INTEGRATING THE SOCIAL AND CIRCULAR ECONOMY AT THE ONSET OF THE INDUSTRY 4.0

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Abstract

Scientific research in the field of economics is a never-ending process as a result of constantly emerging questions, the number of which is constantly increasing with the advent of the Technology 4.0 era. A typical issue is addressing the economic, social and environmental aspects of innovative processes related to the deployment of digitization, robotization and automation. According to human capital theory, some groups of the population do not have the capacity to adapt to these technological changes. In technological processes, there is also an accelerated moral amortization of capital equipment and subsequent decommissioning on the other hand. In accordance with the Sustainable Development Strategy, ecological disposal and subsequent return of processed waste to further production is essential. Individuals unable to adapt to Technologies 4.0 can significantly participate in this process. For the above reasons, the prevention of pathological social events such as long-term unemployment is a possible solution in the application of mutual integration of the social and circular economy. This can meet the challenges of the Sustainable Development Strategy for the economic, social and environmental impact of the Technology 4.0 innovation process.

Key words: social economy, circular economy, Technology of Industry 4.0

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Introduction

An extremely current trend in waste management is the introduction and promotion of the so-called "circular economy". Its goal is the maximum return of secondary raw materials and energy back to the production and consumption cycle and the conversion of waste into "resources". For example, under European Union law, the circular economy is a concept that is an integral part of sustainable development, so it looks at ways to improve the quality of the environment and human life by increasing production efficiency. This procedure significantly

contributes to the protection of the environment and the creation of new jobs, which is also the subject of interest of the social economy.

The social economy builds on the original goals of 19th-century social enterprises: to guarantee the right to employment, make more consumer goods available to workers and apply the principles of solidarity, especially between producers and consumers, to mitigate the negative effects of the market (Newbert; 2018). At present, other functions are attributed to the social economy, including solving the problems of the welfare state or mitigating the consequences of economic crises (currently we can talk about the impacts of the crisis in connection with COVID-19). The social economy has thus gained an important role in local conditions, as it responds immediately to specific problems. It is thus an important social policy at regional and national level. From the point of view of economic theory, the circular and social economy is usually defined as an alternative to the market and the public sector. The interconnectedness of the social and circular economy is, in essence, an innovative way of responding to the needs of the public good and is a prerequisite for stable economic growth. Therefore, their importance is growing worldwide and countries where the mentioned mechanisms of functioning of economies have not yet been adopted by legislation or otherwise, are beginning to create conditions for their functioning within the framework of macroeconomic and microeconomic economic policy. The same is true in the Czech Republic, where social entrepreneurship (as a social economy) and the circular economy have enjoyed unprecedented interest in the last few years.

At the same time, the advent of Industry 4.0 technologies and the accompanying demographic factor of population aging is a challenge to accelerate the interconnected circular and social economy. This will be reflected in difficult access to the labor market for some social groups of the population, as innovations (artificial intelligence, digitization and online technology, robotics, automatik…) will not be able to adapt to these technologies due to their specific disabilities (low qualifications, health and other restrictions). In this context, there are challenges for both the circular and social economy. The circular economy will focus on the ecological transformation of fully physically and morally amortized technological equipment into future "resources" - production factors (Šetek & Petrách, 2016). These are challenges for the social economy in the area of entrepreneurship, in which disadvantaged individuals find employment (Jonášová, 2018). This can clearly contribute to a significant reduction of possible adverse social and environmental impacts, accompanying structural changes in the economy as a result of the introduction of Technology 4.0.

1. Search of professional literary sources on the issue

The circular economy will focus on the ecological transformation of fully physically and morally amortized technological equipment into future "resources" - production factors. These are challenges for the social economy in the area of entrepreneurship, in which disadvantaged individuals will find employment. This can clearly contribute to a significant reduction in the possible adverse social and environmental impacts that accompany structural changes in the economy as a result of the introduction of Technology 4.0 (Duernecker & Vega-Redondo, 2018).

Forecasts confirm that in addition to environmental benefits, the transition to a circular economy means other benefits. This is evidenced by a study by McKinsey & Company from 2015, according to which the circular economy can save up to 1.8 trillion euros a year in addition to reducing emissions in Europe (Duernecker & Vega-Redondo, 2018).

