

WORKFORCE AND WORKPLACE ECOSYSTEM – CHALLENGES AND OPPORTUNITIES IN THE AGE OF DIGITAL TRANSFORMATION AND 4IR

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Abstract: We are witnessing the Fourth Industrial Revolution (4IR) in which technological discoveries and changes are coming at a dizzying speed generating tremendous transformations of organizations, the environment and societies. The purpose of the present paper is to analyze a set of challenges and opportunities of the workforce and workplace ecosystems in the context of 4IR. Innovation – as key ingredient of scaling-up processes – and the widespread implementation of specific 4IR technologies will lead to substantial, sometimes even disruptive changes of the labor market, but also to the workforce and workplace ecosystems’ transformation. Among others, artificial intelligence (AI), smart robotics, and intelligent automation are emerging technologies that dramatically change the ways of work, productivity, but also the types and number of available jobs. This paper has a few specific objectives: summarizing the main technologies and tools specific to 4IR and Industry 4.0; analyzing the major shifts related to the current structure of the workforce - highlighting the external and technological component (AI, robots, automation); analyzing the hybrid workplace (physical and digital); identifying some emerging technologies and their impact on the work ecosystem. The methodology of the study relies on qualitative methods - literature review, systematization of knowledge, observation/ participation (as experts in different national and international consultancy and training programs). The paper draws conclusions and some remarks regarding the intention to address other challenging subjects in the future, such as: rethinking performance management systems to reflect and tackle these challenges; skill gaps and the role of emerging technologies in supporting Society 5.0. - a more sustainable, inclusive and human-centric society.

Keywords: workforce, workplace ecosystem, 4IR, Industry 4.0, digital transformation

1. Introduction

Nowadays and moreover in the next decades individuals, organizations, communities, governments and nations face major global, economic, political, sociocultural, environmental and technical issues and challenges: resource competition (energy, oil, water, gas etc.); climate change and global warming; pollution and environmental degradation; hunger and extreme poverty; inequality of income and inequality of opportunity; working conditions and precarious employment in some regions and/ or countries, diversity,

inclusion and equity; health problems and pandemic risks and impacts; social and demographic change, ethnic and religious rivalries, terrorism, armed conflicts etc. New technological discoveries are coming at a dizzying speed. We live and work in an interconnected world, increasingly marked by the process of digital transformation that creates opportunities and progress but also faces us with important challenges, sometimes even threats. Outcomes are not the same for everyone. Technological innovation and major digital transformation challenges can result in big winners and big

losers. In order to be resilient in a VUCA (Volatility, Uncertainty, Complexity and Ambiguity) environment, organizations need to rethink their design and business models in a synergistic, holistic approach and build their agility in adapting to new challenges. Therefore, work systems - specific to the organizational structure – has to be redesigned to anticipate and respond very rapidly to the needs and expectations of employees and customers – as key stakeholders – but also to suppliers, competitors and pressures of the macro environment - political, economic, sociocultural, technological, legislative and environmental (PESTLE).

2. 4IR technologies

Technological change is a megatrend that radically reshapes economies, societies, and the environment. Besides technological innovations, the COVID-19 pandemic has likewise had a huge contribution to the speed, amplitude and priorities of digital transformation. Now we have an extraordinary power in our hands – the

information and communication technology (ICT) and the tools provided by the 4IR. The concept Fourth Industrial Revolution – also known as 4IR or Industry 4.0 - was coined by Klaus Schwab. As Founder and chairman of the World Economic Forum (WEF), Schwab has presented a report regarding this disruptive transformation and in 2016 has published a book with the same name. The 4IR is the fusion of “technologies and their interaction across the physical, digital and biological domains”[1]. Moreover, different innovations, domains and disciplines are integrated and harmonized in an intelligent approach and create new forms of intelligence [2]. The specific 4IR & Industry 4.0 technologies (Figure 1) have generated interactions from macro, micro and nano levels, reshaping society, organizations, and individuals. This process of technological transformation has already begun – although it is quite at the beginning in some industries and countries - but it will have a huge boost and impact in the future.

