of digital transformation:

Even though digital transformation offers several benefits, except that there are some constraints that lie behind. (Bounfour and All,2015) to this effect, states that "the challenge is that digital technologies participate in improving the processes of value creation, while taking into account the management of risks and technical performance". The digital transformation has generated several risks, whether technological, social or even economic. We start with the technological issues generated by automation. We find the problem of confidentiality and exploitation of data that require the use of cyber security strategies to maintain the right relationship. We move on to the presentation of economic and social issues that affect the appropriation of digitalization by all actors. According to Grimand (2012), the appropriation of digitalization by the actors is "one of the essential conditions for a return on investment in the use of digital technology by employees, managers and leaders of organizations". It is also worth mentioning the lack of skills and technical knowledge of employees in the field of digitalization will not allow the successful implementation of digital strategies, hence the importance of providing training sessions and support. We also mention the difficulty of access, old people are the most concerned by this constraint. In order to succeed in the digital challenge, we will propose some recommendations:

- Start by strengthening the legislative and legal framework;
- Provide targeted training;
- Integrate the digital transformation in all the working devices;
- Engage all the necessary means to ensure the success of this digital transformation.

(Bilgeri, Wortmann, & Elga,2017), (Hartl& Hess,2017), (Heilig, Schwarze, & VoB,2017), (Mueller & Renken,2017) emphasize that "digital transformation represents organizational change, major driven, built, or enabled by digital technology, that changes the way business is conducted. These organizational changes impact the different processes of organizations whether internally or externally. For, according to (Karimi& Zhiping,2015) "Digital technology, innovation, and digitization are fundamentally changing business processes, products, services, and relationships." This digital transformation "has brought new disruptive changes to the economy" (Nylén,2015), due to "digital technology and digitization, environmental conditions are changing rapidly" (Osmundsen,Iden& Bygstad,2018). After defining what the concept of "Digital Transformation" means, which is according to (Hanelt et al.,2021) "which is qualified as an organizational change

guided by technological innovations". We will try to answer the following hypothesis in the following section:

H1: Digital transformation leads to organizational change.

B. Organizational change concept

- Definitions :

The emergence of new computer technologies has occurred in the last twenty years, and the concept of change has also emerged in the same epic. In order to remain competitive and to respond to both internal and external challenges, organizations must adapt to the context of unpredictable change by developing adaptive capabilities in order to improve effectiveness and efficiency and subsequently guarantee their survival. It should be noted that the concept of change is qualified as a vague concept that lacks a unanimous definition, but that varies in the time parameter. It can be qualified as a process of reform, renewal etc. We will propose a repertoire of definitions from the following theorists in the table below:

Authors	Change definitions
(Haned et al., 2007 ; Hansske et Delerue, 2006)	Seek to see change as a process.
(Carton, 2006)	Change is a dynamic process whose objective is to understand a dysfunction and to mobilise all individuals to serve the organisation.
(Kotter et Cohen, 2002 ; Bareil, 2004).	Of course, the human factor is the main key to successful change, but it is also one of the biggest "causes of failure".
Collins & Porras (2000)	Insist on the need for a real vision of change that distinguishes the stable from the evolving in an organisation and that allows for the direction of change action.
(Vandangeon-Derumez, I., 1998).	Change is nowadays the rule and stability the exception
(Pettigrew,1987),	Considers change as a phenomenon that brings together three parameters: context, content and process.

Table 1: Definitions of the concept "Change

Source : CHAANOUN, J., RAHMOUNI, A., & ALAOUI, M. (2022). Le changement organisationnel et la transformation digitale : Quelle relation ? Revue internationale de comptabilité, finance, audit, gestion et économie, 3 (5-1), 63-86.

Through the history of organizations, (Van de Ven and Poole, 1988;36), define organizational change as " an empirical observation of differences over time in a social system and also a progression of events that takes an existing entity over a period of time from an initial state to its final state or destination". Organizations are obliged to innovate and adopt new managerial practices in order to cope with the context of rapid change and consequently accompany globalization. We then go through the following definition of organizational change "as the passage from an initial state to a desired final state". The last section will provide an answer to our research problem, which is the following: do the organizational change models from the literature allow us to conduct a digital transformation?

- Digital transformation and organizational change relationship:

We note that the literature review has allowed us to give a definition commonly accepted by researchers of the concept of digital transformation from the perspective of organizational change. We then go through the definition of (Gong & Ribiere, 2021) which states that "Digital transformation is a process of fundamental change, made possible by the innovative use of digital technologies accompanied by strategic leverage on key resources and capabilities, aimed at radically improving an entity and redefining its value proposition for its stakeholders. To this end, it becomes necessary to highlight the different dimensions of the concept of organizational change:

- Digital transformation implies a strategic change:

New technologies have revolutionized the whole world. And organizations are called to face the challenges of integration and exploitation, and must formulate a digital transformation strategy that includes the following elements namely: the use of new technologies, the change of value creation processes, the change of organizational structures, the financial dimension (Hess et al., 2016).

- TD implies a change in jobs and skills:

It should be noted that new technologies impact the designation of work and leadership (Schwarz Müller et al., 2018). In addition, the integration of new technologies has led to the creation of the position of Chief Digital Officer (CDO) (Haffke et al., 2016). As well as the expansion of the role of the Chief Information Officer (CIO) to a conductor (Kohli & Johnson, 2011).

- TD from the perspective of its process:

It is a process that puts agility as a core mechanism for strategic renewal of (1) business model, (2) collaborative approach, and finally (3) culture of an organization (Warner & Wäger, 2019). TD is about transforming the business model using new technologies to deliver new customer value (Berman, 2012). Thus, the merging of these three independent variables ensures the performance of organizations in the context of industry (4.0).

C. *The relationship between organizational change models and the conduct of digital transformation*

The abundant literature dealing with the concept of organizational change gives rise to a panoply of prescriptive models for conducting organizational change according to different types: planned, imposed or contingent.

- Models of organizational change put forward by the literature:

We will present a set of models for conducting organizational change according to different approaches to change, allowing organizations to choose the approach best suited to their context.

- Lewin's model (1947): he proposes a model of change comprising three phases: Unfreezing, Moving, Freezing. 1: The phase of the deconstruction of norms, according to Lewin the balance must be destabilized to get rid of the old practices, it made possible thanks to the discussion of the group. 2: The phase of transformation, the change will take place by the reduction of the forces of individual resistance by

experimenting the new practices. 3: The phase of the reconstruction, that is to say the stabilization of the organization to a new balance by integrating new practices (Burnes, 2004). The role of the group in driving change, it is possible to change an individual's behaviors by sharing practices within the group to which they belong.

