*Miodrag Komarčević, Milovan Dimić and Petar Čelik*

# Challenges and impacts of the digital transformation of society in the social sphere

***Abstract***

*The world is rapidly entering a digital era that will fundamentally change not only the way that production operates, but also a way of life. The new industrial revolution will bring many positive changes while the introduction of the 'smart factory' and the digitisation of industry as a whole, or its individual sectors, will inevitably lead to changes in the labour market and in methods of work, as well as the transformation of the character of work and employment. At the same time, social polarisation and marginalisation, as well as business networking and the 'flexibilisation' of labour, is generating a weakening of social organisations, especially trade unions. After determining the semantic and epistemological characteristics of the key terms and concepts, this article principally examines the social impacts of the digital transformation of society. Special attention is paid to an understanding of the position of workers, their social status and general positioning in the emerging and future conditions, in addition to a visualisation of the accompanying phenomena and by-products carried by digital transformation.*

***Keywords:*** *fourth industrial revolution, digital transformation, work flexibilisation, status of workers, social policy, social peace*

## Introduction

In a global environment, current economic, social, environmental and technological processes are under strong pressures of an interdependent nature amidst rapid changes of increased complexity and accompanied by uncertain future outcomes. In such a turbulent and dynamic environment, several macro processes or revolutions are taking place in parallel which not only encourage one another, but overlap and intersect. In the foreground, this refers to the globalisation that is accelerating in all segments; the growth of companies and markets that increases business opportunities; sustainability, which focuses on finding new ways of managing limited natural resources; and finally the digital revolution, as a mega-trend and a process of global proportions.

After accelerating the flow of information, increasing the capacity of networking communications and significantly simplifying and facilitating the process of production and services provision, information technologies are entering their last and final stage – the digitisation of things. Thanks to huge technological and innovative advances, this revolution will completely change the way people interact with the environment, marking a definite step forward in the digital era in which all segments of society – business, the financial sector, public administration, politics, culture, etc. –

are being digitalised. Digital transformation completely changes the way of doing business, work organisation, market access, models of management among companies and organisations, relationships with customers and the way of creating value within a company. The application of new digital technology generates deep and far-reaching changes in the field of labour and employment, social policy and the protection of workers: in a word, digitisation strongly emphasises the social dimension, the consequences of which have not yet been sufficiently studied and specified by key parameters affecting the security of workers, social inclusion, social status and, finally, the social peace.

## The physiognomy and performance of digital transformation

There are many different definitions, but the digital transformation usually means the ability of firms, companies, broadcasters and other stakeholders to take full advantage of digital technology in their domains. The phenomenon of digital transformation equally affects all sectors of economy, society, and public and other services, as well as companies of all sizes. It is based on innovation, so the success of digitalising comes from unconventional innovation, or so-called reinvention, and it is therefore unconventional, changing space, time and the level of complexity, reducing costs and enabling predictions. In addition, digitisation allows the repair and modification of existing business models and public services.

In the academic literature, there are three pillars of digital transformation: relevant content; appropriate communications channel; and user information. From this it can be inferred that the main factor in digital transformation is information. In today's business, it is the most important and most wanted resource.[1] It is incorrect that there is a universal formula of conducting digital transformation.

Each company, department or service is unique in its organisation and its way of conducting business. The digital transformation of any company can thus, because of these differences and characteristics, be done taking into account all their specific features. Certain guidelines and recommendations on how to carry out this transformation, at what pace and as to what order and what measures and actions it should include formally exist and are available to all interested stakeholders.

In any such transformation, we start from digital technology and increased production volume having an impact on lowering the price of products. To maintain the same profitability, or make it higher than before, it is necessary to increase efficiency, which is now one of the highest priorities in all companies. One of the most effective ways to achieve this is to increase employee engagement. To find a way successfully to increase workers' engagement, companies must connect with them, offer them all relevant information and all the knowledge necessary to do the job. When companies improve communications and the awareness of their employees, reducing the gap between technical resources and human ones, it leads to better ideas and more creative ways to do business, leading in turn to greater productivity. In addition to the involvement of employees in the digital market, it is important to engage cus-

1 Business & Technologies (2016) 'Internet mirror. 2016. The fourth industrial revolution' Special Edition *Digital Transformation* Belgrade, p. 61.

tomers. Specifically, in the highly competitive market where there are no restrictions of a spatial or geographical nature, diversity is a way to achieve a factor of interest for a product, service or brand as a whole.

New generations of customers and technologies, in the broadest sense, dictate new market rules. Contemporary business models cannot, in the digital age, ensure the steady growth and development of companies. Faced with the situation on the market, they are looking for new business models that will provide new sources of revenue alongside cost reduction. Creating new business models requires a transformation of enterprises in accordance with market challenges. Digital transformation brings with it a new way of thinking, new organisational design and a new approach to resolving problems.[2]

The key to successful digital transformation is therefore in the definition of new strategies aimed at improving the user experience via the application of the modern concept of customer relationship management, in which software allows the different desires, habits, preferences and needs of customers to be properly analysed and information used to construct an adequate offer in relation to any particular buyer or customer.