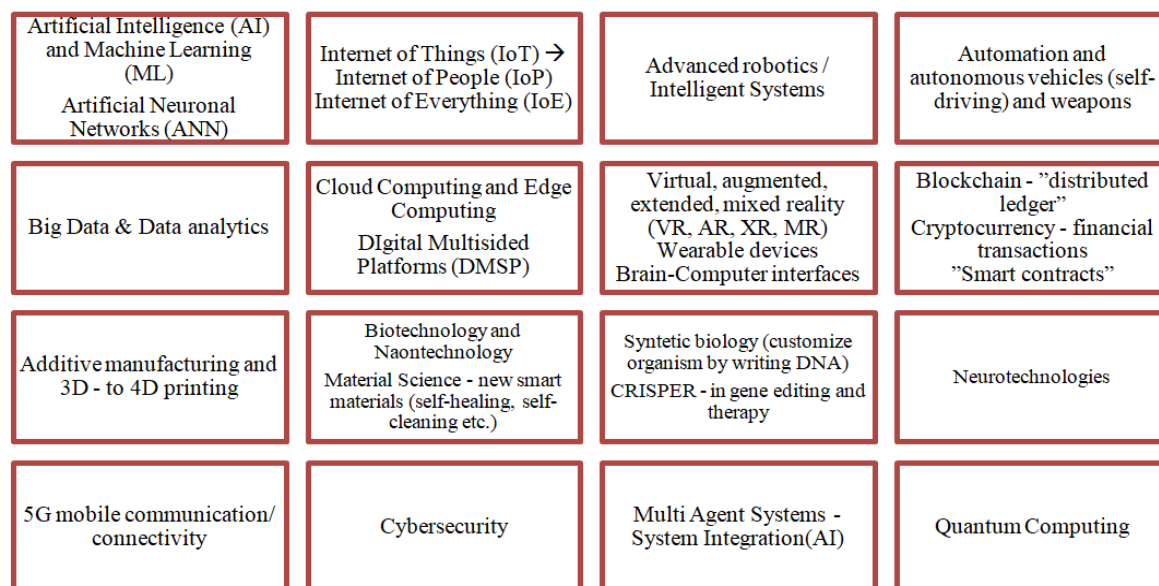


Figure 1: 4IR technologies

The transformation generated by these emerging technologies is characterized by two types of interactions: machine-to-machine - that exclude human intervention,

and human-to-computer/ machine - in which case humans interact and collaborate with intelligent systems (Figure 2).