- Beer's model (1980): this theorist developed a change management approach composed of six phases. This is presented as follows: (1) Mobilize commitment to change through a clearly defined problem situation. (2) Develop a common vision of the object of change, defining new roles and responsibilities in order to remove functional and hierarchical barriers to information sharing and problem solving. (3) Foster consensus around the new vision, competence to implement it, and cohesion to advance it. This requires strong leadership from the executive director. (4) Spread the revitalization throughout the departments without pushing it from the top. (5) Institutionalize the change, integrating it into formal systems and structures. (6) Monitor the change, adjusting it as problems arise, creating a learning organization to adapt with the changing environment (Beer et al., 1990). The role of top management (with strong leadership potential) in creating the conditions for change (alignment of the vision with the main task), by modifying roles and responsibilities and working relationships, will force learning and the acquisition of new skills, creating a sense of effectiveness. Changing coordination patterns leads to participation, collaboration and information sharing. Beer's model encourages change without imposing it. Organizational change is a unit-to-unit learning process rather than a series of programs to be imposed.
- PETTIGREW's model (1985, 1987): His model presents three major variables, namely: the internal and external context which designates the economic, social and political environment as well as the organizational structure of the institution. In second place comes the concept of content which in turn allows a true formulation of the process of change which is ultimately the third parameter of a very complex nature " (Chaanoun. J & Alaoui. M, 2022).
- Armenakis' model (2009): He proposes the following 4-phase model: (1) The phase of effective organizational diagnosis which consists of identifying the problems and their root causes. (2) The phase of creating a state of readiness for change as a cognitive precursor to resistance behaviors. (3) The phase of change adoption by the beneficiaries by taking into account the five beliefs that promote adherence to change. (4) The phase of institutionalization of the desired change with an emphasis on the strategies that leadership can use to influence these beliefs and anchor the change in behaviors (Armenakis & Bedeian, 1999; Armenakis & Harris, 2009).
- Kotter's (1996) model: developed an eight-phase model for leading change. (1) create a sense of urgency by diagnosing the environment to identify

threats and opportunities. (2) build a powerful coalition, creating a team with a shared commitment and sufficient power to lead the change effort (3) Develop a future vision to guide the change effort and a strategy for achieving that vision. (4) communicate the vision using whatever means necessary (5) inspire action by changing structures and encouraging initiative (6) generate short-term wins to reinforce the implementation of change, rewarding contributors to improvements (7) consolidate success to boost the legitimacy of the change, and re-energize the change with new actors and projects. (8) anchor the change to the organization's structures and systems (Kotter, 1997, 2006). Kotter's model of the role of managers in leading change.

- Autissier and Mautot's model (2015): They developed a model of change management composed of three phases: define, experiment and anchor. (1) Definition begins with a diagnosis of the context using workshops with stakeholders. (2) The experimentation of the change in the workplaces in the form of workshop cycles in collaborative mode. (3) Finally, the last phase consists of anchoring the accumulated learning experiences on change in the daily management of the organization (Autissier et al., 2018).

We present the following table that provides an overview of the different change management models:

Key success factors	Irwin (1946)	Beer (1980, 2009)	Coopend (1980, 2009)	Spinks	Patenge (1987)	Imagie (1991)	Adson (1991)	Kanter et al. (1992)	Kanter (1996)	VanDyke (1999)	Hart (2006)	Amann et al. (2005)	Autissier et Moutot (2015)
Diagnose the external and internal context		Triggering change through problem	Awareness of the need for change			Change analysis and planning	Analysis of the organization and the need	Create a sense of urgency through a			Awareness of the need for change	Organizational diagnosis	Define
Preparing for strategic change	decentralization		The discovery		Evolution of the behavior without modification of		Create a sense of urgency	Building a powerful				Creating a state of readiness for change	
Create a change management entity			Plan and set		management		Get	Creating a vision					
Create a vision and a strategy for change		Develop a common vision	The future		shared vision and common direction		Create an action plan, communicate, strategies to						
Communicating the vision					The separation of the past		Communicate the vision						
involve	Transformation				Acceptance of the change and the communication								
develop learning					Acceptance of the change and the communication								
Enable or contingent institutionalized in the change		Monitor and adjust			Adaptation with modification of the new								
Types of change mechanisms of change	Planned	Emergent	Emergent	Individual-Group-Organizational	Planned	Emergent	Planned	Planned	Planned	Planned	Emergent	Planned	Agile

Figure 1: Summary of different models of organisational change management
Source : CHAANOUN, J., RAHMOUNI, A., & ALAOU, M. (2022). Le changement organisationnel et la transformation digitale : Quelle relation ? Revue

internationale de comptabilité, finance, audit, gestion et économie , 3 (5-1), 63-86.
 It should be noted that the comparative analysis of organizational change models from the literature suggests that these models have undergone a sociological paradigm shift that provides an answer to the following research hypothesis:
 H2: Organizational change models enable TD to be conducted.

It is a transition from an approach based on the stages of conducting organizational change to another more appropriate approach based on dynamic capabilities, on the development of change capabilities. These organizational capacities allow us to react in time while being agile to the evolution of the environment.

- Key success factors for leading organizational change in a digital transformation context:

In line with the previous finding, organizations in practice have found the transition to digital transformation extremely difficult for several reasons, including the lack of a standardized implementation model, the focus on introducing new technologies without evaluating their role within the business, the compartmentalization of digital project initiatives from the rest of the business, and the large-scale implementation of digitalization without a realistic view of return on investment (Butt, 2020). In this sense, to drive digital transformation, it is necessary to develop dynamic capabilities and IT capabilities, as part of a contingent approach of continuous use of new digital technologies in the daily life of the organization, whose agility is recognized as a dynamic capability for continuous strategic renewal of (1) the business model, (2) the collaborative approach, and finally the (3) culture of an organization (Warner & Wäger, 2019). In addition to dynamic capabilities, organizations need to develop organizational capabilities in connection with information technologies, because several studies have shown that 'there are positive relationships between the implementation of a proactive environmental strategy and business performance, and that IT capability is a good determinant of this strategy and that there is a positive predictive relationship between technology and superior business performance through the exploitation of this environmental strategy (Benitez-Amado & Walczuch, 2012). In this sense, IT capabilities have positive effects on the implementation of proactive environmental strategies and that these IT-based strategies could also result in direct business benefits (Do et al., 2022). Finally, after outlining the most famous models of organizational change management, highlighting the type of change specific to each model, whether emergent, planned or contingent, as well as the appropriate change levers. Subsequently, we were able to deduce that the evolution of organizational change management from a classical approach to another approach based on agile methods, this leads us to conclude that the conduct of digital transformation by organizational change models is limited, with the exception of the model of (Autissier and Moutot 2015) which allows to drive change in a context marked by a strong orientation towards digital, by

focusing more on the development of dynamic and IT capabilities.

- Identify triggers for change:

According to Weick and Quinn, (1999) The organization introduces change to adjust the gap between its current state and the demands of the environment. Change can be triggered by external and internal factors. External factors, according to Meyer et al, (1990) competitive pressures, technological developments, regulatory changes. Internal factors, antecedents of organizational change, cynical feelings, insufficient technical skills, attitudes towards change (Jack Walker et al., 2007). According to Beer, (1980), Judson, (1991); Kanter et al., (1992) emphasize that a good understanding of the organization is its context, external and internal diagnosis is crucial to identify problems and opportunities. Lewin (1948) and Kotter (1996, 2012) argue that change is triggered by creating a sense of urgency by setting extreme goals at the nexus of a careful diagnosis. On the other hand, StawSandelands and Dutton, (1981); Locke & Latham, (1990); Ashford (1988) their work emphasizes that the situation of urgency can be a barrier to change given the negative effects it creates on recipients such as fear, rigidity, change avoidance and stress. While Cooperrider& Srivastava, (1987) urge on positive experiences of the organization to trigger change (Stouten et al., 2018).

