

The economic effects of working remotely: causes and implications

Silvia-Elena IACOB

Bucharest University of Economic Studies, Romania
silvia.iacob@economie.ase.ro

Rareş-Mihai NIȚU

Bucharest University of Economic Studies, Romania
niturares18@stud.ase.ro

Radu-Alexandru BUDU

Bucharest University of Economic Studies, Romania
buduradu17@stud.ase.ro

Abstract. *The COVID-19 pandemic has changed the perspective of the way that remote work is viewed and how different activities are made. With social distancing, some individuals had to move their work online and enterprises had to adapt to digitalization. This paper focuses on the causes that stood for the appearance of remote work phenomenon for individuals, employees and employers. Analyzing the situation at European level, we notice that there is a direct relationship between the degree of economic development at national level and the share of revenues from telework in GDP. Using the concept of remote work, we analyzed the correlation between the Information and Communication Technology (ICT) sector and the level of telework in total lucrative activities. The article contributes to the understanding of the telework phenomenon and to the effects that this way of working has on the economy at macroeconomic level, as well as at the level of individuals' incomes.*

Keywords: remote, ICT, development, pandemic, labour market.

JEL Classification: J21, J22, J24, J31, J6, J82, O15, O52.

1. Introduction

Digitization has led to the relocation of a number of jobs from offices to the personal space of employees from their homes. Thus, it can be seen how digitalization has led to the emergence of new jobs (Piroşcă et al., 2021) and has changed the way employees behave and relate to employers. The current pandemic context has changed the way companies and society operate. Even if the trend before the pandemic was towards digitalization and technology, the pandemic only accelerated the process. There has been a growing increase in jobs in the ICT sector in recent times, which is normal as technology begins to play an increasingly important role in industry (Shapiro and Mandelman, 2021). We assume that a greater integration of digitalization in the activities producing goods and services entails lower costs for the company and consequently a rationalization between the implementation of automation by the company and the employment rate of individuals wishing to enter the labour market (Fossen and Sorgner, 2018). This article analyses the causes and effects of telework from the perspective of digitalization.

There are both benefits and repercussions for the development of the ICT sector. First, digitization will lead to streamlining and digitized procedures and services will reduce barriers to market entry for potential competitors, which will lead to easier access for new producers. On the other hand, the labour market will change – employees performing repetitive work are likely to be replaced by machines (Brynjolfsson and McAfee, 2016). Moreover, there are debates about employees remote work home in terms of their efficiency. The workplace provides the necessary benefits for the productivity required by the employer (Kessler, 2017), but working from home can create confusion between employees due to the lack of a fixed work schedule and the process of communication that stands as an important factor regarding the efficiency of the work.

Regarding to this phenomenon at international level, digitization is not equally present in all countries. The level of digitalisation is more developed in the advanced economies, rather than the emergent ones (World Bank, 2016). Thus, there is a positive correlation between the degree of economic development of a country and the level of employment of people.

The paper is built on the following structure: the second section presents the literature on the effects of digitalization on the labour market and how teleworking influences individuals' incomes. The third section projects the relevant analysis about the main topic. The fourth section contains the findings made. Section five concludes the paper.

2. Literature review

This concern for working remotely has been the basis of many subjects. Especially, lately, with the emergence of the pandemic, economic discussions have shifted to the efficiency of enterprises and the yield given by employees who started working from home (Nagurney, 2021). Previous work has shown that at European level there is a direct and positive correlation between the degree of development of a country and the share of people who are specialized in the digital field. At the same time, it has been shown that a higher

degree of digitization implies a reduction in unskilled employees. It was proved that individuals who worked in a company and were poorly qualified regarding digital skills are more likely to become unemployed over time (Portillo et al., 2020).

A current concern is the professional training of future employees. As companies and economies, themselves engage in an ever-increasing process of automation, with the express aim of increasing the productivity and efficiency with which resources are used, the acquisition of skills ends up being left to the background. Education policies must encourage the gain of digital skills, both at national and international level, in order to promote the insertion of people into the labour market and the individuals to benefit from new jobs that have emerged as a result of technology (Bick et al., 2020).

Digitalization and the process of increasing the efficiency of large companies, which is an increasingly important topic when discussing economic development, also have negative effects: the lack of specialization and digital skills of employees leads to increasing the unemployment rate. Research shows that people who have been laid off following the replacement with technical capital and have become inactive, consider finding a new job a far too big challenge for them, as they decide to remain in technological unemployment (Coibion et al., 2020). By far, the largest share of people who suffer from the rules of social distancing and who impose a remote work regime (remote work) are predominating individuals who are at the bottom of the income distribution list (Mongrey and Weinberg, 2020).

This paper analyses at a general overview of the least five years of the UE countries regarding the economic condition at national level on the labour market. The study is meant to project an economic difference in countries situations before and after the pandemic. This approach is a starting point for research on policy implementation, both economically and socially, and allows for a critical and objective observation of macroeconomic trends in society.

3. Data analysis

For the analyses made we used a set of six indicators, one regarding the economic level of development (GDP – Gross Domestic Product) and five others that are used to describe the actual situation of the people that activates on labour market (Individuals' level of digital skills, Unemployment by sex, Percentage of ICT personnel, Broadband and connectivity and Employed persons working-home).