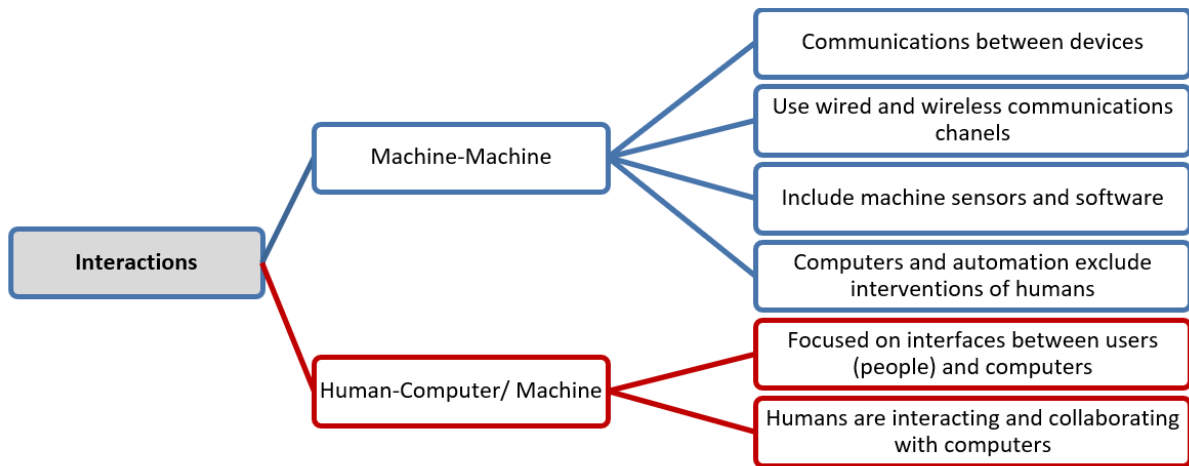


Figure 2: Specific forms of interactions in 4IR

3. Workforce and workplace ecosystem – some challenges and opportunities of 4IR

Until recently, when referring to the workforce, it was mostly about employees. Nowadays, the concept of workforce ecosystem is increasingly used and in addition to employees – as an internal and traditional workforce – it also includes two other important categories of participants: the external workforce (gig workers or freelancers, service providers, contractors, developers, accessory providers, etc.) and intelligent technology for workforce augmentation (Figure 3).

At present, organizations are increasingly resorting to outsourcing. The external workforce allows managers to better manage human resource issues and challenges, as well as changes in the economic, technological and social environment. In the age of 4IR, in addition to human resources (both internal and external), robots and AI will become an important component of the workforce ecosystem.

ICT advancements – specific to the digital age – have generated important changes in

the economy, the labor market and employment dynamics, such as enhancement of blended workforce and gig work [4].

Concepts such as “digital economy”, “gig economy”, “sharing economy”, “collaborative economy”, “on-demand economy”, “platform economy” – that arises in the digital age – are all ICT-driven.

The gig economy is an important shift, and its proliferation was facilitated by both technological and sociocultural changes – such as an interest in an independent work style, freedom, flexibility, work-life balance etc. Maturity of mobile technology and applications combined with the advances of/ in digital platforms contribute to the widespread increase in gig jobs (freelancers) and development of a gig economy. Increasingly frequent, gig workers supplement or even replace full-time or part-time employees. Now facing a talent crisis; organizations should develop their capabilities to take advantage of the added value that this new types of workforce can generate.