- Assessing change readiness:

In order to assess change readiness, Hiatt (2006) and Kanter et al. (1992) emphasize organizational variables such as the impact of previous changes, pace of change, activities, and resources for implementing change, with the goal of planning the change in a roadmap. Beer (1980) emphasizes the importance of problems, the conditions for change, the degree of support from leaders and the competence of change agents. On the other hand, other authors emphasize individual variables such as beliefs, attitudes and intentions, receptivity, resistance, commitment, cynicism, stress, and beliefs (Armenakis et al., 1993; Armenakis&Bedeian, 1999). When preparing for change, whether individually or collectively, it is essential to consider the affective element (Rafferty et al., 2013). The perceived performance of the change positively influences commitment to the change, while the extent of the change has a negative influence (Michel et al., 2013). Justification for change can help mitigate negative reactions and increase commitment to change (Self et al., 2007). Influencing strategies as well as the importance of change agent credibility and interpersonal and social dynamics in the readiness creation process. Combining the urgency of the needed changes and the readiness of employees, a typology of readiness programs is proposed, including persuasive communication, active participation of beneficiaries, human resource management practices, symbolic activities, dissemination practices, internal and external information management, formal activities demonstrating organizational support for change initiatives (Armenakis&Bedeian, 1999).

- Forming a Change Steering Coalition:

Kotter (1996, 2012) argues that the task of the coalition is to foster a sense of urgency, helping stakeholders understand

the rationale for change, for effective functioning Kotter states that the coalition must develop trust on the part of the beneficiaries of change by using adequate communication media, it needs common goals that incorporates the search for excellence. Judson (1990) emphasizes that the task of the coalition should be limited to advice, and that it should not be directly involved in the decisions of change. Regarding the composition of the coalition, Kanter et al (1992) Beer (1980) show that it should include all stakeholders, especially those who hold decisive power in the change process. Similarly, Cooperrider&Srivastva, (1987) emphasize the competence of coalition members in specific change topics.

- Creating a vision:

Kanter et al. (1992) consider that the vision should indicate the end state of change and incorporate stakeholders. Cooperrider and Srivastva, (1987) the vision represents the future state of the organization. Kotter (1996) the vision must express the objectives to be reached, be achievable for the beneficiaries, be easy to communicate by the leaders, be emotionally attractive and be flexible to allow individual initiatives. Beyond quantitative goals, Beer (1980) considers that the vision must clarify the role and responsibility in change, relevant behaviors and attitudes.

- Communicating the vision:

Hiatt (2006) and Kotter (2005) the vision must be disseminated through multiple channels, in a clear manner, managers must continuously explain the change by words and deeds, while adopting different approaches depending on the target. Beer (1980) emphasizes the role of the leader in the implementation of change, Judson (1991) the role of managers to make the reasons for change understood and elicited the interaction of beneficiaries. According to Beer and Noria, Morrison and Milliken (2000), Kotter (1996) the failure of change management is mainly related to the lack of communication, information sharing, knowledge and trust. Management's attitude towards silence and communication opportunities are associated with and predict employees' silence behavior. These three dimensions are also associated with organizational commitment and job satisfaction (Vakola&Bouradas, 2005). Competencies have proven to be a powerful tool that has allowed human resource managers and change agents to communicate the goals of change and management's expectations of new ways of working, which has allowed employees to better understand the desirable actions and behaviors to achieve the stated goals (Vakola et al., 2007). An organization's antecedents to change (i.e., context) have the potential to negatively influence the success of change. To counteract these effects, change agents should strive to clearly communicate the details of the change (i.e., the process) to employees (Jack Walker et al., 2007).

- Imply :

As part of a planned change, it is important to involve all stakeholders in the change process, to this end, organizations must consider strategic, emotional, and sensemaking (Bartunek et al., 2011). Organizational change is similar to the adoption of an innovation. The determinants of beneficiaries' adherence to change are cognitive, emotional

and intentional (Armenakis et al., 2007). Successful change management is related to individual characteristics, the existence of a relationship between personality traits and employees' attitudes toward change, emotional intelligence and "bigfive" personality dimensions can facilitate organizational change (Vakola et al., 2004). Taking ownership of change through emotional. Gains were related to interpretations of the change initiative and pleasant feelings and that there was considerable emotional contagion within work units. Such effects are particularly likely in employee empowerment initiatives, as experiences are linked to the interpretations and moods of change recipients (Bartunek et al., 2006). The role of organizational justice, both procedural and interactional in the affective commitment of change recipients (Bernerth et al., 2007). Judson, (1991); Kanter et al, (1992); Kotter, (2005) emphasize the importance of providing the necessary means for employees to act in a way that is consistent with the vision, through the development of new ideas and ways of working. Hiatt (2006) that support can take the form of employee autonomy, managers must perform a role of proximity, the opportunity for employees to express their views on the change. Kotter (2012) build autonomous teams. Judson (1991) involve employees in the change process. Beer et al. (1980) encourage employees to propose their solutions to problems based on their daily experience. Cooperrider and Srivasta in (1987) employees develop specific change plans facilitates their ownership of the change. Encourage initiative and reward effort. Increase willingness to accept change through participation and involvement. The re-imagined organizational change leadership advocates for collective and collaborative work, provides greater ethical safeguards, views the views and opinions of all members of the organization as informative and disagreement as creative, draws on multiple academic disciplines and their interrelationships, views leadership and management as interdependent, engaging with all members of the organization, opens up opportunities for action research so that participants in change can be part of the research and change processes (Burnes et al., 2016). Causes of resistance to change: fear and inertia. stress caused by leadership issues (Alas, 2015). Organizations will need to develop structures and cultures that facilitate rapid and effective change if they are to compete and survive. Achieving this will require long-term planning and action, preceded by a frank examination of the current situation and future needs of each organization. It may seem contradictory to talk about rapid change in one sentence and long-term planning and action in the next. Distinguish between adaptive change and fundamental change. Fundamental change is about the radical transformation of an organization, while adaptive change is about particular aspects of its functioning and activities, such as departmental reorganizations, introduction of new products, etc. (Burnes, 1991).

- Developing learning:

The rapid pace of change and increased competition, is pushing organizations to move toward a new management paradigm based on organizational learning (Burnes et al., 2003). Effective change involves the development of new knowledge and skills. Hiatt (2006) argues that learning is

made possible by removing barriers to change. Schechter&Qadach, (2012) consider that barriers to learning are related to perceived uncertainty. The barrier to change is cultural, a change that challenges existing norms, attitudes (Burnes & James, 1995). Beer (1980) marked The key role of managers in developing learning. Learning is linked to understanding the vision and commitment to change. Edmondson, (1999, 2002); Edmondson, Bohmer, & Pisano, (2001) emphasize team learning as a mechanism for change adoption. Learning is possible through the introduction of new technologies and training (Vakola&Rezgui, 2000).

