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DIGITAL ECONOMY TRENDS: GLOBAL CHALLENGES, STRATEGY AND TECHNOLOGIES

Monograph

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THE IMPACT OF DIGITALIZATION PROCESSES ON THE SOCIAL SPHERE

With the introduction of digital technologies into the working environment, which have been starting since the 1980s, the range of tasks that machines can perform has constantly expanded. With the most recent period of the digital revolution and advances in robotics and artificial intelligence, public fears have been growing that machines will make human labour obsolete and give rise to widespread unemployment. In this study, changes on the labour market consequences, social challenges and the health sector challenges of the recent period of the digital revolution are revised.

To understand the role of technological developments, digitalisation and the role of information in society nowadays, for this paper it has been chosen a starting point –the mid-20th century, more specifically, with the launch of Sputnik 1957. This starting point and the following historical developments presented below are some examples that can be understood as the developments from industrial society towards a post-industrial society and later on towards the emergence of information economy where information becomes a commodity and the access to information will be a key for individual and social well-being.

A historical approach is helpful for better understanding the digitalisation in society and ways of technological developments might have an impact on various situations today. Looking back to take the lesson from history is also a way to develop understandings of formulations in current policies to see which e.g. ‘societal problems ’are represented. For example, the economic crisis is being understood as one ‘problem’ that works as a driver for change of societies alongside with technological advances. This will be highlighted below through the example of education before shifting focus towards the question of what digitalisation really is, leading towards perspectives of the role of information.

The launch of the Russian Sputnik in 1957 is often described as a starting point for the increased funding of technological developments that took place in the 1960´s. One can say that Sputnik started a technological hype or even a competition between countries on how to become 'the best' at technological developments. The hype concerned explicitly the former Soviet Union and the United States of America (that invested the significant sums of money in technology) but it grew to become a global phenomenon. Parallel to technological spending there was a debate about how technology could or should be a driver in changing education and society as a whole. The beliefs in technology, which are playing a key role in the change, alongside the financial crisis, put pressure on, e.g. school systems. Schools were understood as adapting to slowly to socio-economic changes and that the formal education system failed to keep pace with the developments and needs stated by the wider society – called the World Educational Crisis presented by UNESCO. As a result, the World Bank stressed the need to reach out to (young) people outside of traditional or formal systems by e.g. providing education in other forms than existing formal education systems. Enhanced by discussions in UNESCO and the publication Learning to be: The world of education today and tomorrow, where the concept of Lifelong learning was born, the first and commonly used understandings of formal, non-formal and informal education were defined.

The 2000s and 2010s showed that history could be understood as having a cyclic pattern. The relation between technological developments, economic crisis, education and reaching out to young people seemed to repeat its patterns from the 1960s. The collapse of two Bear Stern hedge funds in the summer of 2007 resulted in a worldwide economic crisis. This economic crisis evolved alongside with years of significant technological advances of ICTs and technologies that benefitted from faster transportation of digital data. The internet became useful and used by growing numbers of people throughout the world, increasing the number of users between 2007 and 2016 with a bit over 2 billion users to an estimated total sum of almost 4 billion users today (Internet Live Stats 2018-05-29). Even though the digitalisation of society has been an ongoing process from the day the modem was invented, the extent of it and the economic crisis can be seen as factors that once again 'forced 'policy into formulations

similar to the policies in the 1960́s and 1970́s. Education was seen as failing to keep pace with the digital society and economy and questions were raised as to whether the schools make the most of digital technologies or not.

The use of technologies is cultivated differently in different contexts. This is due to e.g. different needs, knowledge, economy, trends, etc. Today, the internet-enabled ICTs have developed to smartphones, tablets, GPS devices, VR-glasses or various forms of wearable technologies such as glasses or watches. The ICTs have developed into being understood as interactive, transformative and like environmental forces. In addition, Säljö brings forward an understanding that "knowledge is expressed in our abilities to merge and collaborate with external tools and to integrate them into the flow of our doings, whether these are intellectual, physical or mixed".

