

The Future of Work in a Jobless Society: Globalization, Smart Digitalization, and Cognitive Automation

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Abstract.

Research background: The future of work is undoubtedly one of the toughest challenges faced by many researchers and managers all over the world. The new era in digital globalization and smart digitalization, the trends in robotization and artificial intelligence have changed the labour market. Due to accelerated technology, many companies are ready to adopt digital solutions, stationary robots and drones with significant consequences over the declining jobs. The new human-machine frontier will determine a different outlook work in a jobless society, where many roles become automated, while human's role in these processes is minimized.

Purpose of the article: In our opinion, globalization and impact of artificial intelligence on the future of work will be significant. In this paper we try to analyse and clarify the issues in question in terms of smart digitalization, cognitive automation, human-machine frontier and changing employment types. The data used for this research was obtained from previous study conducted by World Bank and OECD.

Methods: In order to fulfil our goal, we apply the methods of comparison, analysis, deduction and our estimates for identifying the trends that are shaping the future of jobs and the evolution of jobs caused by technological change.

Findings & Value added: In the near future, innovation will continue to accelerate and many artisan jobs are being lost to computerization and office automation. Finally, we formulate our own conclusion and view about digitalization and opportunities to create new jobs, increase productivity, and cost reduction, through innovation and accelerating change.

Keywords: *artificial intelligence; business automation; smart economy; human labour*

JEL Classification: *H12; J01; M15; M48*

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1 Introduction

The relationship between big data and cloud computing is strong and complex, but cloud computing provides major solutions for big data [3, 5] while accelerating the benefits of digital data management. Big data can be used, reused, moved and modified with low cost at fast speed, bringing about good results for top management. In the last decades, the future of work in the digital activities has become uncertain due to disruptive technologies that will allegedly create jobless growth and worldwide unemployment [1]. The future of work is changing as the result of globalization, smart digitalization and cognitive automation. Thus, there are many alarming predictions about the changing nature of work and skills in the digital age [2] and strong challenges will be faced by many researchers and managers all over the world. The new digital accelerated technology will reshape jobs all over the world with significant impact over businesses and recruitment [1]. The new human-machine frontier will determine a different view over the future of work in the jobless society, because our society is increasingly confronted with automation, not only in robotics market and behind fences in factories [3, 24], but also on daily activities. The current trend of labour market is changing as a result of three simultaneous important shifts [1]:

- A demographic shift, including an aging population, especially in Europe;
- The economic shift of digital globalization, that creates digital platforms and changes the economics of doing business across borders;
- A technological shift, driven by the Internet, including artificial intelligence, big data and cloud computing.

Digitalization changes the economics of globalization in several ways, with significant consequences over the future of work [4, 5]. In the European Union (EU), the technological revolution is causing significant changes in the labour market and some jobs are at risk of being lost to machines [5].

2 Methods and Data

We developed our research based on data collected from the Eurostat, World Bank and OECD databases. Thus, according to the Eurostat, technology is a key driver of new forms of work and it is a big demand in ICT specialists in the European countries [5, 6]. Despite the increasing number of advanced digital skills graduates, statistics report that, in 2018, 53% of companies had difficulties in filling vacancies with ICT specialists [5].

We performed some research and made some estimates based on the human-machine frontier and changing employment types and we present the evolution of jobs caused by technological change in the digital world.

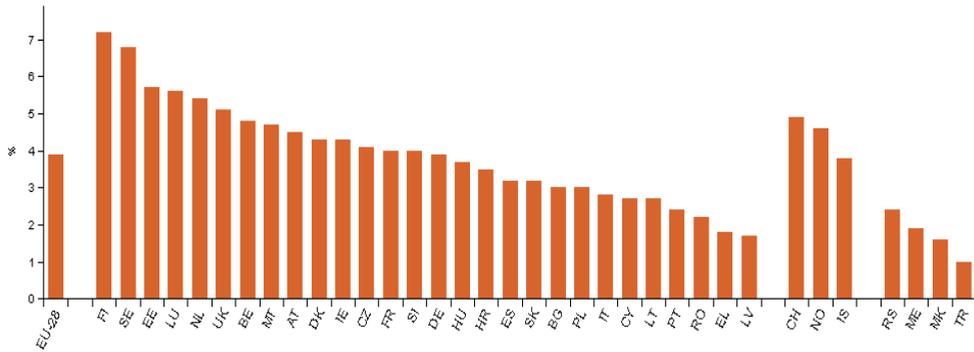


Fig. 1. Proportion of ICT specialists in total employment in 2018

Source: https://ec.europa.eu/eurostat/statistics-explained/index.php/ICT_specialists_in_employment

In a recent study for the OECD, automation is perceived as a threat that will ultimately foster technological unemployment. Thus, smart digitalization and continuously progressing robotic process automation will transform jobs and but also have begun to have an impact on how work is performed and structured in the next few years [6, 7, 25].