The transition to digital business will change all industries and expand across all geographic regions. Some industries, such as banking, insurance, telecommunications, retail, transport and energy, and also the public sector, are drastically changing their appearance and performance as a result of accelerated digitisation. Leading companies that have successfully gone through digital transformation want to analyse and investigate how the digital revolution is transforming their business at the level of strategic management and how they can accept the possibilities and advantages that it brings.

Recent research shows that digital transformation usually brings significant financial benefits. In digital transformation, companies can expect an increase in operating income of 5 to 15 per cent, cost reduction between 10 and 20 per cent and an improvement in their business of more than 30 per cent. In contrast, companies that are late to, or go slow with, transformation are in danger of being thrown out of the game because they will not be able to compete with the upcoming new companies that use the benefits of new technologies aggressively to conquer global markets.

Two leading companies in the development and provision of services in the field of digital transformation, Saga and New Frontier Group, recently completed a study of digital transformation through various industries. They identified two main routes that lead to the achievement of this goal: the evolutionary and the revolutionary. The evolutionary approach uses digital opportunities to achieve development within an existing business model, to better engage in the user interface and also provide offers and relevant content tailored to customers with the aim of digitalising processes and operations, expanding the business eco-system and realising better employee and stakeholder engagement. The revolutionary approach, in contrast, involves a much greater change – a fundamental shift to a different business model, including a wider

2 Petković, M (2013) 'Impact of information technology on designing organizations: the case of organizations in the health sector' *Sociology* 3, Belgrade.

organisational system with a radically-expanded number of partners in the business eco-system. Such a type of digital transformation has to be built on a foundation made of information, internet platforms and, above all, the power of networking.[3]

The first wave of digital transformation is based on five key digital technologies: cloud computing; mobile; big data; social networks; and the internet of things. The second wave of transformation comes under the influence of the so-called fourth industrial revolution, which will be dominated by robots, drones, artificial intelligence, 3D printing, energy storage and others.

Already, digital technologies are bringing many benefits, for example the application of 3D printing in medicine, enabling better and more effective treatment; the use of drones in controlling floods and fires, but also in monitoring of agricultural crops, etc.; the use of robots in difficult and risky working conditions; artificial intelligence in the service of people – via smart forecasting models and the like.

In order to succeed in a practical way, digital transformation must be supported by the government, universities, research institutions and businesses, too. Digital transformation thus represents a third phase of the acceptance of digital technology, preceded by digital competence and digital use. This third phase allows innovation and creativity in a particular domain, not just the application of traditional, already adopted technology. In the field of business, digital transformation is taking place in an atmosphere in which companies thrive by satisfying customers' needs, these being users whose needs are radically changing in the digital world.

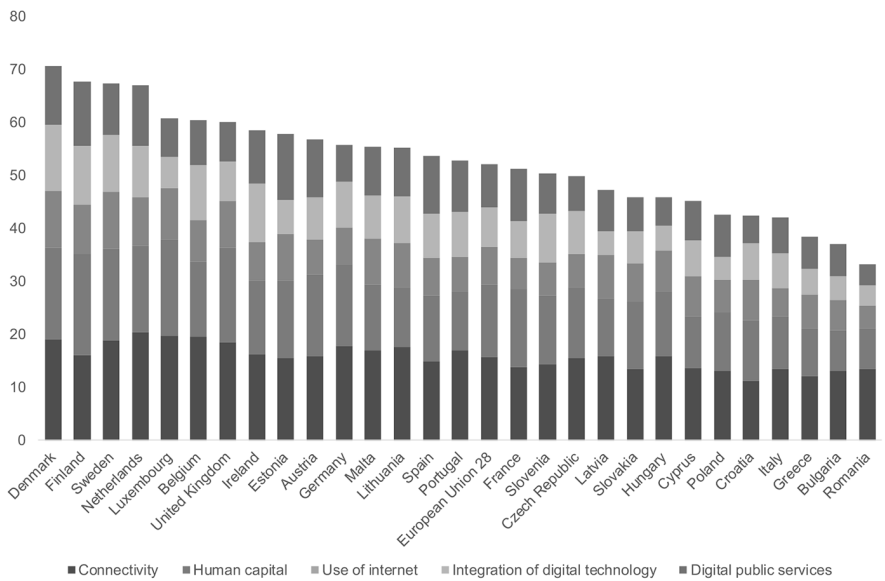
Along with the digital transformation of business, companies have rising expectations of information technology (IT). Seen from this perspective, IT must continue to provide a safe, stable and economic environment, but IT is also increasingly expected to support, or even start, business optimisation and innovation. In order for IT companies to deliver effective IT operations and innovative business solutions, it is necessary to take advantage of new technologies, but also to change the approach in which service offers are positioned, packaged and promoted. Digital transformation requires complex and more developed business and technology services, most of which have not been and will not be created by the company itself but which are already located in the broader business eco-system. For these reasons, the landscape of rapidly changing digital products and experiences requires the organisation and management of these services instead of the traditional 'build or buy and integrate' approach. At the same time, the transformation model of delivering IT services to companies or public services requires changes in their architecture, searching for sources of models of organisational structure and the use of technology. With each technological change, a company occasionally has to increase or decrease the level of complexity. Greater complexity means higher costs with less speed and flexibility. Therefore, the greatest challenge in terms of digital transformation is inflexibility or partial changes, along with analogous slowdown and delays in relation to the speed of competing companies.