- Evaluating short-term progress:

Hiatt (2006) Kotter (1996, 2012) emphasize the importance of communicating the results of short-term progress, allows to demonstrate the achievement of the vision and to reinforce the adherence to change. At the organizational level, indicators of progress can focus on learning, information sharing, innovation, coordination, financial performance, product and service quality (Burnes & James, 1995). At the individual level, Jaffe et al. (1994) and d'Isabella (1990) consider that evaluation can focus on the degree of rejection, resistance, experimentation, and commitment to change (Armenakis&Bedeian, 1999). Gilmore, Shea, and Useem (1997) found that positive and negative outcomes occurred simultaneously. While typical improvements were achieved in criteria such as quality, service, productivity, and risk taking, affective outcomes such as organizational commitment, work climate, and employee morale deteriorated significantly (Armenakis&Bedeian, 1999).

- Monitor and reinforce the change process:

Models agree on the need to monitor and reinforce the conduct of change, continuing to invest resources. Kotter (1996, 2005) suggests that senior managers continue to focus on the vision of change and its urgency, while middle managers continue to focus on specific projects to drive change. Beer et al (1990) strengthen change management by making necessary adjustments to change plans. In this framework, Judson (1991) and Kanter (1991) suggest that reinforcement may include modifications to initial change plans in the event of new obstacles or an opportunity.

- Anchoring change:

Models agree to embed change into practices. According to Kotter (2005) middle managers need to be consistent with the vision of change, make explicit and explain to employees that performance is the result of the change effort, which will enhance the credibility and legitimacy of the change. Beer (1980), Judson (1991), and Kanter et al. (1992) quantify the results of the change in order to make visible and verify the degree of achievement of the objectives. Ornatzky and Klein (1989) found that innovations are likely to be adopted and institutionalized (Armenakis et al., 1999).

D. Conclusion

As a consolidation guide, and at the levels of our scientific contribution, our objective was to present a review of the literature on the concept of digital transformation, starting with its history and ending with its implications and constraints. Then, we tried to treat the concept of organizational change with a comparative analysis of

models from the literature. These models have been studied in depth in order to determine their capacity to lead organizational change in a digital transformation context. The research hypotheses that we have mobilized have given rise to the following results:

H1: Digital transformation gives rise to organizational change (validated).

H2: Organizational change models enable to drive the industry (being validated).

Regarding the limitations of the research, the comparative study of organizational change models revealed the existence of a single organizational change model for driving digital transformation, but which is not yet standardized. For this reason, we have proposed a set of key success factors that can be used to complement these organizational change models for successfully driving TD and which are:

(1) diagnosis of the internal and external environment, (2) assessing readiness for change, (3) creating an entity for change leadership, (4) creating a vision and strategy for change, (5) communicating the vision, (6) involving, (7) developing learning, (8) evaluating and correcting, and (9) institutionalizing change.

Finally, the main research perspective lies in a future scientific contribution to test these key success factors via an empirical study to validate the H2 hypothesis and bring valid knowledge into the literature.

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The role of digital transformation on the human resources (HR) function within organizations digital transformation as a leading role in human resources within organizations

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Abstract

The concept of digital within organizations is no longer seen as a novelty, however, the arrival of digital in the functioning of organizations, has raised a number of questions especially that of the HR function.

The objective of this work is to shed light on the digitization of the HR function at the strategic and managerial level, by responding to the following problem: What is the added value of the digitization of the human resource function and its role in the transformation of organizations?

Through this research, we will mobilize the theoretical approaches as well as the role that plays the HR function in the transformation in a global way of the organization, and then we will present the challenges and issues of the digital transformation of the HR function.

Keywords—*IJOA, Journal, Optimization: Digital transformation, digitization, HR function, organization*

I. INTRODUCTION

In the digital era, consumer uses and behaviors are evolving rapidly, induced by constantly renewed technologies, access to information, and behavioral changes. Digitalization is affecting in an extreme, violent and irrevocable way all fields of activity, regardless of their sector, and all generations.

If large companies have reacted quickly to integrate digital, many of them have remained attached to traditional internal schemes, investing little, these sleeping companies have not yet seen the emergence of this cloud of new uses come to stifle their activities.

If digital has been a priority for the management of very large groups for some time now, it is now one of the most important strategic imperatives for all companies, regardless of their size and sector of activity.

Faced with organizational change, the HR function is at the heart of this revolution, with the creation of a strong

digital dynamic in organizations by integrating the digital and its means of internal and external communication, about ten years ago, the term "digital" has substituted that of "digital" which operate transactions and operations from calculations on numbers hence the term digital to designate computer applications, accessible on connected objects (such as computer, tablet, ...).

The company no longer has a choice, the need to adapt to a new connected economy, to get ahead in a changing environment even if the technicality, costs, resistance to change are often brakes to the digital transformation of companies, facing this change of "business model", the HR function is at the heart of this revolution.

HR must manage this change and activate several levers at several levels in order to ensure this transition serenely, on the one hand to create a strong digital dynamic in the company by integrating digital at all levels and its means of internal communication, and on the other hand, to encourage and guide the appetite for digital through various practices by accompanying employees in the change by the implementation of instruments thought in line with the obligations of the company and each.

On another aspect, HR must also anticipate the needs of teams in terms of digital, in collaboration with other departments, human resources must therefore identify new skills to develop to improve work, project management, organization and consequently the competitiveness of companies.

Rossi (2018) in these researches raise the important element of the so-called company (of the future), the taking of place of new digital devices of management and organization is part of the daily landscape of companies for a decade such as the "information system, mutualization of functions, organization of processes", finally to respond to major developments that shakes the ecosystem of the organization at the level (economic, Bretesché (2018) for the author, it

is no longer just a matter of adapting or change as previously perceived, but substantial transformations and systems that affect both management systems that behaviors, relationships and professional cultures of organizations.

Therefore, Rowe and Besson (2011) argue that the transformation of organizations is primarily a "phenomenon" characterized by the "intentionality" of a global change, the concept of digital within organizations is no longer considered a novelty, however, the arrival of digital in the functioning of organizations has raised a number of questions, especially that of the HR function.

The digitalization of the HR function begins with its own transformation, this transformation starts from these processes (recruitment, training etc...), while playing a role of the basic function for the global transformation of the organization.

Our work is therefore a first step towards a better understanding of the digital transformation of the HR function in companies. It would explain how digitalization can lead companies to make organizational and managerial changes in order to integrate into an innovation process.

The objective of this work is to shed light on the digitalization of the HR function on the strategic and managerial level, which consists of an organization integrating digital technologies into all its activities, so that it is a powerful lever of differentiation and competitiveness within organizations and that is why we wonder in this work to know: **"The role of digital transformation on the function of human resources (HR) within organizations?"**

In order to provide an answer to this problem, our reflection follows the contextualist approach. This approach constitutes a particularly stimulating framework for analyzing the trajectories of projects in organizations.

To make this work more structured through two points: the first will address the digital transformation and HR: conceptual framework; the second point will be devoted to the challenges and issues of the digital transformation of the HR function. Our work will end with a conclusion in which we will try to provide some answers to the problem raised at the beginning, by mobilizing theoretical tools with some research perspectives related to the digital transformation of the human resource function.