According to a study by the Club of Rome, the transition to a circular economy in the Czech Republic would mean the creation of up to 150,000 new jobs (Duernecker & Vega-Redondo, 2018).

2. Data and metodology

Important determinants for ensuring stable economic growth are ecological and social aspects, which within the implementation of the research plan represent the interconnection of social and ecological policy as an integral integral part of economic policy in the public and regional dimension. This is logical, because the appropriate quality of life of the population of society also develops from the level of economic policy. This is fully in line with the concept of sustainable development, where the choice of technologies involves the participation of models of multicriteria decision-making, ie the depiction of decision-making problems, in which the consequences of decisions are assessed according to multiple criteria.

For the above reasons, the method of processing is based on the possible impacts of the expected demographic development on the economy of the Czech Republic, and therefore on its labor market. The development of interest age groups of the population, including its relevant predictions, can be taken into account as an essential starting point. These facts can be substantiated from Table 1.

Tab. 1: Development of the age structure of the population of the Czech Republic until 2050 (in thousands)

Age group	2018	2020	2025	2030	2035	2040	2045	2050
20-29	1202.8	1131.3	1000.8	1118.8	1216.2	1216.6	1193.0	1116.2
30-39	1541.8	1477.6	1399.5	1212.6	1083.4	1201.5	1298.9	1299.7
40–49	1676.0	1757.2	1682.5	1498.3	1422.2	1237.8	1110.7	1228.8
50-59	1317.9	1337.7	1499.3	1723.2	1652.4	1476.9	1405.1	1226.2
60-69	1383.1	1331.1	1241.1	1242.4	1403.3	1620.5	1558.5	1401.5

Source: Czech Statistical Office 2019 and own processing

It is clear from Table 1 that in the following decades, due to the aging of the population, the Czech economy will face significant changes in the age structure of the population. In terms of the orientation of research on the interconnectedness of the social and circular economy, the interest age groups are 50-59, 60-69. This follows from the reality that it will be more difficult for the 50+ age group to adapt to digital technology tenders. In this context, the digitization threat index can be applied. It is compiled according to current professions according to the threat of digitization on the labor market in the context of the regions of the Czech Republic. At the same time, for fiscal reasons, the employment of persons of senior age would also be beneficial, ie in the age range of 65-69 years.

3. Results

3.1 Theoretical background of the issue in the concepts of economic theory

In the early 18th century, the Dutch philosopher and writer Bernard de Mandeville, in his essay The Fable Against Bees (subtitle "Private Habits - Public Welfare"), argued that the desire for personal gain is a source and prerequisite for economic growth and the well-being of society as a whole (Abraham & Laczo, 2018). In real life, the needs of the individual are endless, as claimed by John Stuart Mill, a classical economist and co-author of Homo economicus. His vision largely involved saturating people with their material needs, which provided fertile ground (under conditions of limited population growth) for their cultivation and shifting the value framework (Newbert, 2018). He predicted high taxation of speculative profits and profits from owned natural resources, which was to prevent the plunder of nature (Jonášová, 2018). From biological theory, the growth of activities is an integral part of all living things, but the question remains as to what this nature should be.

The above statements are fully in the context of the theory of human capital, which represents the productive abilities of man invested in production. Therefore, the "relatively young" theory of human capital (with genesis since the second half of the 20th century) is an integral part of the modern conception of economics (Abraham & Laczo, 2018). Human capital understood in this way represents the knowledge, skills, abilities and characteristics of the individual, which facilitate the creation of personal, social and economic and ecological well-being (Šetek & Petrách, 2016). This is also confirmed by the attitude of public policies (especially economic, social and regional), which, based on the theoretical concepts of the scientific disciplines involved, focus on the human dimension (Džbánková & Sirůček, 2013). This trend has been accelerating in recent years.

According to Luhman's theoretical concept, all the risks of today's society are the result of decision-making (Abraham & Laczo, 2018). The risk identification and management process also strains institutional capacities and capabilities, which can lead to conflicts with other organizational structures. As a result, institutions must address, in addition to external, social risks, the management of "their" internal, institutional risks. At the same time, institutional risk management can improve social risk management, for example by improving the decision-making process, but it can also have potentially negative consequences if institutions manage "their" risks at the expense of social risks (Newbert, 2018). This spiraling feedback between social and institutional risks requires an examination of the factors that shape the balance between social and institutional risk management and risk colonization. As an idealized model, it represents an attempt to break down and analyze the closed links between risks and their regulation (Wawrosz & Valenčik, 2014).