3 SAGA (2017) *Digital transformation strategy* available at: www.saga.rs/digitalna-transformacija [last accessed 14 May 2017].

Digital transformation is not an option but an imperative, as was said by the President of the European Institute of Innovation and Technology (EIT Digital), Willem Jonker, at a conference on launching European digital transformation in Brussels. He said that the Institute has invested €1bn in digital innovation and entrepreneurship, and announced that it will accelerate its research based on digital technology by investment in four strategic areas: digital cities; digital industries; digital well-being; and digital infrastructure.[4]

According to the recent Eurostat DESI index, which measures the degree of digitisation of European countries, there are vast difference visible in this respect among EU member states (Figure 1).

**Figure 1 – Index of digital society and economy in the EU**




Source: Eurostat (2017)

## The concept and strategy of the fourth industrial revolution

The term 'fourth industrial revolution' or 'Industry 4.0' is a new term. The initiative for the Industry 4.0 started at the Hanover Fair in 2011, with a separate industrial-academic consortium founded only one year later (2012). This devised a strategy of industrial development with recommendations for the German government which accepted the proposed strategy in 2013, incorporating the recommendations into its 'hi-tech' Strategy 2020.

4 For more, see: https://www.eitdigital.eu/about-us/leadership/management-committee/ and expressly: https://www.eitdigital.eu/innovation-entrepreneurship/overview/.

The new strategy, called 'Industry 4.0', represents a vision of advanced industrial production which is being achieved in many European countries today to a greater or lesser extent. It includes the use of modern technology to automate the production, processing and exchange of data. This new technological vision of industrial development has the characteristic feature that, for the first time, it connects the two, until now separate, but rapidly growing, digital fields of robotics and e-commerce into one homogeneous entity with a high degree of synchronisation. The essence of Industry 4.0, according to one of its most active promoters, Klaus Schwab, President of the World Economic Forum, is reflected in a new approach in which, for the first time, we have networks of smart digital devices with products, machinery, tools, robots, people, etc.[5]

According to Schwab, the fourth industrial revolution, based on new technologies that are taking place in parallel in the fields of robotics, autonomous vehicles, nanotechnology, biotechnology, chemical technology, quantum information technology, the internet of things, artificial intelligence, 3D printing, etc. will drastically change not only the way of work but also the way of life, with an impact on identity, privacy, the issue of ownership, consuming goods, leisure time, communications, how we build our skills and establish connections, etc.

Unlike the three previous industrial revolution, the fourth takes precedence because it has the capacity to change people. The disruptive technologies and innovation coupled with them not only redefine the way that people transact business but also the way in which our brain is networked. According to the estimates of the World Economic Forum in January 2017, it was emphasised that 'Industry 4.0' will, in many areas such as genetics, medicine, synthesised biology, chemistry and others, greatly contribute to making life and work easier, to the improvement of living standards and welfare in general and to the fight against the many problems that humanity faces. At the same time, it will also put new socio-economic, demographic and geo-political challenges in front of states, business organisations and other relevant stakeholders, with a wide range of threats and risks, both old and new, but especially so-called hybrid ones.

All organisations, both commercial and in the public sector, are facing a number of challenges and risks resulting from the proliferation of applications, new models of consumption and the switch to mobile or cloud environments. The good side of the revolution, according to experts, could be cheaper goods and services which will lead to new economic growth. Conversely, the biggest threat could be mass unemployment, implying poverty and the social exclusion of a large number of workers, further deepening the conflict between corporations and workers and the dissatisfaction of the latter with the state.

The fourth industrial revolution is likely to see the creation of economic surplus. However, the question is how evenly it will be distributed among countries, people in different economic strata and parts of the world. This was the warning of the General Manager of Microsoft, Satya Nadella, at the annual World Economic Forum in

5 Schwab, K (2016) *The Fourth Industrial Revolution* World Economic Forum: Geneva.

Davos in 2016.[6] Professor Takuro Morinaga, of Dokkyo University, Japan, is reported to have commented that the world was on the threshold of the fourth industrial revolution caused by robotics and artificial intelligence, adding that the country which was ready for this revolution would have the power to control the world.[7]

This major technological trend is not primarily focused on increasing commerce *per se*, but on increased flexibility, better quality and the improvement of production. This affects productivity and thus contributes to improved competitiveness and the better positioning of companies or products in the market. One of the benefits of introducing new technologies into production is the drastic reduction in time between the development of a new product and its production launch.

