The Effects of Digital Transformations and the Impact on Employment in Europe and in the Republic of Croatia

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Abstract

Digital transformation involves changing and transforming the business model and adapting the company to market changes using different digital technologies. For companies to survive in the market and become competitive, it is necessary to adapt to the process of digital transformation that can be viewed as a change in all aspects of human life caused by digital technology. Nowadays, in the context of digital transformation, we can talk about the application of robots, artificial intelligence, 3D printing, drones, or so-called "industry 4.0". The concept of Industry 4.0 requires digital transformation and networking of all functions inside and outside of the factory, where robots are used instead of workers in production lines. The development of robotization comes in all spheres of human life and is increasingly paying attention to their development, research and appliance. Robotization has an increasing impact on employment, so accordingly there is a need for new jobs, while today's professions go to oblivion. Robots use sensory and control systems and artificial intelligence that leads them to independence in decision-making and work. Replacing workers in jobs that don't seek creativity, other than routine work. Considering that the labor market will be significantly altered, the impact and automatization will be significantly different from sector to sector.

Keywords: digital transformation, industry 4.0, robotization, labor market

1. Introduction

In this time of universal data connectivity new elements of business are emerging, leading to exact data and field application, which introduces a new dimension to data processing and analysis, as well as a rapid response to the collected information. The global business environment dictates adaptation to new ways of business by introducing new techniques and technologies into business which lead to digital transformation. More and more business transactions are taking place via the internet and products and services are purchased through different platforms. In this way, the added value of the business is being developed and more efficient customer relationship management is achieved, with two-way interaction leading to customer satisfaction. Products are created by integrating resources from around the world and are developed to meet the desires and needs of customers and Internet users. Traditional products are taking on a new communication and distribution channel.

Depending on the changes brought by digital transformation, which have a significant impact on employment, research has been conducted. The subjects of research are the effects of digital transformation on the labor market in Europe and the Republic of Croatia. The analysis was conducted based of scientific articles, previous communications, and other professional literature.

The aim of this research is to analyze and determine the impact of digital transformation on employment. Research questions were asked: What does digital transformation bring into labor force market? Which are new and which are old preferred occupations? Which worker skills will be valued?

2. Digital Transformation

The global business environment brings different changes and adjustments to the existing market. In order to remain competitive, companies must adapt to current market changes. With the introduction of new processes into the business, digital transformation is coming. Digital transformation, as a transformation of business based on digital technology, is an inevitable part of the company's business cycle. It indicates changes and transformation the business model of the enterprise by using different digital technologies. It began by using technologies such as Cloud computing, Big Data, Internet of Things (IoT), while in the context of digital transformation we can talk about the application of robots, artificial intelligence (AI), 3D printing, drones, so called "industry 4.0." [1].

Companies are directing digital transformation to meet the wishes and needs of customers and to strive for closer relationships with them in order to survive in the market and become competitive. From that comes the concept of Industry 4.0, which involves the digital transformation and networking of all functions inside and outside of the factory, where robots are used instead of workers in production lines. That is the creation of a "smart" factory that uses information and communication technology to manage production and business processes. The main goal is to achieve ascendency the market by achieving improved quality, lower costs and more flexible production [2]. Information technology and digital transformation has become an inevitable tool for reaching users in terms of providing products and services. For that reason, companies must be receptive to changes in networking, digital transformation and industry 4.0, in order to be ready to respond to them and adapt to change. Many countries around the world provide support to companies for digitalization, networking and for using applications of industry 4.0.

Nowadays, buyers expect their future desires and needs to be foreseen and created before they determine what they are. With the development of digital technology and high availability of information, a new dimension of user expectations has emerged from existing brands and businesses, making them vulnerable in consumer preference of substitution. The characteristic of today's world and national market is the presence of a highly emphasized competitive spirit which seeks to achieve a rival advantage [3].

2.1 Positive effects of digital transformation

Enterprises are expected to develop toughness to changes in digital transformation, networking and industry 4.0., keep up with trends and reactions to them. Digital transformation brings plenty of business-related changes that are manifested as the positive effects of digital transformation.