Moreover, it should be mention that the COVID-19 pandemic has also affected the society in its own way. The World Economic Forum (WEF) has published a study on the near future in the labor market. As before, WEF believes that automation and robotization are driving fundamental change, destroying jobs in some industries and creating jobs in others. Due to COVID-19, this process will accelerate significantly. In 2020, a combination of shocks to the health care system and the markets as a whole put the world's economies in free fall and unsettled the labor market. Millions of people around the world have lost their sources of income; millions of people are at risk from the global recession, structural changes in the economy and further growth in automation. At the same time, the pandemic and recession hit hardest on those strata of society that were in a difficult situation before, "the report of the World Economic Forum" Future of the Labor Market 2020 ", published this week, says. Back in 2018, the WEF predicted that the growth of automation would reduce 75 million jobs by 2025, but at the same time, it would create 133 million new ones.

People and machines will work hand in hand, and by 2022, there will be 58 million new robot and AI jobs. However, now this process has been significantly affected by the COVID-19 pandemic. It has dramatically accelerated automation and robotization in many areas, including reasons for epidemiological safety.

For example, in the spring, there was a sharp growth in demand for robots designed for cleaning and disinfection of the specialized Danish company UVD Robots, which supplies its products to hospitals in Europe and China. And, large retailers such as Amazon or Walmart have significantly increased the use of robots in warehouses and sorting points.

This situation, according to the WEF, led to a "double shock" for the labor market. 43% of companies' owners, surveyed for the study, said they are already determined to cut their workforce thanks to advances in technology. By 2025, according to WEF forecasts, the time that will be spent on solving current work tasks by robots and people will be equal.

Despite the fact that in the end there will be more new jobs than the jobs that automation will destroy, at the moment we are observing a situation in which the reduction of jobs has accelerated, and the creation of new ones has slowed down. Employers note 'that by 2025, as a result of robotization, 85 million jobs will disappear, but 97 million new jobs will appear – as the relationship between machines, algorithms and humans in the labor market changes" WEF experts say. That is why it is an urgent question to

So what about digitalisation…

When a router translates the analogue data from a computer into digital data in order to transmit it to another router that can receive and translate the digital data back to analogue data for another computer to read, then we experience the most basic form of digitalisation. This is basic knowledge to understand that digitalisation in a way is related to the sending and receiving of information, digitalised information.

The information can be transmitted from one agent to another with more or less effort, understood as a variety in informational friction. The old and 'slow 'dial-up internet from the 1990́s was connected to a telephone line and transmitted with a speed of 56 kilobyte per second (Kbps). Today, the telephone nets have often been replaced with more modern routers and broadband with other preconditions. A transmitting speed of 10-30 megabyte per second (Mbps) is more or less 'normal'. In Europe 2017 the average Internet speed per country in Europe differed between 5,8 Mbps (Albania) and 19,1 Mbps (Sweden) (Fast metrics, online information retrieved 2018-05-03).

The informational friction in the examples above differs between countries, simply because of variations in access to the internet. On top of that, differences in socio-economic status between individuals mean that some have a new smartphone, and in addition, probably several various forms of computers, while others do not. Hence, the informational friction differs not only between countries but also between individuals due to varying possibilities or preconditions for sending and receiving digitalised information.

Talking more about the changes caused by digitalization. Part of the digitalization process of the economy is the introduction of automated labor into production processes. Robotization allows you to minimize costs and, as a result, increase profits. Nevertheless, the process of digitalization of the economy has not only a positive impact on the way of states; the technogenic economy will bring a number of challenges and difficulties to both – government circles and society. Together with greater mobility, technological equipment and increased freedom of action, society and government will be vulnerable to cyber-attacks, the creation of new extremist groups, and the availability of personal and government data. Conducted within the framework of this article and other studies of trade, economic and political relations of countries, in the field of robotics, as an industry of digitalization of the economy, it can be concluded that the introduction of automated labor in production gives a positive trend in the state GDP and the development of external state trade relations. In the presence of crisis situations and the country's dependence on the resource potential, the automated type of production processes, in conjunction with research and development of innovative technologies, provide the country with access to the required level of well-being.