II. DIGITAL TRANSFORMATION AND HR : CONCEPTUAL FRAMEWORK

Nowadays, digitalization represents an important strategic issue for organizations, in recent years, following the advent of new technologies and information technology in general, many companies have indeed decided to take action by digitizing considerably to take into account this change, it is essential to shed light on the digital before moving to the design of digitalization.

The digital transformation of the HR function involves, first of all, the digital transformation of the HR function itself, in its various processes: recruitment, training, compensation, skills management, etc. In a first approach, it can therefore be defined as the use of the potential offered by digital technology, through various digital HR solutions (already existing on the market or to be developed) to:

- ✓ Enrich the way HR tasks or processes are performed;

- ✓ The development and especially the democratization of virtual simulation in training and recruitment allows, for example, to offer new types of training (always closer to reality), as well as new possibilities to enhance the employer brand of a company (virtual visit of the premises, presentation of industrial know-how...);
- ✓ Transform the way HR tasks or processes are performed;
- ✓ The use of social networks has transformed the way of sourcing candidates by adding a set of communication channels to find and contact potential candidates. They are complementary to more traditional sourcing methods (school relations, trade fairs...) and have become essential for several years;
- ✓ Automate the way tasks or HR processes are carried out, RPA (Robotic Process Automation) allows to automate a certain number of tasks in the process of welcoming and integrating employees thanks to the use of algorithms that will automatically launch tasks to be carried out, such as pre- filling administrative documents, launching the creation of e-mail accounts, proposing e-learning modules to be followed for training.

1-1 DIGITAL TRANSFORMATION IS A CONCEPT THAT HAS EXISTED SINCE THE RISE OF THE INTERNET

The notion of "digital transformation" is a recent concept, which is gradually replacing the notion of digitalization. Since 2004, the term "digitalization" has been used and associated with the latest technological revolutions.

Beyond these technologies, digital transformation is associated with the company as a whole and takes into consideration not only technological innovations but also human capital and strategic dimensions, but how can we define digital transformation?

Since the 19th century, society has been profoundly affected by the Internet and new technologies. Today, digital transformation is revolutionizing our society, and is now an integral part of every company and every individual.

Digital transformation can be defined, according to Laurent Bour, Digital expert, as "the process of implementing a maximum of digital technologies available within their activities, for a better business and with a view to perpetuate the company.

Thanks to this revolution, companies are seeing the emergence of new competitors and a volatile consumer, and therefore a new consumer profile. They must more than ever develop strategic issues of transformation to remain successful and not leave the race: one of the most concrete and common examples of this revolution is the commonplace use of instant messaging and emails within a company, these tools have facilitated exchanges within the structure but also with the external world.

1-2 DIGITAL TRANSFORMATION: STILL A VAGUE TERM:

Digital transformation, also known as digitalization, is still a protean concept. Some practitioners characterize it as "the

changes brought about by digital technologies in all aspects of human life" (Stolterman and Fors, 2004).

The notion of digital transformation questions the nature of the evolutions made possible by the latest developments in the field of ICT (Information and Communications Technology), the different waves of technological development have all, to varying degrees, had a profound impact on socio-economic development and that of organizations, keeping in mind this historical dimension is necessary to avoid falling into the trap of novelty, digital transformation is not a new phenomenon: the expression (digital transformation) appeared for the first time in 2000 (Patel and McCarthy, 2000).

Moreover, all actors agree that digital transformation shifts value within sectors, whether industrial or service sectors, whether companies operate with industrial clients or in the general public sector. This notion of "value shift" had a hard time finding a place in the academic world, but it has now become one of the most studied concepts in the literature of economic sciences. At the same time, the digital transformation is redrawing the place of the human being in companies, all the tasks that can be automated are in the process of being automated, from the robotization of operations on automobile production lines to the automation of the tasks of office employees or cashiers. Robotization also allows for production on demand and the possibility of personalizing products and services: the formulation of the customer's request, the design of the solution and the automata that execute them, and finally the service, which consists of delivering to the customer. " (Landier et al, 2015). Reis et al (2018) identify aspects of digital transformation into three distinct classes :

- ✓ A technological aspect where digital transformation relies on the use of new digital technologies such as social networks, mobile technology, analytical or integrated tools (Fitzgerald et al, 2013)
- ✓ An organizational aspect where digital transformation requires a change in operational processes or the creation of new business models (Ross et al, 2016)
- ✓ A final social aspect or digital transformation is a phenomenon that influences all aspects of human life (Matt et al, 2015)

1-3 DEFINITION OF THE CONCEPT OF DIGITAL TRANSFORMATION

In the era of digitalization, flexibility and adaptability become a necessity for all companies, the basic definition of the term has remained the same, namely: "the use of all available digital technologies to improve business performance", the digital transformation will allow

companies to stand out and optimize their performance, thanks to the simultaneous use of different technologies.

Digitalization also refers to a total transformation of the company (Ross, et al, 2017), It aims both the speed of expression and the comprehensiveness of the transformation, compared to digital, digital refers to those in the corporate world have perceived the issue and acted accordingly, on the other hand the term digital is attributed to those who would not have made efforts or would not have understood the issue (Moatti, 2016).

However, a digitalization will only be complete after a transformation that allows the company to define and respond to customer needs and preferences more quickly and innovate to compete (Ross, Beath, & Sebastian, 2017).

The development of innovative products and services requires the deployment of an effective digitalization business process, which must guarantee a number of requirements: reliability, efficiency, security, and process discipline (Ross, Beath, and Sebastian, 2017), which are key factors for success in constantly changing markets.

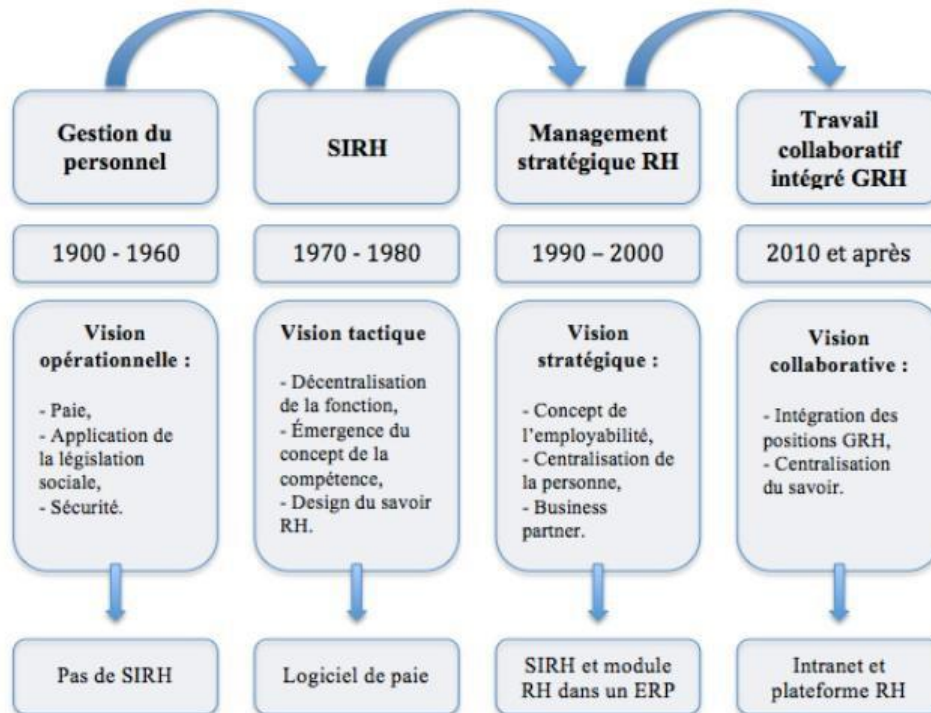
The development of innovative products and services requires the deployment of an efficient digital business process. The latter must guarantee a certain number of requirements: reliability, efficiency, security, discipline in the processes (Ross, Beath and Sebastian, 2017), these elements constitute the key factors of success in markets in perpetual mutation, we can consider the relationship between digitalization and digital transformation as reciprocal. Indeed, the introduction of digital technologies encourages companies to transform themselves, i.e., to achieve the possibility of driving the business using digital. On the other hand, the introduction of such technology requires a deep transformation by the company. In other words, in this new era successful companies are both digital and digitalized (Ross, Beath and Sebastian, 2017).