Companies direct their business toward the end user while providing them a fully customized product or service. Digital transformation enables businesses a new marketing approach by providing products and services to customers in order to fulfill their existing and future wishes and needs. Enterprises exploit the potential of digital transformation to transform their management to achieve competitiveness and survival in local and in global markets. With the possession of technology in business, it is essential for companies to ensure the right mix of information and communication technologies through which personalized marketing is promoted [1].

Traditional marketing activities are slowly dropping out of use since they do not provide market success, instead the focus is on a more financially and technologically acceptable solution-digital marketing. Products and services offered by companies through various connected devices are very easily accessible and omnipresent in society. Digital transformation reduces business costs and increases the efficiency of sales of small and medium-sized enterprises through integration of intelligent and autonomous systems and the improvement of logistics processes [1]. By using different marketing strategies and tools, companies are presenting and offering their products, and by using two-way communication they collect feedback on user reactions. Two-way communication enables foresight of customer and user behavior through information that companies collect and possess by conducting analysis from their databases. Enterprises over a certain time period follow the reactions and actions of users and by that only offer products and services of their interest, those they really want, or those that will trigger positive reactions and encourage buyers to buy.

2.2 Negative effects of digital transformation

The risks arising from resisting globalization arise from the view that social global life is solely based on trade with the ultimate goal of consumption, that the foundation of globalization is a material gain and representation of basic motivation for action [4]. By developing digital technology and introducing it into business, information becomes easily accessible to a large number of users in different environments. Considering the above, a new environment has been created in which users have great expectations from existing companies and market brands. Thus, they become vulnerable to substitution of consumer preference. Significant generational differences were detected in user attitudes towards new communication technology because they are more technologically exposed and use more information-communication technology than older generations. The Internet is used in all spheres of life and perceives it as a source of information that can be very negative if obtained information is incomplete or inaccurate [3].

With the appearance of new technologies, present jobs are being replaced by new jobs that are needed in digital business and which require training of the workers to be skilled in performing out jobs of that kind. One of the negative effects of digital transformation is also the danger of intensifying work, from increased levels of stress and work time. New forms of employment threaten that workers will have to be available all the time and anywhere because new technologies blur or erase the traditional boundaries of professional time and space [5].The increase of worker stress level can be affected by increased employee tracking, assumption of workers availability 24 hours a day, frequent job change and managing work by using algorithms [6]. Possible outcomes of the increasing digital transformation in the workplace include the increased ergonomic risks caused by human-machine interfaces and increasing mobile work online. Online markets often contain different information about the products being sold, as well as the people involved in the process of sale itself. The mentioned affects the promotion of discrimination based on seller's race, age, gender, or other aspects of appearance.

3. Development of Robotization and Impact on Employment

Nowadays, in the increasing presence of digital transformation and robotization, we can talk about a new era for humanity that will significantly change the everyday way of life both in business and in private. By developing electronics, sensors, artificial intelligence and other technologies, robots are no longer just machines. They become more and more accepted "partners"

in everyday life. In previous industrial revolutions, it could not be imagined that robots would significantly change and facilitate everyday life. Robots are becoming more and more present.

Their role in medicine, army, service industry and households are becoming inevitable and increasingly important. At the Fraunhofer German Institute, a prototype of the Care-O-Bot robot was developed. His primary task is to prepare food and drinks, reminding people of their medication intake or a favorite television program. This kind of robot has its application in nursing homes. The need for its development started with the fact that the population lives longer and the labor force are less and less concerned about the elderly. Miniature robots have a significant role in the military for signaling the attack better, defense and/or scouting. In medicine, robots are being incorporated into the human body, and are also considered to play a significant role in performing individual operative procedures [7]. Generally, we are not even aware of omnipresence of robots.

Today, without thinking, it's normal for airplanes to have autopilots; the automotive industry is developing cars without drivers, and self-parking cars with the help of digitized systems. Just as we quickly accepted the Internet, mobile devices and other gadgets, it is considered that we will be able to accept further advancements in the field of modern technologies in an even easier and in conspicuously way.

