Future of Work

On the large scale of ICT use, the pressure of getting everything around us automated represents a real challenge. For the next years, digitalization is seen as the biggest influencer for the future of many jobs. An OECD report published in 2016 (OECD 2016) estimates that over 9% of the jobs available within the state members can be fully automated, thus the human being is at risk of replacement, while over 25% of all jobs will be subject to major changes in the way the execution of tasks takes place, targeting excessively the automation of work processes. Through the synthesis of information from various studies, in (Osburg și Lohrmann 2017) it is estimated that about half of the current jobs will be significantly influenced by digitization. The trend will not only affect low-skilled jobs rewarded with low wages and not just those from the industry sector. Dependence on explicit, widely available knowledge, repetitive tasks, manual data transfers, the existence of many employees with a similar job, or the possibility of outsourcing the work are just a few of the risk factors associated with digitization. For communications-based jobs, the replacement of the human individual with chatbots/social bots is seen as possible. Referring to the educational sector, the authors in (Palvalin, Lönnqvist, & Vuolle, 2013) notice that the pressure exerted by automation and digitization is not naturally absorbed, and describes education providers as inertial, transmitting and using outdated information. The pressure of digitization also affects the employees. It has been shown that individuals who cannot develop high-level skills and cannot resist the pressure of ICT use at work, do not have enough autonomy, feel threatened, insecure, confused, resulting in job failures or quits (Kiel, What Do We Know About Industry 4.0 So Far? 2017).

Another challenge is the rapid evolution of technologies. In (Harari 2018), it is stated that computers have made the financial system so complicated that few people manage to understand it. As AI techniques improves, we may soon be at a time when no one can understand finances. Also, the biotech and infotech revolutions will give us control over the world inside us and will allow us to design life itself. We will learn how to "construct" the brain, extend lives and kill our unwanted thoughts. Nobody knows what the consequences will be as people were always much better at inventing tools than at wisely using them. People have two types of abilities: physical and cognitive. In the past, machines competed with people primarily on physical skills, and at that point people had a big advantage over machines - their cognitive skills. Thus, because manual jobs in agriculture and industry have been automated, new jobs have emerged that require some sort of cognitive skills that only humans possess: learning, analyzing, communicating and, above all, understanding human emotions. However, currently things are a little different. AI begins to outperform human tasks in more and more of these abilities, including the understanding of human emotions. We do not know any third field of activity - beyond physical and cognitive - where people will be able to keep a safe margin forever. In Yuval Harari's own words, "as AI continues to improve, human employees will need to repeatedly learn new skills and change their profession" (Harari 2018), p. 35.

This situation impacts the human way of working and job designs, with the **distribution of roles and responsibilities between people and machines** being one of the most sensitive issues in the context of IIoT. The roles played by working human individuals, robots, and organization representatives have to be carefully analyzed and harmonized, keeping in mind that the human worker is the most important. (Kiel 2017) warns that in a scenario where a machine leads, while people perform operational, repetitive tasks, employees are most likely to lose their engagement and interest in the

job. In a second scenario, where the machine is only an instrument controlled by a skilled worker, low-skilled jobs will disappear. In both cases, the importance of high-skilled jobs increases concurrently with the difficulty of performing these jobs, which will incorporate serious planning, monitoring, and decision-making responsibilities and will require adaptability, flexibility, and complex systems' understanding and management. A third scenario devised by (Möller 2016) presents humans and robots work spatially closer, so that the productive robot can learn from the flexible actions of the human worker. The robot watches the human worker's activities, recognizes patterns of movement, actions, and gestures, and then processes this information, becoming increasingly autonomous via cognitive abilities and genuine "mechatronic colleagues" of humans. With this scenario in mind, one may notice that the already-old question formulated in 2011 by Gerald Santucci, Head of the European Commission's "Knowledge Sharing" Unit, remains highly topical: *In a world where 7 billion humans will 'cohabit' with 70 billion connected machines and several thousand billion objects connected to a dynamic global network infrastructure with self-management, self-configuration and self-healing capabilities, what will be the place of human beings?* (Santucci 2011)

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