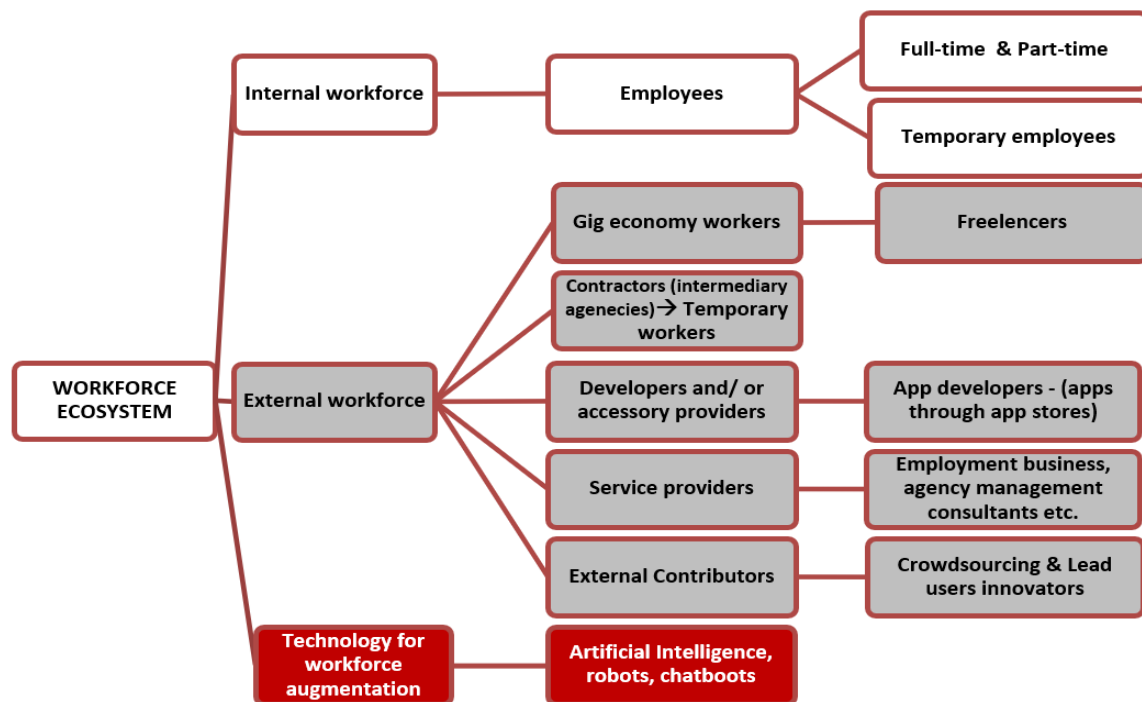


Figure 3: Workforce ecosystem – categories of workforce participants
(Source: Author's synthesis based on Altman et. al., 2021) [3].

In the digital age, with advancements in ICT, crowd work – also known as “work on-demand via apps” or “just-in-time” workforce – has become part of the gig economy. Crowdsourcing – a concept coined in 2006 by Howe – is a blend of two elements: the crowd – mass of people – and outsourcing [5]. Through crowdsourcing, activities and/ or tasks performed by employees or contractors (in the traditional work model) are outsourced – via digital/ online platforms – to online crowd workers. In a competitive world, organizations should understand that talent is of strategic importance in gaining a competitive edge. Talent – as a key ingredient of organizational success – is valuable, difficult to attract, motivate, engage and retain. In the days of 4IR, success depends mostly on the talent ecosystem that includes four related elements: (1) Acquisition of talent (Buy); (2)

Nurturing / developing skills and experience (Build); (3) Usage of a liquid workforce (Borrow) - done through outsourcing; (4) Use of technology - robots and AI (Bot) (Figure 4). As it can be remarked, the external workforce - liquid/ adaptive workforce (in which category gig workers are distinguished) – facilitate workforce procurement in times of talent crisis (Borrow). Also, in the talent ecosystem, emerging technologies - AI, automation and advanced robotics/ intelligence systems - that can replace, assist or collaborate with human resources by enhancing their skills and competencies, are a valuable support in talent management. It is obvious that there is interdependence between the three categories of hybrid workforce - internal (employees), external (gig workers and other participants) and advanced/ intelligent technologies.

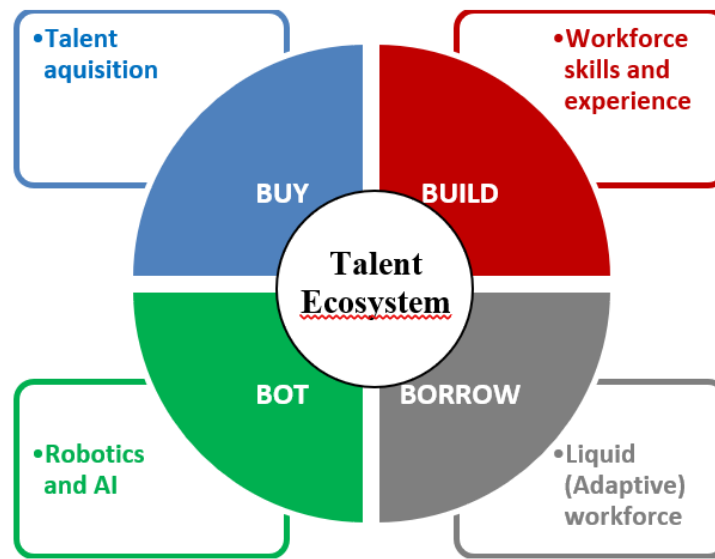


Figure 4: Talent ecosystem – Reimagining the workforce
(Source: Author’s representation after Accenture, 2018) [6].

AI, robotics, smart automation are emerging technologies that dramatically change the way individuals work, their productivity, as well as the types and number of available jobs. In the near future due to the automation wave, a lot of jobs are at the risk of disappearance.