Robotization will make a significant mark in the 21st century. The development of robotization enters in all spheres of human life and is increasingly paying attention to their development, research and appliance. Robot development in the future will also change the social spheres. The development of a humanoid robot that looks more and more like a human, behaves like a man, and is accompanied by emotions and feelings, will be totally shocking if we look at today's aspect of morality and social relationships. Such robotic development will affect changes in social relationships, and interpersonal relations will be reduced to a new form of friendship, socializing, perhaps partnership. Given a series of ethical and moral dilemmas, rules and practices for upcoming times should be set up today; all in order to protect the rights of human life, and robots remain under the control of people.

Robotization will have an increasing impact on employment. Some research point to the disappearance of 47% of current jobs and is considered as high risk. Namely, there will be a reduction in the need for the middle working layer, i.e. The need for skilled and highly skilled workers will be reduced, and the need for unskilled and highly educated workforce will increase.

Automatization and growing robotization in the business world will most certainly affect and change jobs. It is assumed that regardless of the abolishment of individual jobs, there will be a need for new jobs that at this time we may not be aware of and we do not pay enough attention to.

Currently we can only assume which jobs that might be. Research suggests a reduction in workplaces requiring primarily repetitive jobs, which will easily be replaced by robots. In general, jobs that are at greatest risk for digital transformation are administrative jobs, sales, trade, logistics, construction, manufacturing, some types of services, such as translation, tax consultancy, etc.

Robots will not be able to replace jobs for 40-50 years, primarily those professions that require innovation, creativity, talent, imagination, scientific approach, etc. The emphasis will surely be on the professions relating to construction, robot maintenance, programming applications, that is the need for computer workers, scientists and engineers. The need for soldiers, cops, judges, attorneys, brokers, educators, and service workers (hairdressing, beauty care, social workers) will continue to exist. Doctors will still be required, but part of the operation and diagnosis will be set up by robotized devices. In previous industrial revolutions there were also problems with the introduction of new technologies. Removing existing jobs for new devices and machines is not a novelty. As an

example, there is the first industrial revolution when many jobs were revoked due to the appearance of steam engines. Also, at the beginning of the 20th century large changes were made in agriculture.

Even 70% of the population was involved in food production. Nowadays, if we look at developed countries, only 3% of the workforce is involved in the creation of food and its products.

Robots are just one part of the new technology, and the need to replace human work has always been present. This role used to belong to an animal, a slave, machines, and in the future will be automatized machines and robots that will increasingly have a dose of independency in decision-making and offer solutions to emerging problems [7].

Fear and concern for the job and overall employment is quite normal and is in human nature.

As already mentioned, computerization and robot application will affect a large part of the workplace. In research conducted by experts who are in touch with new technologies, 48% of them predicted that the effect of robotization would be significant and that changes in the types of occupations would be significantly affected and would have an impact on a sudden drop in employment. Social differences will be more pronounced, and the gap between the poor and the rich will be even greater. Other 52% of experts believe that new technologies will not have a negative impact on employment. Occupations will naturally change, but employment will be on the rise. There will be a need for new experts, new knowledge and skills. An example is the beginning of this industrial revolution in which million robots created three million new jobs [8].

Robots will be more prominent, but the need for human control will be inevitable.

Ivan Cifrić, in his 21st Century Expectations of the Early 21st Century Examination, conducted at a student sample at the University of Zagreb, concludes that 25% of respondents are not sure what future to expect, 70% expect that technology dependency will be significant, pollution will increase the environment, and the poor countries will become dependent on rich and developed countries. Less than 35% of respondents believe that genetically modified food will be more significant, "superhuman" will be created, and human creativity will be reduced [9]. Every research leads to some new insights and opinions, but in general, computerization and all automated representations will significantly change the daily life style we are already slowly seeing looking back ten years. Even then we were not aware of the present time, and who knows what the next twenty, thirty or more years is waiting for us.