3.2 Possible integration of disadvantaged social groups in the labor market

Unemployment has prevailed in the Czech Republic since the beginning of the transformation to a market economy, ie since the early 1990s. Although in recent periods the unemployment rate in the Czech economy was the lowest in the European Union (in the second half of 2019 at 2.6%), the period, especially in the 90s of last century and during the financial crisis 2008-2010, when began to gradually increase (Novotná & Volek; 2014). It cannot be ruled out that a similar situation may arise as a result of the restrictive measures imposed since the beginning of March 2020 in connection with the COVID-19 pandemic. As a result of these adverse events, disadvantaged people are excluded from the labor market into the social role of the unemployed. Such persons need to be given increased care in order to ensure that they

are sufficiently attractive from the point of view of employment. Such disadvantaged social groups can be observed from several levels. There are differences between large cities and the countryside as well as differences between regions in the possibilities of employment, in the quality of education, access to resources (Volek & Novotná, 2015). Social justice emphasizes the principles of support and solidarity, regardless of ethnicity, orientation or religion. Active inclusion means enabling all people to be full members of society. In practice, it is about equal access for all people to the labor market, access to quality education, access to services that help to actively participate.

A typical approach to solving the above problem is the application of the social economy. As a tool for social inclusion since the 1990s, it has shifted attention in the European Union's programming documents from the fight against poverty and subsequent social exclusion (Gokhale & Raffelhüschen, 1994). This is understood as a situation where an individual or group of individuals does not participate fully in the economic, political and social life of society and / or where their limited income and limited other resources do not allow them to achieve a standard of living acceptable to their society. The state of social exclusion, which occurs by moving these people out of society, threatens the social cohesion of society. The shift from the fight against poverty, ie the unequal distribution of wealth in society, to the fight against exclusion, is a change in the subject of interest. In the concept of social exclusion, attention is focused on the interconnectedness that binds individuals to the whole of society and that connects its individual segments. Nevertheless, there is undoubtedly a strong link between poverty and the risk of social exclusion, although not all the poor need to be socially excluded at the same time. The European Union calls on the individual Member States to have a strategy for social inclusion, which should be based on the common goals set out at the Lisbon Summit in 2000, namely sustainable economic growth, employment and social cohesion. Therefore, individual Member States draw up National Social Inclusion Plans, which specify the strategies chosen to achieve these goals and identify specific institutions responsible for the transfer of goals to regions and localities (Džbánková & Sirůček, 2013). According to the National Report on Strategies for Social Protection and Social Inclusion 2008-2010, social inclusion and labor market participation are closely linked. The subjects of the social economy create favorable conditions for the employment of persons who are socially excluded or at risk of social exclusion, ie those who have long-term difficulties in obtaining and retaining a job. Therefore, the benefit of socially disadvantaged groups is one of the defining features of the social economy, which is manifested in

employment for its subjects. These include forms of social enterprises for work integration, assisted employment of disabled people (with disabilities) and social cooperatives.