Also, technological changes lead to shifts in skill requirements for jobs. According to the review, technological change until the mid-1980s was mostly skill-biased, raising the demand for highly skilled workers while worsening perspectives for low-skilled workers. This changed with the introduction of computers in the mid-1980s, which were particularly efficient at replacing workers in middle-paid cognitive and manual routine tasks. Hence, the labour markets polarised with declining employment perspectives and wages of replaceable, middle-paid, middle-skilled workers. Workers who managed to upgrade their skills in order to meet the

demands were able to benefit from the changes, while for other workers the changes implied downgrading to lower-paid jobs.

Moreover, technological adaption in firms is accompanied by a process of organizational redesign. The changes are often targeted at challenges related to shorter product cycles, customisation of products and services, more complex production lines, faster communication and decision-making as well as a new work division between humans and machines. Consequently, IT-related organizational changes lead to more flexible organizational forms with less hierarchy and which generally involve workplaces with a wider range of more demanding tasks and more decision-making authority. The review suggests that such organizational changes ultimately result in job enrichment and are thus complementary to younger and highly skilled employees.

New technologies bring along new forms of work. In particular, alternative work arrangements are on the rise and can largely be explained by trends towards outsourcing as a result of stronger work standardisation, fragmentation of work as well as reduced costs for monitoring and supervision. A further related trend explaining the rise of non-alternative work arrangements is the emergence of online platforms. Although the gig workforce is relatively small compared to other forms of alternative work arrangements, the share is growing rapidly, providing workers with new opportunities, but also new risks. Finally, trends in alternative work arrangements, especially freelancing, may also be the result of changing worker preferences such as higher demands for more autonomy and flexibility as well as a better work-life balance.

Digitalisation calls for digital transformation of society.

The reason for this transformation is based on the situation that young people and humans in general are (constantly) going through a process of reshaping the way society ‘works ’including patterns for information and communication. It is a known problem that preconditions for taking part in this transformation differ between contexts such as lack of access to the Internet or high friction for information (‘slow ’or no Internet). However, this implication is not firstly about that even though it is included in the problem. Instead, it focuses on how organisations, and to some extent individuals, can be prepared for digital transformation of society, like for instance; how are nations prepared for digital transformation? This

implication is firstly understood from leadership and governance perspectives and in a sense, it is about how to prevent a situation where ‘you build the railroad when the train has left the station’. A question that is in place is, whether individuals and organisations in various contexts are ready for the digital transformation? Because, being ready does not only mean having appropriate technologies and a fast internet connection. There is also need to be a readiness for processes and systems that make this transformation possible.

Talking about social change, start costing with jobs and change the very scope of providing and doing work. Specialists of related fields are becoming more and more in demand. It is not just about specialists who know a little from related fields, but also about specialists who combine skills in disruptive, highly intellectual fields. And in this regard, there is also a need for specialists who are ready to be "vigilant learners" who develop relevant cornerstone skills. It is also worth mentioning the rather pressing problem of the "life cycle of professions" and the ability of the older generation to adapt to the rapidly changing labor market.

"Life cycle of professions" implies the demand for a particular profession at the time of graduation from the university. With the introduction of digital technologies, the life cycle of professions becomes shorter, thus, a person, having chosen the direction of study by the end of the training period, may face the problem that this profession is no longer in demand. In this regard, there is an urgent need for any person not only to "guess" and predict about the relevance and relevance of the profession, but also to have the ability to retrain in another field of activity, etc. It will be especially difficult for the older generation to cope with such a challenge, since with age, acquiring new knowledge, memorizing material, and "grasping" skills becomes more difficult due to physiological changes in the human brain. Hence, a separate aspect of the social policy pursued by states will be the provision of such a layer of "unadapted" people necessary for a full life.

In this study, we also aim to highlight the social transformations in health care and rehabilitation that are taking place in the light of the digitalization of the economy. It is worth starting with what are the consequences of the technogenic nature of the current life course on human health.