Given that the labor market will be significantly altered, the impact of digital transformation and automation will be significantly different from sector to sector. Although it is difficult to predict changes in workplaces, it is assumed that there will be a need for new jobs, new sectors, and the emergence of new services. Digital transformation will not only change the labor market, it will also change the social position of individuals, their salaries, the quality of new and changed jobs, etc. Computers become more sophisticated and powerful, and the opportunities they provide become countless. The problem is accelerated computerization, and the question is whether the human mind can keep up with the process of doing so. Many organizations, their knowledge and skills are set back in time. For this reason, it is necessary to elaborate the future strategy further and to wait for the sudden changes that would cost organization survival on the market. We can't say that there is a period before us that we have no influence on. What follows is a major restructuring process whose direction of motion will largely depend on political decisions. For example, will it be acceptable that in the upcoming time trucks will be able to transport goods without a driver?! The question is about safety and what regulations will meet such form of transport.

Some authors believe that the labor market will become flexible, and the labor contract will not be defined. By doing so, the regulations on working time, salary, work place, trade union etc., will

not exist. The employee will be a "participant/partner" in virtual business. Taking care of your insurance, sickness, retirement will have to be done by individual. Being self-employed in such circumstances is not so positive if we look better at all the circumstances. The beginning as well as the termination of employment is established through different platforms. Let us hope that the legal and legitimate norms on this issue will be better defined in the future in order to protect the worker and his position in the virtual business world. The problem will also arise in blur of the border between private and business life. The dependence on the devices needed to perform a job will greatly change the everyday, primarily private lifestyle. Reading and answering mails at any time of the day or night including the weekend will create addiction and everyday routine without rest and job breaks. However, such situations are unfortunately already present today. Also, some employers point out that private life partly infiltrate into business by reading private mails, communicating with friends through social networks and the situations like that. It is difficult to determine the boundary between the private and the business world nowadays. Who knows what direction it will take place in the coming period? Working time and workplace will most certainly gain new features, and the need for legal regulation will be inevitable. Given that new technologies will "throw" the middle tier of labor from the labor market, more and more payment inequality is also assumed. Lower skilled labor will receive minimal wages, primarily because of small complexity of the job, while the pay of highly educated experts and scientists will be growing. A gap in the wealth of the work layer will not only be affected by income. Impact will also have tax benefits for the richest, reduced investment in education, healthcare etc. Depending on the type of job and private life (e.g., mothers who care for children) technology will increasingly contribute to the flexibility of the job. Depending on the circumstances, flexibility and autonomy may have advantages and disadvantages. For example, mothers who care for young children will easily arrange and organize their work, which will contribute to greater efficiency in carrying out work tasks. On the other hand, workers are at risk of intensifying work, the level of stress will increase, which will undermine the health of people. New forms of employment point the need for constant presence of workers, and traditional boundaries on working time and space will gradually be erased.

Christophe Degryse, in his work "Digitizing Economics and Its Impact on the Labor Market", Table 1., highlights the abstract of the main issues through the SWOT analysis and thus more clearly presents categories – strengths, weaknesses, opportunities and threats in the era of digital transformation. Strengths that stand out are the connected world through open systems led by the knowledge economy. Automatization will overcome and the machines will learn by themselves and over time offer themselves the solution for newly emerging problems. New products and services will characterize innovation and adaptability to the user in everyday life. Opportunities will create new jobs that will primarily be focused on digital transformation and informatization.

Flexibility and independence in work are just some of the benefits in the workplace. Repetitive and routine jobs will be phased out, and robots will be taken over. The author also lists some of the weaknesses of the new era. The future will be characterized by economic growth without jobs.

Consumer habits of individuals will be clear and specified. The problem will arise in non-compliance with regulatory, administrative and working standards, and the protection of personal data will be minimal. Some of the threats are the revoking of mid-term jobs, the boundary between the private and business world will be unclear, and the distrust between the worker and the employer will be expressed to a greater extent. These are just some of the examples and assumptions that the future and its technology will look and impact the everyday life [5].