Analysing the implementation of the strategy for Industry 4.0 in practice, Professor M. Herman from the University of Dortmund has identified six design principles on which the implementation scenario for networks in Industry 4.0 is based:[8]

- interoperability – the ability of mutual connection and communications within the cybernetic-physical system (CPS), people and smart factories
- virtualisation – makes it possible for CPS to monitor physical systems by connecting data obtained by sensors with virtual and simulation models
- decentralisation – with the increased requirements for the individualisation of products, strategic management of systems is becoming increasingly difficult
- ability to work in real time – the status of plants is constantly monitored and analysed and, in the case of machine failure, the manufacturing process is automatically redirected to other machines
- customer orientation – internet servicing encompasses all participants in the production plant and those outside it
- modularity – standardised hardware and software enable flexible adaptation to the changing requirements of the smart factory via replacement or extension of individual modules.

In order to utilise digital opportunities and innovative potential, the European Commission adopted in 2016 a strategic vision for industrial policy in communications, entitled 'Digitisation of European Industry – exploitation of the benefits of a single digital market'. The new strategic vision and the establishment of a single digital market focuses on four main themes:

1. technologies and platforms
2. standards and reference architecture
3. geographic cohesion represented by a network of regional innovation hubs

6 Nadella, S (2016) *Global Agenda World Economic Forum Annual Meeting 2016* 'Mastering the Fourth Industrial Revolution' Davos.

7 Tanjug (2015) *Robots for the fourth industrial revolution* available at: http://www.novosti.rs/vesti/naslovna/tehnologije/aktuelno.236.html:569765-Roboti-za-cetvrtu-industrijsku-revoluciju [last accessed 14 May 2017].

8 Info Trend (2016) *Industry 4.0 Application of the Internet of Things in Industry* 202, Zagreb, available online at: http://www.infotrend.hr/clanak/2016/7/industrie-4.0-primjena-interneta-stvari-u-industriji-,88,1248.html [last accessed 14 May 2017].

4. skills at all levels.[9]

According to official EU data and the assessments of recent studies, the European ICT sector represents about 4 per cent of GDP and employs more than six million people, making it an important part of the economy. Digitisation of products and services will bring more than €110bn in annual revenue to the industrial sector in Europe over the next five years. It is expected that, in the next ten years, further digitisation of the industry in Germany will lead to an increase in productivity of up to 8 per cent and revenue growth of €30bn per year.[10]

The European Action Plan on the fourth industrial revolution is based on four so-called courses of action or 'offensives':

- that all industrial companies, especially small and medium-sized ones, in any sector and in any part of the EU, have an easy approach to digital infrastructure and the adoption of innovation
- that automotive, aerospace and energy industries take a European leadership position in the digital industry market
- that digital skills should be promoted across Europe and its regions, at all levels of education and training, in order to prepare workers for the digital revolution and to allow them to benefit from it
- that countries should adopt common, smart regulatory solutions for smart industries.

According to the estimates of the European Commission for Industry 4.0, every year there is a need for 150 000 new IT professionals.

Meanwhile, experts consider that Industry 4.0 will bring even faster innovation cycles, implying the creation and introduction of further new technologies, but also setting major challenges before companies, governments, workers and society as a whole to reduce or amortise the accompanying negative side-effects of the already-underway and accelerated digitisation.

*The role and importance of disruptive technologies*

The new technological revolution relies upon cybernetic-physical systems with visible trends towards an acceleration of the implementation of the internet and 'smart' things, their integration into complex systems on a global scale and the resulting biological evolution. This is all combining into, and building, the fourth industrial revolution.

These revolutionary technological cycles have the transformative power to redefine and reconfigure society and the economy with their exponential growth, causing structural change, and also with a quantum leap in reverse innovation and the cre-

9 European Commission (2016) *Digitisation of European industry: the utilisation of all the benefits of a single digital market* COM180final, Brussels.

10 Boston Consulting Group (2015) *Industry 4.0 The future of productivity and growth in manufacturing industries* available at: https://www.bcgperspectives.com/content/articles/engineered_products_project_business_industry_40_future_productivity_growth_manufacturing_industries/ [last accessed 14 May 2017].

ation of new products and services that are in correspondence with their production potential.

In this way, the disruptive technologies that form the basis of Industry 4.0 are founded on the convergence of information technologies, multi-layer computing and communications technologies, such as cloud computing and fog and dew computing. In turn, they are also bound up with a variety of new operating techniques, such as additive manufacturing, the automation of industrial processes and of factories, artificial intelligence, robotics and the internet of things including a number of contextual forms of interaction and the exchange of real-time data between machines[11] and their environment, as well as the establishment of innovative intelligent manufacturing systems and products through the factories of the future, smart factories, smart products and predictable systems of adjustment and maintenance.