Since the 1990s, Enterprise Resource Planning (ERP) systems have driven the digitalization phenomenon and formed the central foundation of digitalized business processes (Ross, Beath, & Sebastian, 2017).

1-4 AN OLD PHENOMENON THAT IS ACCELERATING

As for the digitalization of companies, the digital HR transformation is not a new phenomenon. The 1970s saw the arrival of the first payroll software, and the 1980s were marked by the development of HRIS (Human Resource Management System). During the 2000s, the potential offered by the Internet enabled the development of numerous solutions and practices around e-recruitment, e-training, HR portals and social networks. Since 2010, the digitization of HR activities has been marked by an acceleration in the use and distribution of

FIG. 1: EVOLUTION OF THE HR FUNCTION



(Chammaa, 2016, p. 164)

1-5 THE HR PROFESSIONAL: AN ACTOR OF CHANGE

In change management, the understanding and reading of human issues is, by logical association, the responsibility of the HR function, the HR professional is the one most called upon to accompany the change, and considered the most decisive for its success (Peretti, 2013), in fact, the roles assigned to the HR professional, as an agent of change, have evolved according to the transformations, the context and the expectations of employees.

In his book "*HR from the outside in*," Ulrich shows that an HR professional must understand the world and be open to the external environment of the organization to anticipate change. His matrix remains a fundamental framework for the HR function, it will be enriched by the key competencies that an HR professional should develop at the strategic, organizational and individual levels (Ulrich, 2018)

As a result, to manage change effectively, a change agent must perform the following four roles (Ulrich, 2018):

➤ CHAMPION OF CHANGE :

The HRP (Human Resource Planning) must first initiate the change, which consists of creating the need for change and justifying to the recipients the importance and the opportunity that it presents. This action relies on its ability to bring together all the parties concerned and engage them in a common strategy, followed by the second step of co-construction of the change, The HRP must support the change and make it sustainable by putting in place the appropriate methods, with the aim of identifying individual and collective problems and transforming them into an action plan. It must also define, with the decision-makers

and managers, the necessary resources and the expected results, in order to evaluate the effectiveness and evolution of the planned transformation.

➤ STRATEGIC POSITIONER :

Change is the result of a desire to adapt to developments and trends in the environment, so the HR professional should translate these external trends into internal decisions and actions, he/she is required to understand the social, technological, economic, political or environmental context, likely to influence business models, in addition, he/she must be able to detect the needs and expectations of employees and customers and contribute to the implementation of consequent strategies, in this regard, the HR professional follows a forward-looking logic in order to anticipate changes and transform them into leverage and competitive advantages.

➤ CREDIBLE ACTIVIST :

The HR professional must inspire confidence, the role of "*credible activist*" is crucial for a change project, the latter must invest in relationships with the different hierarchical lines, at all levels of the organization, a skill that is nourished, among other things, by personal integrity, ethics and empathy towards employees. HR professionals are most effective when they are credible, reliable and proactive.

III. CHALLENGES AND STAKES OF THE DIGITAL TRANSFORMATION OF THE HR FUNCTION

In this context of accelerating digital transformation, technological, economic and social issues are very well taken into account.

2-1 TECHNICAL ISSUES

Digital technologies are helping to transform the organization and operating methods of companies through the automation of processes and the evolution of project and business practices. Aligning technologies and their uses with the company's strategic orientations, mastering internal and external data sources, identifying algorithms that make sense of the information collected and having the skills to work in a coordinated way within the organization seem to be key success factors in the new digital environment. The question of IT governance that enables the IT organization to support and develop the organization's strategy and objectives is more central than ever. "The challenge is that digital technologies participate in improving value creation processes, while taking into account risk management and technical performance" (Bounfour and All, 2015).

2-2 ECONOMIC ISSUES

Digital technologies continue to foster new modes of organization and new intermediations, profoundly transforming the economic models inherited from the industrial revolution, and the place of the consumer/user. At the same time, the way in which organizations will know how to collect and process massive data, while reassuring the various stakeholders about the processing carried out, could constitute an intangible capital of primary importance, still insufficiently valued by the markets.

Just like brand equity, which financiers now include in the valuation of firms, it seems to us that, in a knowledge-based economy, companies should be able to define and value their digital capital. A key question for us, therefore, is to verify whether we can speak of the digital capital of companies and, if so, evaluate it. While the media sector was affected very early on by the digital transformation of cultural goods, for which consumers themselves chose to become music and film publishers (Poels, 2015) by relying on electronic exchange platforms, other sectors are still on the verge of major transformations, such as the automobile or health sectors.

2-3 SOCIAL ISSUES

Today, human activities will be more and more dependent on digital devices. In this context, human issues must be reconsidered.

❖ THE APPROPRIATION OF DIGITAL BY ALL THE PLAYERS

One of the essential conditions for a return on investment in the use of digital technology in the workplace is the appropriation (Grimand, 2012) by employees, managers and leaders of organizations. The identification of the factors of appropriation of digital technology in a particular context is essential in order to work on deployment strategies for all the actors of an organization.

❖ THE EVOLUTION OF INDIVIDUAL AND COLLECTIVE SKILLS

A key question for the company of the future will be the skills of these employees, in the factory of the future,

"the role of man in the triangle man/machine/product is called to change profoundly; operators would indeed be equipped with tools of augmented reality and communicating to interact with other team members, monitor the production line and identify incidents. Man, and machine are deeply intertwined here. The integration of automatic sensors and the influx of massive data on workstations within the production chain are changing the relationship between men and machines and should allow for an enrichment of tasks and an increase in skills that companies must anticipate and support to remain competitive.

In the digital age, Human Resources management will have to face new challenges. These changes and challenges force us to adjust and reinvent ourselves in order to meet individual, collective and organizational needs.

The digital transformation of organizations leads not only to a change in the tools used, but also in behaviors and work habits according to (Tambe et al. 2012). Information technologies make companies more extroverted, i.e., capable of being more in touch with their environment in their innovation process, so it leads to the emergence of new ways of working with an improvement in the Quality of Life at Work, HRDs (Human Resource Development) must be competent on the digital tools available to them.