Table 1. SWOT analysis of the impact of digital transformation on employment

STRENGTHS	OPPORTUNITIES
1. Connected world, open systems, knowledge economy **2. Automatization, Learning Machines, Robotics** **3. Innovative products and services, mobile applications that make everyday life easier** **4. Micro-factory**	1. New Jobs (Computer Engineers, Scientists, Network Experts) 2. Flexibility and independence in work 3. Abolition of repetitive and routine tasks 4. New way to distribute productivity gains (shortening working hours)
WEAKNESSES	**THREATS**
1. Growth and the future without jobs **2. "Algorithmizing" of behavior, work and consumer habits of individuals** **3. Non-compliance with regulatory, administrative, labor standards, less protection of personal dana** **4. Fewer workers at the top of the scale, more workers at the bottom of the scale**	1. Extermination the middle working layer 2. Blurring the boundaries between the private and business worlds 3. Digital management, worker supervision, loss of trust between worker and employer, wage stagnation 4. Erosion of the tax base and social security financing

Source: Degryse, C. (2016). Digitalna transformacija ekonomije i njezin utjecaj na tržište rada. Radni dokument 2016.02. Europski sindikalni institut, pp. 40. https://webcache.googleusercontent.com/search?q=cache:IJSFQn_nAjwJ:https://www.etui.org/content/download/31950/295676/file/ETUI_Digitalizacija_FIN.pdf+&cd=1&hl=hr&ct=clnk&gl=hr (accessed 03.06.2019. 18:30)

4. Situation in Europe

Machine connectivity, availability of big quantity of data, production flexibility, product customization, and automated production are just a part of the new era. The need to change business ideas, investing in employee training, improving internal processes, and investing in management tools and activities is an inescapable part of modern business, all in order to progress and keep up with time [10].

The European Union has noted that investment in research and development (R&D) are falling behind leading world countries like America and Asia. The first ten world countries invest about 80% of all the world's R&D investments. The United States, which invests US $ 476.5 billion in IR, China is in second place, investing 370.6 billion US dollars, and Japan ranked third with 170.5 billion US dollars [11]. Due to the great lagging in investment, the European Union has adopted several key development strategies by 2020. One of the goals is to invest 3% of GDP in R&D. The plan is implementing new strategies which will create about 3.5 million new jobs [8]. According to available data, in 2017, the EU invested 2.07% of GDP. Only three European countries are investing more than 3% of GDP. Sweden is in the first place (3.33% of GDP), while Austria, Denmark and Germany are following [12]. In Europe, the country's top investment in R&D, by the total investment amount, is Germany with an amount of 109.8 billion US dollars [11].

The robotics development strategy in the European Union is carried out in co-operation with EUROP (European Robotics Technology Platform) and CARE (Coordination Action for Robotics in Europe), involving leading European manufacturers and institutes. The European Commission has decided to fund research projects in the field of digital transformation and robotics with about 100,000,000 euros annually. In addition, the European Commission has established a project called SPARC for the application of digital transformation and robotics in the fields of agriculture, medicine, households, production and so on. The primary goal of the project is to increase the number of jobs for 240,000 and to take Europe's share of global level in the amount of 42%. It is

concluded that Europe should primarily be a manufacturer, not just a consumer in the field of digital transformation and automatization [7].

Based on OECD data in mathematics, natural sciences, and digital competences and lifelong learning the workforce skills were assessed. Also based on the cluster analysis and LCC (Latent Class Cluster Analysis) of European countries we can reduce to three clusters that indicate the speed of adaptation in future digital times. High performance clusters are the countries of Northern and Western Europe, middle-successful countries are the countries of Central Europe and the Baltic countries, while the poor performance of the cluster of countries is entering the South and South-Eastern Europe. The adaptability of the workforce in an automatized and digital environment in times that are yet to come is an important indicator of future growth and survival of leading organizations in a certain country [13].

5. Situation in the Republic of Croatia

Can Croatia be in step with the European Union?! Croatia aims to allocate 1.4% of GDP for research and investment in technology development by 2020, which is lower than the European average. In 2015, the share of funding was 0.7% of total GDP. The reason for the lower level of the goal set lies in the fact that there is a bad situation in the country and a small source of funding for research and development (R&D) [8]. In 2017, 0.86% of GDP was invested in R&D. Of the total funds in R&D, the largest share was invested in the business sector with a share of 48.4%.