Technology is here to stay, but it’s always morphing and expanding. As each new technology enters the scene, it has the potential to improve lives. At the moment, the digitalization of the healthcare sector is already widely used, since it makes it possible to cope with emerging (including in the process of both digitalization and automation) challenges.

Bionics-related rehabilitation robots are also used in the medical industry. For example, to help patients recover from strokes and other brain injuries, and to help users regain strength, coordination, and dexterity. As the population ages, people live longer, improving the quality of life and reducing the recovery time from injury becomes more important for older people. Looking at the growing geriatric population, there is a need for rehabilitation robots.

The global market for robots used in rehabilitation is estimated at more than $2 billion, according to industry analyst CB Insights. In particular, robots are being developed for the rehabilitation of the older generation, in view of the aging of nations. Such robots are aimed at the rehabilitation of patients after strokes, fractures of weakened bones, helping immobilized people.

Rehabilitation is just the beginning of the recovery process, but it can be vital to a patient's mental and emotional health as well as their physical well-being. The sooner patients begin to rehabilitate, the shorter the hospital stay, better motor dynamics, less swelling, and less pain in the long term. One example of a robot designed for early rehabilitation is the Hunova Movendo Technology system. An FDA-approved robot was recently installed at MossRehab, a US rehabilitation center that focuses on robot-assisted rehabilitation. Hunova is applicable as both a rehabilitation tool and a monitoring system that tracks patient movements, providing clinicians with real-time information.

Robotics can help patients move faster without the need for multiple medical professionals. This is especially useful for those who are seriously injured or completely immobilized. In Germany, the VEMO rehabilitation system is used, which is designed to help start the rehabilitation of patients while they remain bedridden in the intensive care unit. A robot assistant helps to move the legs of recumbent patients so that they can perform rehabilitation exercises.

The companies developing these devices hope to use this technology to offer personalized care to patients. Robots can help healthcare professionals focus on rehabilitation earlier, which can result in shorter hospital stays. As robotic applications in medicine advance, these technologies face obstacles to adoption.

A small study based on 2015 FDA data on surgical robots found that "despite the widespread adoption of robotic systems for minimally invasive surgery, there are still few technical difficulties and complications during procedures". The study mentioned that hopes for robots are not risky. Some of the most pressing issues are listed below.

Money and time: One of the big hurdles many robotics companies face is the cost of machines. For example, creating robots that can accurately replicate the way a surgeon moves his hands, wrist, and fingers is an expensive development. One robot car can cost a healthcare facility over $1 million. And that doesn't include the cost of training doctors and nurses need to operate these devices. Certification may take a long time for some devices.

Regulation and liability: Medical regulation is another stumbling block for many startups and healthcare brands. The FDA must approve robotic devices for use in humans, a process that requires lengthy and costly testing. There are also liability issues that need to be considered. If the robot makes the wrong diagnosis of the patient, who will be to blame? The more autonomous robots become the more pressing questions about the consequences of mistakes become.

Privacy Issues: Users may also be concerned about privacy. As more bots are powered by artificial intelligence, the companies that develop them will have access to millions of patients' medical data.

Untested technology: Lack of data can complicate further implementation. While the use of many medical robots looks promising, there is actually not much data on long-term cost-effectiveness.

Ethical Issues: There are doubts about the advisability of using telepresence technology. The ethical issues associated with the use of robots take many forms, from fear of limited privacy to fear that using robots prevents patients from communicating with humans – something that many medical professionals consider vital to care.

To increase the level of robotization in the healthcare sector, it is necessary:

1. Training of IT specialists and narrow specialists in various branches of medicine for the development of new samples of robots or the creation of analogues of the world's best robots

2. Allocation of funds for the development of programs for the introduction of robotization both at the state level and with the involvement of private capital.