According to Baudoin, the digitalization of the human resources function within companies covers two main dimensions as mentioned in the above section (the transformation of the function itself and then, it must accomplish the mission of accompanying the global transformation of the company), as the "architect of social" it must fully assume this role.

More generally, the digital transformation of the HR function raises a number of major management issues. The authors list at least five major challenges of the digital transformation of the HR function, such as: Thanks to digitalization, the use of potentials offered by digital technology, the HR function must be able to develop certain services allowing to "identify" and "analyze" the internal performance factors of employees thanks to HR analytics, to adopt a recruitment strategy, and to set up a feasible virtual training plan.

This transformation allows the HR function to respond to the new operational challenges and expectations of current or potential future employees in order to attract, retain and make employees perform well, thanks to the digital potential offered by e.g. the future candidate self-learning informal and employees no longer need a training plan or traditional skills development (face-to-face) but remotely (telecommuting) ; by digitizing the HR department, harmonizing practices and content, by setting up a human resources information system (HRIS), making it possible to standardize all practices in different entities despite their divergent processes.

This digital transformation of the HR function, allows to optimize, automate and decentralize the circuits of validation of request, tasks to be accomplished by all the different actors of the system, the time of realization and the mode of validation.

Finally, thanks to the digitalization of the HR function, allows the control of human resources data i.e., manage flows for HR practices, compliance with legal texts and laws on data protection; RGPD (General Data Protection Regulation); and control of performance Baudoin et al. (2019).

CONCLUSION AND OUTLOOK

The literature on the transformation of the HR function has allowed us to observe that this transformation does not stop at the level of the HR function, its processes and practices, but extends to all the functions that make up the organization.

From a managerial and theoretical point of view, the digital transformation of organizations requires in-depth studies on this subject by practitioners and researchers to enable academics to understand the issues and challenges that organizations face.

To answer our question we can say that the digital transformation that the world is going through is more important than the industrial revolution, in order to complete our answer the digitalization of the HR function, and the organization in general, constitutes an added value as indicated by (Westerman et al. 2011): digitizing the customer experience such as digital marketing, operational improvements such as process automation, and the transformation of the business model of the organization such as networking.

This research has a number of limitations, on the one hand at the theoretical and empirical level, at the theoretical level, the digital transformation on the plan presents a deficit and less exploited by researchers in economics and management, and on the managerial level, the digital transformation presents a number of challenges and difficulties for practitioners in HRM (Human Resource Management), manager etc. is to replace traditional practices by the new ones.

These limitations open up several avenues of future research, firstly, to complete this research with a field study, in order to apprehend the facets of the digital transformation of the HR function itself and that of the organization in a global manner, then to study the impact of this transformation on the performance of the HR function and the organization.

To conclude, the arrival of digital technology has subjected organizations to competition on a national and international level. This competition does not stop just at the product and service level proposed on the markets, but on the markets of the human capitals in terms of skills, being innovative and responding to the need of the market in full evolution.

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Digital transformation: what is the impact on training?

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Abstract

Digital transformation makes great strides and deeply impact training and its users. On the one hand, this transformation stimulates innovation, creativity, democratization of knowledge and forges links between several disciplines. On the other hand, it also greatly modifies the practices inherent in training in terms of the relationship between time, space and inter-knowledge. In addition, some inequalities will be established. These inequalities find their explanation in several factors called "conversion factors". Another dimension of this transformation is manifested in the significant evolution of the field of human resources. These developments will call into question the role of the trainer, as well as their skills going forward.

Keywords— digital transformation – impact – training - distance training.

I. INTRODUCTION

Historically, the massive use of information and communication technologies (ICT) to deliver different modes of training has been a source of controversy giving rise to different opinions. Some works insist on the profound effects of their introduction which proves to be disruptive and a source of inequalities between beneficiaries [1].

Moreover, more and more with the rise of digitalization, we are witnessing an exponential development of knowledge and skills [2]. Therefore, it is essential that training follows this change by modifying the ways of learning and training methods. Undeniably, digital transformation impacts the different modes of training both positively and negatively. To what extent, then, does this transformation impact training and what are the different dimensions of this impact?

To answer these two questions, this article will be structured around five points. The first will be devoted to a conceptual framework of the digitalization of training. The

second will deal with some of the positive effects of digitalized training. The third point will discuss the impact of digitalization on training practices. The last point will deal with the evolution of the trainer's job as an immediate consequence of the digital transformation.

II. THE DIGITIZATION OF TRAINING: CONCEPTUAL FRAMEWORK AND RELATED NOTIONS

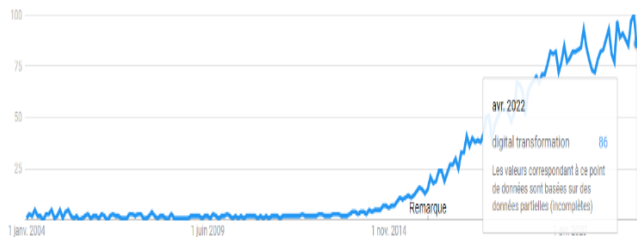
A. Digitization

Through our readings, we have noticed that it is difficult to find a precise definition for the word "digitalization" due to its transversal dimension. However, according to the Petit Robert, digital is a "tool in which binary coding is used" (Petit Robert, 1978, p541). Thus, some authors define the concept of "digitalization" as a process of adoption (introduction) of digital technologies (digital) dealing particularly with the transformations induced by information technologies (IT)[3]. Digitalization has, therefore, a connotation of transformation and change for the purpose of improving the various processes that deal with digitization.

B. Digital transformation

Digitalization denotes the notion of digital transformation that can be defined as a process which leads to a range of transverse actions that must be implemented in the face of information and communication technologies[4] that drive said processes towards new ways of acting and interacting through the use of digital technologies in order to continuously improve. However, some authors confirm that it is difficult to define what digital transformation is since the ins and outs are still not well defined [5]. This partly explains the growing interest in research around such transformation. The figure below highlights the importance of this notion, which has been given the role of spearhead in academic research in recent years.

Fig.1 Evolution of interest in searching for the term “digital transformation” at the global level from 2004 until today.



Source:GoogleTrends<https://trends.google.fr/trends/explore?date=all&q=digital%20transformation#timeseries>

III. POSITIVE SPIN-OFFS OF DISTANCE LEARNING

The devices set up during distance learning courses combine distance learning and digital use. This combination offers more flexibility in learning modalities and makes several functionalities available to different users [6]. Moreover, making information exchanges more fluid, digitizing educational content and participating in the development of skills via a range of digital solutions are all assets of digitalized training [2]. The digitalization of training is also a step towards the digitalization of the entire organization. In fact, no one can deny how much the role of training has evolved. From a purely informational role as a channel of diffusion and promotion, to a more strategic role that supports innovation, creativity and change management by using digital devices and by acknowledging the advantages and risks related to this choice. The digitalization of training also serves purposes such as innovation in learning, rationalization of the training budget, control of logistical variables (room reservations, necessary supplies, etc.), and the dissemination of a digital culture [6].