3.3 Forecast of possible social and economic impacts of the advent of Industry 4.0

Industry 4.0 (the so-called fourth industrial revolution) should contribute to increasing product quality, better working conditions or increasing productivity and work flexibility. At present, there is no clear consensus among experts on whether or not the advent of Industry 4.0 will cause a massive loss of employment. Brynjolfsson and McAfee (2014) were the first to warn of the emerging trend of Technology 4.0 as part of the presentation of their joint work from 2014, The Second Age of Machines. Here they hold the view (Brynjolfsson & McAfee, 2014) that new technologies can lead to higher unemployment and growing social inequality. Another more radical view is held by Ford in 2017, which in its book Robots Boarding warns of massive layoffs caused by the advent of automation and artificial intelligence (Ford; 2017). According to him, higher education and retraining will no longer solve the problem of unemployment. He is also fundamentally opposed to the idea that the advent of technology will only jeopardize the lowest paid jobs, as according to his analyzes, even highly qualified employees should be worried about their jobs. A completely different opinion is seen in the fact that professionals will always be needed and the risk, however, lies in the dismissal of handling, support and non-professional staff. According to certain theoretical concepts, there is no risk of losing a job (Rüßmann, 2015); on the contrary, it can be predicted that a higher degree of automation will even increase employment. In 2016, the World Economic Forum conducted a survey of 371 largest employers in 15 countries, which shows that the highest job losses are not recorded by manual workers, but by administrative professions (Ford, 2017). Only the second most vulnerable group are those professions in the field of production. On the contrary, an increase in job opportunities is expected in the area of financial operations, business and management. However, workers in these areas will be required to have much more logical and mathematical skills (Wawrosz & Valenčik, 2014).

At the end of 2015, the Office of the Government published a study entitled Impacts of Digitization on the Labor Market in the Czech Republic and the European Union, which assesses the vulnerability of regions at the level of digitization in terms of expected change in the labor market (Pavelka, 2017). The results of the study suggest that the effects of digitization on the Czech Republic do not deviate in any way from the trend for the entire European Union, even though, according to the study, the Czech Republic is slightly above

average at risk of digitization. As expected, the digitally endangered index is significantly lower in Prague and the Central Bohemian Region, while the most endangered region is the Northwest (ie the Karlovy Vary and Ústí nad Labem Regions). Right after Prague and the Central Bohemian Region, the least endangered region within the Czech Republic is the South-East - ie the South Moravian Region and the Vysočina Region. Based on a comparison and analysis of the above theoretical concepts of experts and empirical results on the above issues regarding the possible impacts of Technologies 4.0 on employment, it can be stated that there are potentially vulnerable social groups. Regardless of which professions are most affected by the issue, its solution can still be seen as an applied integral unification of the circular and social economy.

3.4 Coherence of the circular and social economy as a possible solution to the negative impacts of Technologies 4.0

The interconnectedness of the circular and social economy is an important economic and social factor. The basis can be seen in microeconomic belonging while respecting the principles of sustainable development and social responsibility (Duernecker & Vega-Redondo, 2018). The subjects of both mentioned economies are characterized by the fact that the goals of their business are different from commercial companies. In the world, it is possible to meet their various forms, which connect economic activities with social and environmental goals in a given microeconomic entity on the example of a municipality and a region.

Within the microeconomic belonging of the circular and social economy, a response to its ecological and social needs can be ensured in an innovative way (Egorov & Harstad, 2017). In the Czech Republic, the social and circular economy has enjoyed unprecedented interest in the last few years and is taking many forms. A large part is made up of companies that employ people with disabilities. Also with the advent of Industry 4.0 technologies and the aging of the population, an acceleration through difficult access to the labor market can be expected (Jonášová, 2018). The interconnectedness of the circular and social economy in areas of interest, cities and regions can make a significant contribution to reducing this problem. Its priority interest will be to provide employment for people within selected companies, mainly due to their inability to adapt to innovations in digital technologies, robotics and artificial intelligence. It is the technologies applied in the circular economy that are the challenge. For this reason, the interconnectedness of the circular and social economy

can be seen as a multifunctional significance, which in parallel fulfills several effects, namely economic social and ecological. In the implementation of this program, the priority interest is to proceed from the principle of subsidiarity, which means allocating a decision-making position to municipalities and regions.

Conclusion

It is clear from the presented facts that the Czech Republic will face very significant changes in the coming decades, accompanied by demographic aging of the population and innovative tenders of Industry 4.0. These changes will significantly affect the entire Czech economy and will be related to potential economic and social risks, the common features of which are unemployment of at-risk groups of the population with a consequent increase in social spending to cover these ills in society. It is obvious that the specific parameters of the expected changes will continue to develop in the coming years and make longer-term predictions more precise, but the fundamental expected trends should not be affected by these changes.

For the above reasons, one of the possibilities for reducing the outlined risks is the interconnected circular and social economy implemented mainly at the regional level. The strategy of this synthesis (which is expected to fulfill the economic, social and ecological effect) should develop, in particular, on the basis of the expected demographic development of the population and the digitization threat index.

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