The advanced technologies are likely to enhance productivity and efficiency, but also will create new jobs in the digital world, boosting consumer demand and generating new revenue streams. According to the World Bank, the share of automatable jobs varies between 6% in Korea and 12% in Austria (see figure 2) and the jobs with high automatability percentage will be found in Spain, Germany or Austria, while the lowest will be found in Korea and Estonia (6%) or Belgium (7%).

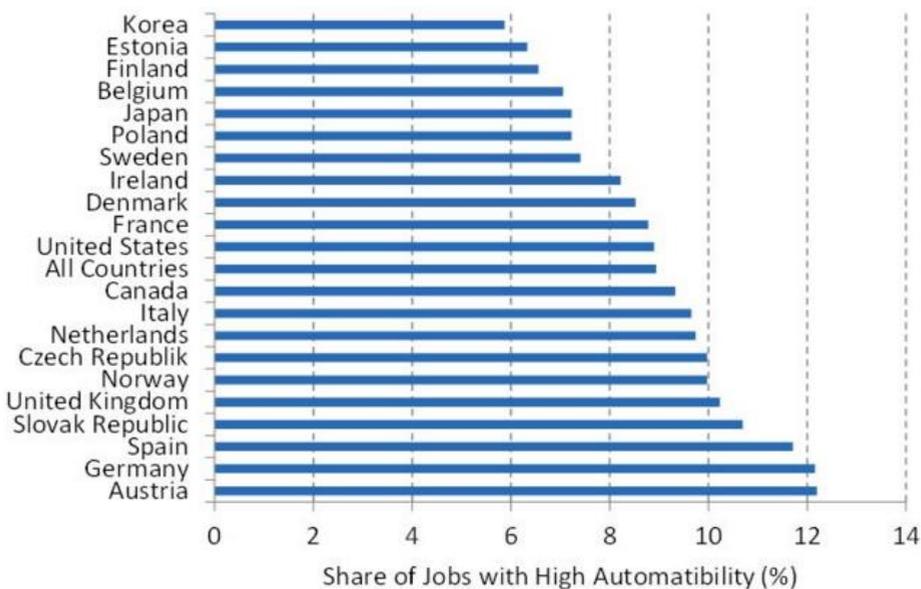


Fig. 2. Share of jobs with high automatability

Source: <https://blogs.worldbank.org/jobs/digitization-unlikely-destroy-jobs-may-increase-inequalities>

The utilisation of digital solutions in terms of data and computer availability allow for automating a substantial share of jobs in the near future. The latest OECD Regional Outlook (2019) shows that the prevalence of jobs at risk of automation is much higher than

average for example in eastern Europe (Slovakia, Slovenia, Poland) and southern Europe (Greece, Spain), while Nordic countries and the UK seem to face a lower risk (see figure 3).

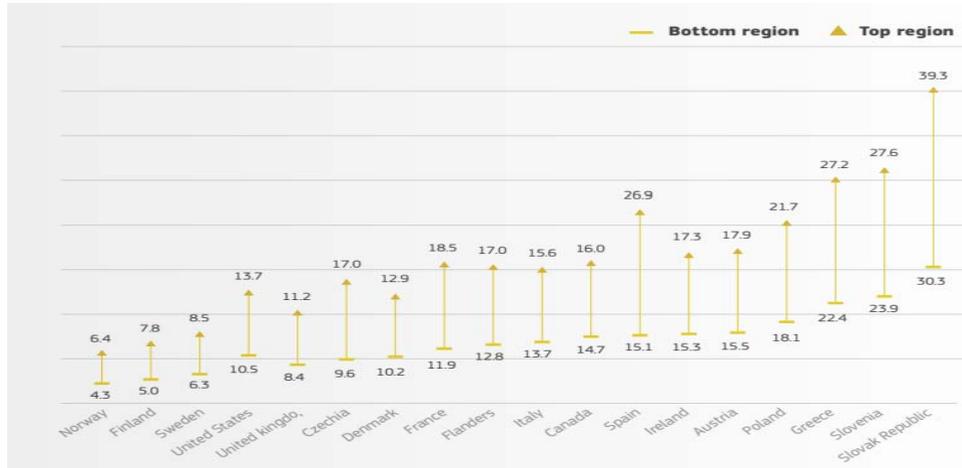


Fig. 3. Percentage of jobs at high risk of automation by country (2016)

Source: <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/changing-nature-work-and-skills-digital-age>

3 Results and Discussion

Current technologies will affect jobs all over the world, but some industries could be more affected than others. For example, banking, insurance, accounting, and auditing services face a high risk of becoming automated in the near future and accounting procedures will be performed by robotics engineers and blockchain specialists. In the same time, medical practitioners, dental practitioners, higher education teachers and senior professionals in education present a low risk of becoming automated and replaced by robots or artificial intelligence. Office for National Statistics (ONS) from UK analysed the jobs of millions of people in 2017 and found that some of these were at high risk of being replaced.