3. Creation of material and labor base (improvement of laboratories, instruments, remuneration of specialists).

Robotization makes it possible to increase the accuracy of the operation, to make the minimum procedure associated with penetration through the natural external barriers of the body (skin, mucous membranes). Surgery will become almost "natural" – to gain access to internal organs, you will not need to disturb the outer surface of the body, but use natural openings. Less intervention in the human body should shorten the recovery time of patients.

The pandemic poses a threat to all of us, but there are many groups of people who are particularly vulnerable or highly affected. Older people are at high risk, making intergenerational solidarity essential today. In their daily activities, many people with disabilities need the support of others, and the continuity and safety of such support must be guaranteed during a crisis. People living in institutions or in prisons face a high risk of infection and should be provided with protective measures. We highlighted the situation of immigrants held in migration centers and in prison. Homeless people are also extremely vulnerable, as noted earlier. The living conditions of many Roma remain inadequate due to limited access to water and sanitation. A large number of refugees and migrants find themselves in a similar situation. In response to the COVID-19 pandemic, all populations should have access to health care, including medicines and vaccines, without discrimination. Any absolute need for prioritization in terms of limited resources must be based on strong medical evidence and the individual urgency of the treatment needed. The human dignity of every person must be respected without compromising the fundamental equality of every person's life. A dedicated effort is needed to maintain mental health during a crisis and to ensure the continuity and safety of treatment, and this is achieved precisely by the usage of the robotics innovation.

Thus, we wanted to draw attention to the problem of introducing medical robots as an independent factor in the development of scientific

and technological progress, which we cannot avoid. And if we want to live and develop as an economically developed country, then the problem of robotization is one of the urgent problems of the promising future of countries.

Conclusions

Whether the potential benefits of upcoming technological change outweigh the risks crucially depends on adequate policy responses. We outline four key policy areas which are affected. The policy issues at stake are wide-ranging and constantly evolving. The policy responses outlined in this paper focus on measures that could be effective in tackling some of the main emerging challenges.

First, education and training policies need to ensure that workers receive sufficient training and the right skills for the labour markets of the future. This requires a general rise in educational attainment and a better match of curricula with required skills, as well as reskilling and upskilling workers via life-long learning (LLL).

Moreover there is no doubt that medical robotics will continue to advance. There are a number of advances in robotics in the medical field that can improve treatment quality and patient outcomes, including benefits such as less invasive surgery, more informed diagnoses, intuitive prosthetics, and faster rehabilitation.

However, there are still a number of obstacles that need to be overcome in order for these technologies to be applied to patient care in the long term. In addition to complex and often costly R&D, companies in this area will have to consider factors such as regulation, pricing and training of health professionals, not to mention emotional and ethical considerations in a sensitive area like medicine.

Robotic technology can bring tremendous benefits to healthcare, but there is no consensus on whether all the problems have been overcome to ensure long-term practical application of this technology.

Second, active labour market policies are needed to address the mismatch between worker skills and changing skill demands due to technological progress. Public and private employment agencies can help mitigate the costs of labour adjustment for both workers and firms. The new technologies themselves can actually help employment agencies to reduce these costs via better information and matching algorithms.

Third, there is likely to remain a group of workers who, despite active labour market policies, will find it difficult to remain in work and, if so, to maintain the quality of their jobs. This calls for income policies targeted to less-skilled individuals, such as in-work tax credits for low-wage workers. Moreover, rising shares of non-standard work arrangements among low-wage workers further calls for an expansion of social insurance to these non-standard work arrangements.

Fourth, higher taxation of labour than capital results in a misallocation of productive resources: too few workers are employed at the expense of too much innovation. This misallocation of labour and capital contributes to the declining labour share and low productivity growth. Therefore, a tax shift from labour to capital could increase the labour share and productivity growth but increasing taxes on capital comes with major challenges for policy makers.

Fifth, policies that regulate investments in new technologies should focus on those technologies that minimize the direct threat of automation for workers and that maximize the positive countervailing effects that increase labour demand.

There are thus a number of policy areas to shape the impact of the digital revolution on labour markets, workers and the future of work and to ensure that the benefits from these new technological advances accrue to most people.

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