Moreover, it is an ad hoc source that is already perfectly suited to unprecedented pedagogical innovation in terms of collaboration, interaction and adaptation to the immediate needs of learners. In other words, digitalization would be a real opportunity to facilitate flipped pedagogy, data mining, and the interweaving of neuroscience and training engineering in order to make the pedagogical leap that is a corollary of societal transformation in the Web 2.0 era.

In the end, digitalized training, and particularly MOOCs, “make knowledge available anywhere, at any time, for anyone (whether in initial education or further training). New practices have sprung up which cannot be ignored.” [7].

IV. THE DIGITAL TRANSFORMATION MODIFIES GREATLY THE PRACTICES INHERENT IN TRAINING

One of the most striking transformations engendered by e-learning is certainly the relationship to time. This relationship offers more autonomy for the participants to choose the moment that suits them to train and to be trained by adopting the preferred mediation devices. These new practices give rise to what can be called “nomadic learning” [7] with all its corollaries in terms of breaking down learning sequences and adapting evaluation methods. In regards to this temporal relationship, the digitization of training can be linked to a temporal fragmentation that generates a dispersion for learners that is aggravated by operational constraints, as

well as a challenge for trainers to manage their availability and to balance between the empowerment of participants and their supervision [6].

For their part, Charrier & Lerner-Sei, (2011) evoked the consequences of a desynchronization of the participants during a distance training which simultaneously presents an advantage and disadvantage for the learners. In fact, said learners can train while maintaining their professional activity, although they may be relatively deprived of any possibility of support both by trainers and by peers. In the same logic, Oudart [8] emphasizes the importance of this time relationship by specifying that “time is both an ally and an enemy of support” which requires the management of different temporalities (action, support, reflection) to balance the different learning rhythms that can be a source of instability and misunderstandings between the “interactants” [9].

The second change in learning related to e-learning is related to a discontinuity of inter-knowledge [6] and a relational rupture within the group [7]. This change results in the isolation of the participants who finds themselves alone in front of the content of the training and facing the technical problems of its digitization without mutual aid or support from either party. This is a fragmentation of inter-knowledge that can be taken into account thanks to the transactional distance [10] which emphasizes the importance of dialogue and interaction between peers. To compensate for this absence of the alter, of the other, and to “tame” this relational distance, the authors propose to schedule preliminary meetings before the training session in order to foster inter-knowledge between the participants and establish a climate of trust between them.

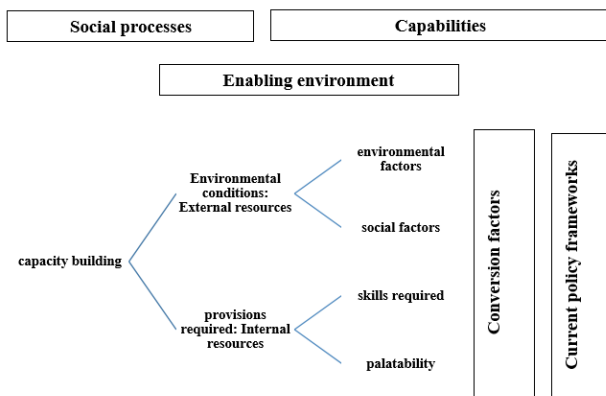
The third transformation caused by digital technologies concerns the co-creation and cooperation that some organizations institute to jointly develop a distance learning device and benefit from a common synergy that can achieve savings in terms of time and cost [7].

The fourth change generated by the increased use of digital technology, this time at the individual level, is the transformation of our ways of memorizing and thinking as a result of the various visual, auditory and tactile simulations linked to digitalization. Even more profoundly, our mental operations are affected and inevitably touch our capacities of perception, analysis and action. Moreover, the successive solicitation of information of different importance weakens our attention capacities [11].

V. DISTANCE LEARNING AND INEQUALITIES BETWEEN TRAINEES

In an article that treats the effect of digitized training on employees' learning, Boboc A. and Metzger J.L. [6] mobilizes A. Sen's capability approach and shows the entanglement of so-called "conversion factors" that feed learning inequalities in terms of distance learning. These conversion factors are divided into individual factors such as dispositions, knowledge, know-how; social factors such as context, social norms; and environmental factors such as infrastructure. Thus, the two authors deduce that the non-success of certain individuals is not only explained by a lack of skills, but also by the deprivations that have characterized their lives and by the mismatch between their dispositions and the conversion factors. Fig.2 highlights this capability approach to training.

Fig.2 Capacity approach applied to training[6]



Source: authors

In this sense, the two authors deduce that "if not envisaged in all these dimensions, the introduction of digital training systems risks not only failing to meet the stated objectives (high drop-out rate), but above all aggravating the unequal distribution of learning capacities among employees".

As for Ben Youssef A. [12], he relates in his article four dimensions of the digital divide. The first concerns economic and social inequalities related to equipment and infrastructure. These inequalities are accentuated for the non-equipped who, consequently, are excluded from a quality informational and relational access. The second dimension of the digital divide can be attributed to the uses of ICT. This version of the divide concerns the way in which ICT are used to meet manifested needs. In this sense, the literature evokes two explanatory factors of this second dimension of the digital divide: on the one hand, the cognitive level of the participant, and on the other hand, the quality of innovation in terms of products and services offered via digital devices. The third dimension concerns the effectiveness of the uses and their contribution to the improvement of individual performance. In fact, the divergence of these performances is explained by the differentiated contribution of ICT for each individual. The last family of digital divides addressed by the author relates to inequalities that modify learning processes thanks to (or because of) the informational and cognitive abundance induced by ICT. This abundance reveals significant gaps in terms of individuals' dispositions towards

education and knowledge, especially since this profusion requires specific skills to manage and exploit it better.

For Peraya Daniel[13], these inequalities cannot be reduced to a set of conditions of accessibility, equipment, use or even quality of use, but "they are manifested first and foremost in the diversity of practices resulting from a variation of social inequalities". These inequalities can take on the character of an imposed use of ICTs, especially in a professional context.

VI. SIGNIFICANT TRANSFORMATIONS IN TERMS OF HUMAN RESOURCES

The use of distance and digital technology presents many difficulties for trainers who find their jobs transformed [6], [7]. This dematerialization of the training offer will impose a certain transformation of the trainer's profession and the modes of its exercise. This change can be explained by the obligation for trainers to be in phase with the new skills to be acquired in ICT and pedagogical engineering, but also, to face the new professions that are emerging along the way. Thus, one of the manifestations of this evolution lies in a new role for the trainer / facilitator who would no longer be the main source and the only transmitter of knowledge while accepting to play several roles of animation, accompaniment, and tutoring, etc.

Conclusion

The objective behind this article is to highlight how training is impacted by this growing wave of digitalization, which will undoubtedly, and perhaps permanently, have profound repercussions on societal transformation.

Digitalization can be a lever for the development of quality training, provided that it is taken into account in all its dimensions when designing and implementing digitalized training, especially those in distance mode.

Finally, it is of paramount importance that those in charge of the training function within any organization support the liberation of potential and rely on the human being as the spearhead and cornerstone, and not only on technology, in order to transform in depth and in the right direction.

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