Invisible technology behind AI - such as machine learning (ML) - can be used both to replace humans or to collaborate with humans and enhance their abilities. For example, smart agents - based on AI and ML algorithms - will gradually replace specialists in banking, the finance sector, insurance, eCommerce, healthcare etc. In a data-driven world, data has huge potential for all organizations, if used correctly [7]. Data Analytics and AI algorithms can explore “Big Data” to analyze trends, find patterns and provide valuable information, knowledge and insight regarding market trends, consumer behavior, etc. AI-driven Analytics has an important positive influence in the decision-making process. Data-driven organizations can use technology to make faster and more informed decisions, with direct and propagated effects for gaining a sustainable competitive edge. Another

example regarding technology replacing people is that of Autonomous Vehicles (AVs – cars, trucks, trains), Unmanned Aerial Vehicles (UAVs – drones) and Unmanned Surface Vehicles (USVs – submarines) – that will influence in a large scale, in the near future, different sectors such as transportation, logistics, commerce, industrial production etc. This shift will have a huge impact on jobs that involve driving as a primary skill [8].

In the coming years, we will witness an extraordinarily complex relationship between technology and humans. We need to be prepared in advance for such changes. It is up to us to be equipped with the capabilities required to manage 4IR technologies and tools. If AI and intelligent automation systems only replace human resources, this will generate a significant set of problems, risks/ threats related to traditional unemployment, technical unemployment, skill gaps, etc. But if this human-technology mix has a synergistic effect, then it can lead to cost reductions and added value for organizations, customers, employees, and other stakeholders.

The workplace is another important element of the work ecosystem. Prior to the COVID-19 pandemic, most of the internal workforce (employees) has worked full-time or part-time in a physical office. The pandemic was the force that contributed to a disruptive change – the online transformation. As a result of the measures imposed by social distancing, organizations were forced to have their employees work remotely. Since the pre-pandemic period, in the context of digital transformation and taking into consideration organizations' interest to implement new policies that motivate human resources, remote work or teleworking was an approach worthy of consideration. However, the shift from the traditional environment (full-time in the office) to a hybrid model – office time combined with remote work – only happened in companies that generally worked on projects and had international teams – with geographically dispersed employees. Nonetheless, even in these cases, most of the remote employees also worked from their offices - even if these were located in another city, region or country. The organizational culture and

infrastructure were not prepared to embrace working from home. A “black swan” - the COVID-19 pandemic – was needed to accelerate this process of transformation, digitalization and proliferation of the hybrid workplace - physical and digital. Increasingly, in the context of social distancing generated by the pandemic, employees have begun to experience flexibility as well as other working from home benefits. Nowadays, the mix - work from home, work from the office or from any place - is increasingly preferred by the workforce. A study to identify work model preferences of workers around the globe was conducted in two stages - pre-covid (more than 2.5 million data points) and post-covid (more than 1.7 million data points)[9]. The results show the current preference for hybrid work (home and office blended). If in the pre-covid period only 29% preferred hybrid work and 59% preferred the office work (office-first) alternative, as a result of pandemic, preferences have changed completely - 81% support the hybrid model (58% office-first hybrid and 23% remote-first hybrid) - Figure 5.

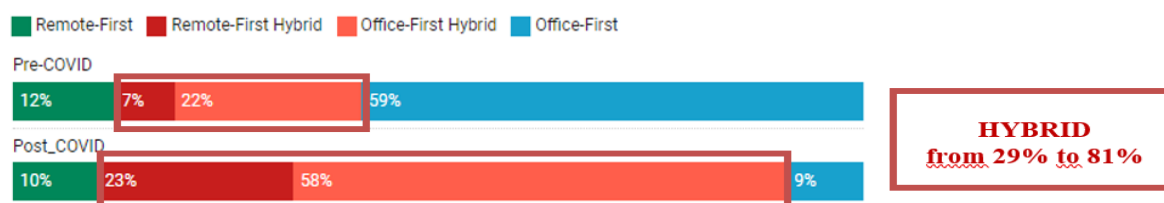


Figure 5: Transformation of workplace ecosystem (Source: Author's computation after CoreNet Global; Cushman & Wakefield Research, 2021)