Accordingly, Industry 4.0 refers to a contextual networked economy based on the direct application of information and communications technology that is strengthened by the simple connection of smart units in the production process and the technology behind these processes. Thus we may come to the conclusion that Industry 4.0 directly leads to the realisation of the idea of the 'intelligent factory'. Clearly, the digitisation of industry achieved through a strategy for Industry 4.0 is much more than simply implementing technology itself. In this context, the European Economic and Social Committee believes that companies must prepare for radical changes due to a number of factors such as:

- the speed, scale and unpredictability of production
- additional fragmentation in and diverting of the value chain
- new relationships among research institutes, higher education and the private sector
- new business models
- new interactions between large and small enterprises
- new ways of co-operation among all levels of enterprises (design, production, sales, logistics, maintenance)
- the need for more sophisticated and new skills and new ways of working
- closer relationships between companies and customers (buyers).[12]

## The impact of digital technology in the labour field

Digitisation in its nature and character transforms and also redefines all segments of society and economy, and therefore it inevitably affects labour and employment. Digital technology has the potential to increase wealth to hitherto unprecedented levels and simultaneously to improve the quality of work and employment in Europe and more widely.

11 Chen, K-C and S-Y Lien (2014) *Machine-to-machine communications: Technologies and challenges* available at: http://sparc.nfu.edu.tw/~sylien/Publications/Journal/1-s2.0-S15708 70513000395-main.pdf [last accessed 14 May 2017].

12 European Economic and Social Committee (2016) 'Industry 4.0 and digital transformation: Next steps' *Official Journal of the European Union* C389/07, Brussels.

In the latest report of the World Economic Forum, entitled *Global Risks 2017*, however, a deeper analysis is made based on a survey of HR professionals in the fifteen most developed countries, employing 65 per cent of the global workforce, and which suggests that, by 2020, some 7.1m jobs will disappear due to the increase in automation and the robotisation of production with 1.8 million robots engaged. Based on the obtained indicators, experts estimate that two million jobs will be created which means that more than 5 million jobs net will be virtually extinguished by the end of this decade.

The most endangered occupations are in the medical and financial sectors, where more than fifteen of today's occupations will disappear. The survey results show that most of the jobs, close to two-thirds, will be cut in intellectual and administrative occupations with new jobs created in the area of information technology, mathematics, architecture and engineering. If we look at industrial sector, the greatest impact can be expected in the health sector as a result of the rise of telemedicine and the use of modern sophisticated machines, equipment and robots. However, automation will create most jobs in the ICT sector, professional services, media and the entertainment industry. This trend will undoubtedly lead to major and drastic changes in the labour market, with an estimated 65 per cent of pupils in primary schools today doing jobs that do not yet exist.[13]

One of the leading experts in the field of information technologies, Manuel Castells, Professor of Sociology at the University of Berkeley (California), believes that new technologies will cause massive and drastic changes in the world of work: jobs are, in most cases, insecure and non-permanent; and most of them will have a temporary and occasional character, which significantly worsens the position of labour in relation to capital. The same author believes that traditional forms of work under the influence of new technologies will gradually disappear.

In the new information, so-called digital, economy, there is a tendency to create a new type of employment: on the one side, a scarce, so-called core, permanent workforce is formed, consisting of senior managers and information professionals; and, on the other, is the majority, or so-called available, workforce that is employed as needed. In addition, new technologies have allowed and encouraged the transformation of work processes, and thus the restructuring of occupations and employment such that some occupations, mostly those requiring university or higher education, have gained in importance, increasing their share of total employment; while lower skilled occupations are losing their role and position in the production process.[14]

Economists from the University of Oxford, in collaboration with the consulting agency Deloitte, give an even more bleak picture of the future when it comes to the labour market, indicating that the development of robotics might see 35 per cent of jobs being placed at risk in the next twenty years. They further warn that, in this

13 World Economic Forum (2017) *Global Risks Report 2017* Geneva.

14 Mesarić, M (2005) 'The information revolution and its impact on the creation of computer, network, global economy – analysis of Manuel Castells' *Economic Review* 5-6: 389-422, Zagreb.

timeframe, some fifteen million jobs in the UK could disappear due to the introduction of robots and other production technologies.

Analysing the rapid rise of the German economy, the study argues that the growth of German competitiveness is nothing to do with wise investment, technology and efficiency, as is commonly stated in official documents. The only source of German economic growth is the current revenue surplus determined by the structure of the euro area and the successful attack on domestic workers by the entrepreneurial class. The study notes that, in Germany at the beginning of the nineties, the percentage of workers in 'atypical employment' – i.e. the types of employment hiding behind the notion of 'flexibility' – was about 20 per cent; and that this now exceeds 40 per cent. The special value of this study, which has broader resonance within the EU, is that it comes to the conclusion that the recent German economic boom and position of leadership has been enabled on the backs of workers. German workers, according to the authors of the study, benefited little from this economic boom: their salaries were stagnating, their jobs became insecure, their pensions were put into question and poverty became their likelihood. The biggest winners were, in fact, German companies and entrepreneurs.

At EU level, this economic boom was carried out on the backs of peripheral countries.[15] In some countries, and within high performance sectors, robots began to replace manpower at a far faster rate than expected. Progress in the development of robotics in recent years has led to robots occupying a number of positions in which routine repetitive actions predominate. So far, jobs that are not threatened are those that require a higher level of creativity, such as artists, photographers, writers, composers, musicians, fashion designers, athletes, actors, etc.