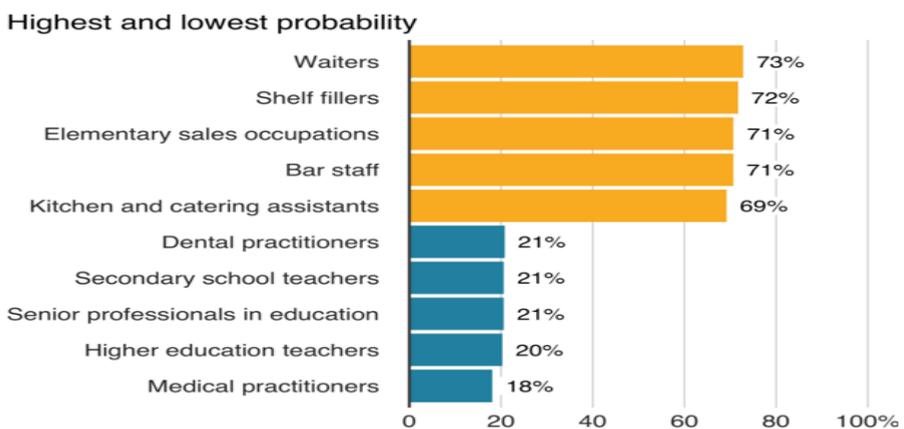


Fig. 4. Jobs at risk from automation in England (2017)

Source: <https://www.bbc.com/news/business-47691078>

According to World Economic Forum 2019, smart digitalization and cognitive automation will create new jobs [16, 19], and some range of roles that are set to experience increasing demand in the period up to 2022, such as data analysts and scientists, software

and applications developers, and ecommerce and social media specialists that are significantly based on and enhanced by the use of the digital technology.

The economic outlook for the future of work will be different shortly and employers will require different skills from workers compared to previous decades [11, 21, 22]. In our opinion, the workers are facing shifting skills demand from job opportunities in expanding businesses. We present in the table below the new jobs with increasing demand in 2019.

Table 1. New jobs and new skills required on the job market in 2019 (%)

Data analysts	25
General and operational managers	21
Computer specialists	20
Digital marketing specialists	18
Big data specialists	13
Other	3

Sources: Market Research; our survey among 2,500 individuals conducted July-August 2020.

Artificial intelligence offers unique capacities for automating cognitive work and certain activities are more likely to be automated [8], but some activities must be performed only by humans. In the digital globalization era, accelerated technology will displace some workers while at the same time create new opportunities for others. We present in the table below the new work tasks performed by employees in 2019.

Table 2. Work tasks performed by employees in 2019 (%)

Decision-making	51
Coordinating, developing, advising	21
Communicating and interacting	17
Administering	9
Others	2

Sources: Market Research; our survey among 2,500 individuals conducted July-August 2020.

Traditionally, industrial robots perform assembly steps in isolation from people, continuously repeating a carefully predefined sequence of actions [9, 18], but in the near future, specialists expect a shift in the human-machine frontier. The market research provides a nuanced view of how human-machine collaboration might develop up to 2022 due to automation, while human's role in these processes is minimized. We present in the table below the new human-machine collaboration estimated up to 2022.

Table 3. The new human-machine collaboration estimated up to 2022 (%)

Information and data processing	45
Performing complex and technical activities	30
Performing physical and manual work	20
Others	5

Sources: Market Research; our survey among 2,500 individuals conducted July-August 2020..

The future of jobs cannot be predicted for sure, but the implementation of the digital technology continues to accelerate and the future of work is predominantly online, using digital platforms in some specific industries, such as: insurance, finance, accounting, banking, etc. [10, 11, 23]. The vision for the future of jobs is related to digital platforms, where technology is developed with automation, robotisation and artificial intelligence, that will determine human work unnecessary in some industries [12, 13, 17]. The interaction between human workers and machines has evolved over time [14, 20] from the level when workers were trained to use the machines and to the present day when robots and artificial

intelligence are developing business and performing more advanced functions. However, artificial intelligence is evolving by itself and some modern equipment has developed so quickly that it is difficult for human workers to use them on daily basis [14, 15]. Machine learning is used often in digital platforms that capture vast amounts of data and many activities that human workers carry out today have the potential to be automated in the near future [18, 19].

4 Conclusions and Implications

The projections for the future of jobs in the digital world are related to the structural change in the labour global market [16] and the evolution of human-machine interaction in the next decade. In our opinion, the rise of workplace automation in so many forms has the potential to vastly improve productivity, while increasing efficiency, safety, and convenience. In the same time, the fourth industrial revolution is minimizing the human role, due to innovation and accelerating change. The projected human-machine interaction indicates that the ratio human-machine working hours will change to more hours performing by machines with modern technology that will substitute humans.

Globalization and digitalization will create new jobs and additional opportunities will appear on the labour market. The impact of digitalisation on the workforce is changing mentality and culture all over the world, and many jobs are likely to disappear in the near future, but some others types of jobs are being created. Innovation continues to accelerate and new workers benefit from the digital transformation for new jobs, like computer specialist, data analyst, big data specialist, robotic engineer, blockchain specialist, Internet of Things architect, etc. Internet platforms have emerged to connect business and people in a global economy. Thus, the decision to invest in the workforce reskilling is crucial. Qualified workers with mixed skills ready for augmentation may find new opportunities on the global market and job quality will increase considerably [16].

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