The result was somewhat expected because the hybrid workplace model satisfies many people's preferences, desires and expectations regarding the flexibility to work from anywhere – home or other remote workspaces. It seems that the shift and preference towards a hybrid workplace, will lead to not returning to the full traditional working model (full-time from office). However, it is important to point

out that without the support of a performant ICT infrastructure and collaborative technologies, the hybrid workplace does not generate the expected positive results. Unfortunately, in many locations, there is currently the risk of poor-quality long-distance communication due to transmission errors or delays. If communication tools - video conferencing, video or audio calls and e-mails – do not

work efficiently, due to insufficient Wi-Fi coverage, poor connectivity, low transmission rate and other such issues, productivity will decrease and this could lead to the frustration of those who cannot connect. 5G technology - specific to 4IR - promises to address these issues. Technological progress will lead to fundamental changes in working environment as a result of connecting the digital with the physical.

Partly due to cloud computing, new emergent technologies can be used from any gadget and from anywhere – office, home, or any other location. Distance, space and national boundaries will become irrelevant. The digital workplace ecosystem – a connected workplace where people and technology are working in synergy – is gaining more and more ground in the digital age. Communication and collaboration between people and between people and technology in a hybrid space – physical and digital – are essential attributes in a connected workplace. For modeling a productive and successful workplace ecosystem, modern ICT is an enabler, playing a key role.

Conclusions and future work

Innovation – as a key ingredient of scaling-up processes – and the emerging technologies specific to 4IR and Industry 4.0 will lead, in the near future, to substantial and sometimes even disruptive changes of the labor market, but also to workforce and workplace ecosystems transformation.

Nowadays, communication is vital – almost as important as air - and no one doubts that. Data and information must flow quickly, and knowledge shared between employees, customers, suppliers and business partners must always be at hand. From a technical point of view, communication and collaboration have never been easier than today - in the presence of collaborative technologies. Virtual collaboration

platforms and cloud computing facilitate this approach. We are working and living in a hybrid world and advancements in technology facilitate integration of physical and online remote work. New collaborative technologies and tools support gig workers and virtual teams, but also employee engagement and new talent attraction and retention.

AI, ML, Big Data and Business Analytics improve decision-making processes. Moreover, besides the previously mentioned technologies, smart contracts/"safe contracts" and blockchain technology decrease the costs of transactions, ensure secure peer-to-peer transactions, and enhance the value added by the platform and gig economy [9].

Amongst others, AI, smart robotics, and intelligent automation are 4IR technologies that dramatically change the ways of working, productivity, but also the types and numbers of available jobs. It is important to highlight that in the long run the success of these technologies depends on the skills and experience of the workforce, but also on its responsibility and engagement. Promoting a healthy and effective workplace ecosystem that encourages hybrid work – from office, home and/ or other locations – to achieve people well-being is very important. Understanding and fulfilling workforce needs is an important step to increase satisfaction, motivation, engagement and as a result to improve workforce performance. The present and moreover the future workplace and workforce performance should address these changes. As a result, organizations should rethink their performance management systems – Objective Key Results (OKRs), Key Performance Indicators (KPIs) and Metrics – for the hybrid work ecosystem and include digital dexterity and other digital-related outcomes.

A key role in employees training is played by e-Learning, which transform

dramatically the way of teaching and learning – anytime and anywhere. E-Learning offers flexibility and has the potential to integrate training into the workplace and to share up-to-date information and knowledge – central ingredients for innovation. As consequences, it can improve productivity and efficiency, decrease costs, competitiveness and organizational prosperity.

Emergent technologies will play a key role not only in improving business performance and reconfiguring work, workplace and workforce ecosystems, but also in reshaping society as a whole. In the upcoming research projects and papers, we intend to address how these technologies will support Society 5.0. – a more sustainable, inclusive and human-centric society.

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