Experts believe that robotisation should be viewed from the positive side, too, because it will free workers from heavy manual labour, especially those jobs which are risky and injurious to health, allowing people to focus their capacity on creative and managerial activities.

Meanwhile, it is clear that the policy in European countries of increasing labour market flexibility, which was active at the end of the 1990s, led to the segmentation of the labour market, i.e. the situation in which, increasingly frequently, contracts with employers are made just for a limited time or where engagements encompass part-time or temporary working.[16]

*The effects of digitisation on labour and employment*

In the field of the intellectual elite, but also in politics, media and everyday discourse, there rises one question: to what extent does digitisation endanger jobs and what will be its consequences and risks? Recent research studies have caused even greater uncertainty and concern about changes in the field of labour. An American study in 2013 pointed out that, in the US, currently 47 per cent of all jobs are threat-

15 Frey, C. B and M. Osborne (2015) *From brawn to brains: The impact of technology on jobs in the UK* Deloitte: London.

16 Savković, M and J. Gajić (2016) 'Youth in the labour market in modern conditions: a comparison of the European Union and Serbia' *Sociology* 3: 5, Belgrade.

ened by technical and technological change, while similar studies in Germany are warning that in Germany some 42 per cent of jobs are in danger. Hilmar Schneider, Chief Executive of the Institute for the Study of Labour in Bonn, points out that there are many who compete to spread various scary scenarios and believes that digitisation is not the only strategic variable that causes changes in the field of labour.[17]

It is clear that apps and the mass introduction of new technologies and innovation contain a number of risks to the world of work, including the transformation of existing jobs, changing the way of working and the destruction of jobs. From a broader perspective, we are talking about a possibility, but one which is coupled to a real threat and the risk of increased polarisation between winners and losers in the digital economy. The latest technologies that are beginning to shape the world around us promise us, at first glance, a bright future: robots whose skills are becoming more sophisticated every day; more numerous and more widespread digital data, synthesised even faster to shape something that will look like an artificial, embryonic global brain; algorithms able to profile every individual and identify their cultural and social preferences; cars that do not need drivers; and, finally, the 3D printers that will soon allow you to print your own car or a new house.

The process of the transformation of jobs is, today, both obvious and visible. In many so-called smart companies and factories, employees work alongside robots that are becoming increasingly intelligent in their skills and thus able to perform more jobs. The trend largely testifies to the ongoing replacement of roles between workers and machines (robots). Within the academic community, there is no agreement on the detail of the impact of the fourth industrial revolution in terms of the future of labour, but there is a unified stance that the final outcome will be negative, primarily because automation, computerisation and robotics will destroy more jobs than they will create.

A side effect of digitisation is that many jobs will be moved to other countries or regions, or will have the status of insecure jobs. In the context of the labour market, the consequences threaten to lead society into a state of extreme polarisation. The future, so-called digital economy, that is less reliant on the role of workers, will lead to mid-level and average-paid jobs for medium-skilled workers becoming small in number. A sort of 'emptying' out of the middle class will create an increasing polarisation of society which will include, on the one hand, difficult to achieve jobs for highly-skilled workers in the field of computer science, engineering and network operation, etc. These jobs will be available only to a small, but select, number of workers. On the other hand, in practice, there is an explosion of jobs for low-skilled workers to perform work that cannot be done through technology. That polarisation has secondary effects which will, for example, call into question the existing models of funding social security and significantly weaken the tax base.

Regardless of the outcomes that are not yet foreseeable, Christophe Degryse, Senior Researcher at the European Trade Union Institute, believes that it is already

17 Venke, R (2016) 'Will robots and the internet take over our jobs?' *Deutche Welle* available at: http://p.dw.com/p/2Ryzj [last accessed 14 May 2017].

clear that digitisation in general establishes a foundation for the following threats and risks:[18]

- the massive destruction of jobs for medium-skilled workers
- intensification of 'anytime, anywhere' work, blurring the boundaries between work and private life and resulting in stress and exhaustion
- workers' loss of control over their own expertise, know-how and free will, by becoming an instrument in the function of machines
- digital management and the surveillance of workers leading to the risk of a loss of mutual trust between employees and management
- uncertainty and volatility (precariousness) of jobs and status and complete dependence on data masters
- weakening of collective action, and manufacturing relations
- mismatches of skills and training/labour demand
- worsening of inequality and wage stagnation
- digital Taylorism and the emergence of a digital working class
- erosion of the tax base and undermining the financing of social security.

The foregoing implies the view that technological innovation, in addition to its undoubtedly many benefits and opportunities, have another dimension as far as work processes are concerned – one that is most visible in growing uncertainty over the radical transformation of the character of the labour market, in which capital is not left intact. Degryse, in an extensive union study, sees the digital economy not only as a danger but also in terms of the opportunities and the possibilities that can be sought in changes in the character of capital, company organisation and structural economics. There is an ongoing transition from an industrial economy to an economy of cultural production that is marked by a disappearance of the distinctions between service and manufacturing activities: instead of being an industrial product, a car will soon become a service based in software design.