High education follows 29.3%, while the least amount of funds was spent in the state and private non-profit sector, 22.3% [14]. Investments in Croatia are much smaller compared to investments in Europe and the world. Unfortunately, Croatia is not in the top 60 countries of the world by investing in R&D, so some of the neighboring states, as well as some African countries, are better off. While Croatia invests 737 million US dollars, Slovenia invests twice as much, 1.5 billion US dollars. Bulgaria and Romania invest over one billion US dollars. Serbia invests 20 million US dollars more than us, and Kenya and Ethiopia even 50 million US dollars more. However, some countries invest less than Croatia. As examples there are Macedonia and Bosnia and Herzegovina, which invest about 100 million US dollars, and Albania and Montenegro two thirds less [11]. In this way, there is less development of innovative products and technologies that could improve the state of the country.

According to the 2018 report for Croatia, the Digital Economy and Society Index (DESI) warns of increasing challenges in terms of digitization. The DESI Index serves to monitor Member States' progress in digitization. According to DESI, Croatia belongs to a group of less successful countries.

Although Croatia was in 2018, has made good progress in digitization, it is still not significant to a great extent. Croatia occupies 22nd place, out of a total of 28 member states of the European Union. The research suggests the readiness for digital technology to be introduced by companies, and the use of the internet by the public to a great extent. A targeted digitalization strategy for the Croatian economy would greatly assist the Croatian economy. Namely, Croatian companies are characterized by the willingness to introduce technology, but the issues point to the lack of national digitization policies. Digital technologies are the key to connectivity, collaboration and business in all segments of the economy [15].

The unfavorable situation that accompanies Croatia is, unfortunately, a matter of historical legacy and a result of the global economic crisis. The crisis that came about in 2008, Croatia was hit hardest by all the European Union countries. The key economic problems that accompany Croatia are the low level of GDP per capita and the high unemployment rate. Nowadays, investing

in R&D is the foundation for realizing the country's economic growth. Croatia is undoubtedly lagging and is not in step with European and national strategies [16].

In order to evolve economic improvement, there is a need for new technologies, new innovative products, investment in education, and opportunities for skilled and highly educated people to develop their ideas. Many countries in the recession period invest more in research and development. It turned out to be so easy to get out of the economic crisis. However, this is not the case in Croatia. It is a sad fact that we are one of the few countries where it's hard to find jobs for highly educated people towards people with lower education. In Croatia, the solution to the problem is systematic restructuring. It does not mean shuffling the same dice, but instead adding and connecting new ones to a better whole [17].

6. Conclusion

Given the questions from the beginning of this work, it can be concluded that digital transformation is bringing a new era that is not that far from us. Namely, new technologies and machines are being introduced today, interconnected, involved in the creation of new solutions, customers create their products, and smart factories are characterized by new technological processes. All work processes are automatized, from communications to production, with the aim of maximizing profits. New technologies will create a need for new jobs related to robot construction, maintenance, and application programming. Some of the skills that workers will appreciate are creativity, imagination, socio-emotional skills, and technical skills related to the use of digital technologies.

The increasing development of digital transformation and automatization will contribute to greater dependency on technologies. Automatized systems represent better solutions, cheaper production, and faster marketing. Robotic systems will dominate the world, and everyday life, both private and business, will not be able to function without modern technologies. Robotic systems will take over much of human labor. Initially, they will take on repetitive and routine tasks until they have feelings and awareness of their existence. Only then will they take on jobs that require creativity and intellectual ability. This will result in major changes in society, and for this reason, legislation should already define the rights and obligations in society. All in order to prevent robotic systems from taking over and manipulating people's daily lives.

Investing in education and research is an inevitable part of economic progress. The more investment in technological development, the greater are chance of getting the country out of crisis.

America, some countries in Asia, Western Europe, and the countries of Scandinavia, are examples of countries that have recognized this and their investment in R&D is significant.

Looking at the development of America and some Asian countries, the European Union has realized its disadvantage in investing in R&D. For this reason, a strategy has been adopted that plans to invest 3% of GDP in R&D by 2020. Unfortunately, due to the unfavorable situation in the country and lack of investment, the countries of South and Southeast Europe cannot compete with the Western countries. Doing so will create dependence on them, and technological progress and growth will not be able to track them. Croatia is also at a disadvantage regarding such forms of investment. Insufficient funds are allocated in many institutions and research projects, and the importance attached to their development is insignificant.

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