The new innovative and technological cycle, and digitisation in general, affects the whole of society so, in order to protect workers and employment growth, and to ensure social workers' rights, there is a need for constructive dialogue between the social partners on the one hand; and government and companies on the other.

Furthermore, to achieve the objectives of the European Platform against Poverty and Social Exclusion,[19] EU member states must further engage their resources on the implementation of a strategy for the revival of industry for a sustainable Europe. This is intended to create an environment and opportunities for stable employment and the wider social inclusion of workers and, to this end, allocates a much higher level of funding and structural funds, as well as special EU programmes; makes changes in the education system; and strengthens the pillar of European social rights. Many European countries are already at a stage of reforming their labour markets and social welfare systems to make way for future trends: redirecting labour taxation

18 Degryse, C (2016) *Digitalisation of the economy and its impact on labour markets* ETUI: Brussels.

19 European Commission (2010) *European Platform against Poverty and Social Exclusion: A European Framework for Social and Territorial Cohesion* COM758final, Brussels.

in order to reduce the costs of employment and facilitate the creation of new jobs; modernising pensions systems by better aligning retirement age to life expectancy; transforming education systems and lifelong learning in order better to respond to current and future needs; and maintaining the connection between wages and productivity for the permanent retention of competitiveness and the creation of new jobs.[20]

## Impact of Industry 4.0 on Serbia

The general influence of technological trends has made a significant impact on Serbia. These trends and developments have been set as a predominant course for the newly-formed government (June 2017) as a source of economic growth. Serbia has started on its own digital transformation with the digitisation of the TV signal, which has become one of the widest impacts of digital transformation on the general population apart from the application of broadband internet across the nation. The creators of this change believed that the digitisation of the media would bring a further transformation of education towards doing business better in Serbia.

In this respect, Serbia has organised a number of conferences and business panel discussions on the topic of digital transformation and the impact of digital transformation on businesses in Serbia. Under this approach, many state officials responsible for digital transformation and representatives of major companies both from in the analogue and the digital sector have had the opportunity to exchange data and experiences and to discuss the pros and cons of the new digital era. The general conclusions of such a debate have had a public input in the sense that they have created a realisation and an understanding that digital transformation is not the future but the present, and that there must be a vision for developing adequate tools within Serbia to follow up this major process since it delivers comparative advantage in the market.

The Serbian IT sector is not well developed at a global level, but Serbia does provide some of the world's IT services and appliances. Even at the present level, the digital transformation in Serbia has facilitated that about 20 per cent of IT companies in Serbia are employing experts from different countries using facilities provided by the digital transformation. Such employments are conducted digitally and remotely, in a paperless way via video calls and remote interviews, giving an impetus to the further development of the Serbian labour market. In this sense, existing digital channels and means of communication have been a significant worldwide asset for social networks and networking which have erased a need for a personal presence, physical signatures on paper and classic interviews on the basis of a traditional time measurement approach at interview, with this being replaced by a 'one-to-one' online digital communications employment procedure.

It has been recognised that digital transformation must be based on a high quality and highly efficient education, both at higher education and at general level, and that there must be a partnership between the public and the private sector in this field since, otherwise, there cannot be efficient development since both sides are exhaust-

20 European Commission (2017) *Document for the consideration of the social dimension of Europe* COM206final, Brussels.

ing their resources instead of making them synergetic. Therefore, Serbia needs high quality people who are aware of what is expected of them and who will be capable of making changes within the education sector not in the future but right now.

In the case of Serbia, the delay factor to rapid development appears to be the point that, even where individuals have the vision, digital transformation is neither easy nor inexpensive, even when a country is keen to implement it in an efficient, safe and successful way. The first regulatory step towards this goal was the adoption of the *Law on Electronic Communications*, that was harmonised with the European regulations, and which is aimed at enabling and contributing to the further digital transformation of the country and the economy.

Serbia has recognised that digital transformation, without exception, affects all parts of life – of the state, economy, science, education, entertainment, etc. – and that, therefore, it has the obligation of supporting a digital transformation which is conducted gradually and systematically, not in an uncontrolled way which can bring about more damage than progress.

From a telecommunications point of view, Serbia is a bit late in development, although not significantly. However, companies on the market have an understanding of this and are striving to catch up with the constant changes; trying to run change and not have change run them.

Serbia has implemented a process of digital signatures, in the process resolving one of the major challenges in digital transformation. Serbia continues to develop a general health information system, based on the digital transformation resources and experts of Telekom Serbia. Progress is being made in this co-operative venture, with investment being made only in the necessary infrastructure. Therefore, this example provides the understanding that this is a time of partnerships, a time of ventures in which everyone has a role and a significance that will prompt further progress.

Recently, Serbia has launched a major project on the development of the domestic IT sector, called 'Digital Serbia'. This initiative is supported by the major market players with the aim of strengthening all the aspects involved in establishing a successful digital and high-tech innovation system. By this project and under such initiatives, Serbia is trying to compensate for the years of delay which have put it behind developed IT countries.

With the aim of digitising Serbian society and raising awareness of the fourth technological revolution, nine Serbian technology companies have established and launched a new association, the Digital Serbia Initiative (DSI), which aims to lead a national initiative to strengthen the IT sector. DSI seeks, in the next ten years, a complete transformation of Serbia into a modern, digitally prepared and educated society, one in which the information technology industry may be able to develop and advance.

DSI has a vision of Serbia 'Ten Years Later', in which artificial intelligence has become an integral part of our lives, in which cars are driverless, in which the value system has not collapsed and in which young people do not emigrate to countries that have prepared themselves in a more timely way for digital transformation.

Realising that great work is still to be done, the Digital Serbia Initiative is striving to change the digital image of our country from the root and thus adapt the do-

mestic economy to a future-oriented structure. However, in order to skip the decade of delays of developed countries and fulfil the stated goals, broad and radical change is needed at the level of the whole society, as well as state support and, sometimes, even direct influence on politics, alongside the pressure of influential companies and organisations in order to bring the original ideas to fruition.

*Does Serbia have what it takes?*

Among the countries that have recognised the importance of digitisation are Ireland and Switzerland, whose vision has managed to see them find their place in the digital sun. Serbia is looking to stand on those same tracks and to develop a future based on the model of these two countries – a model that is largely based on making essential changes in the field of education, start-up support and event organisation, as well as the creation of the conditions for the launch and operation of accelerator and venture capital funds. One of the initial goals in Switzerland was that every schoolchild should have the opportunity to attend programming classes; Serbia is launching new intensive programming lessons which start at primary school and which will bring IT education to every school and child and, in that way, set about the challenges to come.

What progress has Ireland been able to make? Why are all the big technology companies located there? Is it only because of massive tax credits? Of course not – even if that should not be ignored as a factor. The reason is that Ireland has dedicated itself to the implementation of major structural changes that have resulted in a better economic picture and growth in gross domestic product. However, Rome was not built in a day, and so neither did this island nation transform itself digitally overnight. These changes require great patience, commitment and the complete restoration of the education system and the general infrastructure. Complex issues always require the labour of the entire community, alongside business nous and national policy-making.

When it comes to Serbia today, without a consciousness among the people that time is moving on and that it is necessary to keep up with overall technological progress, there is no serious move towards digitisation. Apart from some positive examples, Serbia has, so far, failed to show a willingness to take the major steps required to move forwards which will bring this country 'closer to the fire'. By means of individual initiatives alone, Serbia will not be able to exit the place in which it stands, no matter whether we are talking about a process of replacing health booklets or compulsory IT. Somewhere, in some form, there are brakes on further development and thus there are different forms of people, interest groups or politically powerful individuals who are protecting their analogue interests over the digital progress of society. Therefore, Serbia had better 'roll up its sleeves', because the changes are going to be both painful and complicated although such changes were also the same in other places elsewhere.

Therefore, the progress of Industry 4.0 in Serbia will be clearly delayed until a unifying force is formed in Serbia and investment made in the basic infrastructure through which the changes will arrive at end users – in this case, Serbian society. Dealing with serious, hard and complex issues must be done in a strategic way in

order to facilitate progress and growth in all branches of the Serbian economy, and there is no organisation that could resolve this on its own. Therefore, Serbia must be aware that full, close and steady co-operation is needed between all sectors and government in order to create significant value for all participants in the digital ecosystem of the new industrial revolution which, at all costs, always considers synergy.

Until then, the general area of employment and the social sphere potential of Serbia will share a destiny of limited and partial progress and it will fall behind other developed markets and economies.

## Conclusion

Under the influence of technological progress, globalisation and the growth of the service sector, the world of work is changing rapidly and radically. The economy of co-operation and internet platforms are now reshaping entire economic sectors. New information and communications technologies, with the support of social innovation and the use of collaborative networks, are playing a significant role in strengthening the labour market, increasing its flexibility and achieving better jobs through projects aimed at opening innovative companies and launching initiatives to lower the current unemployment rate. The general and easy availability of new technologies, especially broadband internet is defined as a priority objective in all the strategic documents of the EU and the Member States, and one that should mitigate and/or amortise the digital gap and the resultant social exclusion. In such an environment, employees must contend with ever-faster change and acquire new skills and knowledge to adapt to new business models and changing consumer demands.

In this direction, the activity of both EU member state governments, the wider environment and the private sector is focused on a number of priority issues:

- the discovery and exploitation of the potential of the ICT sector as a source of growth
- achieving a single digital market
- spreading social innovation
- increasing investment in digital infrastructure
- seeking the wider digitisation of the public sector (e-government, e-justice)
- the establishment of closer ties, platforms and interactions between industry and research institutes and universities
- efforts for digitisation to become a priority for European funds and the possibility of access by private investment.

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