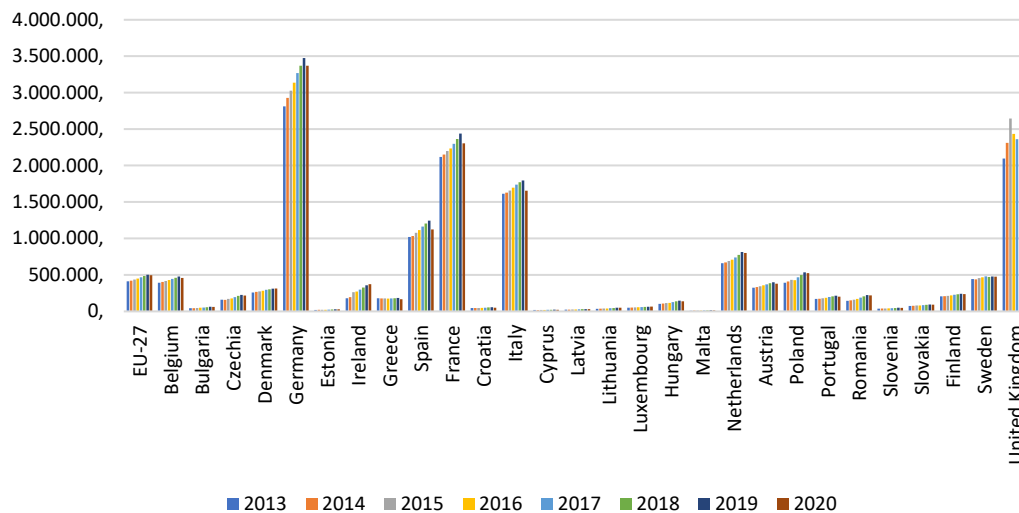
We choose “Individuals' level of digital skills” and “Percentage of ICT personnel” as relative indicators because it shows the level of adaptation of employees from the labour market. The first one measures the degree of specialization of the employees and represents the percentage of individuals that have basic or above basic skills in the digital field. Second one measures the percentage of employees that are hired in the ICT field and it's used to describe the level of specialization of individuals. More, these key indicators give a perspective about the level of development from every country. The Unemployment is used to project a perspective about the number of jobs that were lost due to the adoption of digital

procedures and to analyse the integration of unemployed people on labour market. It is calculated as the rate between the active population and the number of people that can be hired or are already active on the labour market. This indicator is calculated as the rate between employees that are working from their private space and total employees. The “Employed persons working-home” indicator is used in this paper to describe the changes that occurred in the labour market as a result of the transformation of the enterprises production activities. All the data for these indicators were considered starting from 2013 until 2020. Only the Individual's level of digital skills indicator was interpreted for a period of 4 years (from 2015 to 2020), these being the only data available on Eurostat database.

During the analyzed period, a decline in Gross Domestic Product can be observed in all EU Member States., since the end of 2019, which coincides with the appearance of Corona Virus. This global pandemic has emerged as a result of policies adopted at international and national level, which are aimed to protect the population. The security measures taken at that time stopped the activity of many companies, this being the main reason why the accumulation of capital at national level underwent a widespread involution from a European point of view (Auld and Renckens, 2021).

Economic activity has been hampered by the authorities, indirectly, by imposing protection rules. The most affected economic agents were those who could not adopt the process of moving the activity in the online environment, either due to the impossibility given the nature of activity, or due to lack of resources of skill (Dunz et al., 2021).

Figure 1. GDP (million Euro)



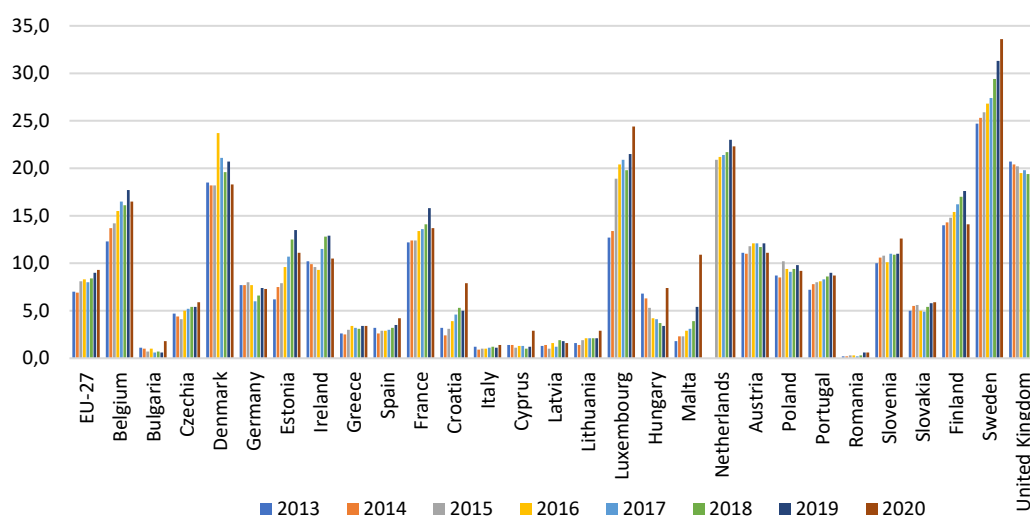
Source: Authors own processing of data from Eurostat database.

In the figure above we can see how the regression of GDP is generally valid. Regardless of the new value added in manufacture process or the economic degree of development of the country, advanced or emerging economy, the trend is identical, which means that the effect is not due to the economic and social structure of countries, but to the protection measures adopted (Dunz et al., 2021).

Even before the pandemic there was a tendency in the labour market to move the activity from working centers, from employers premises to the private space of employees. This process was particularly encouraged by changes in economic activity. Digitalization and relocation of activities in the online environment have led to an increase in the rate of employees that are working from home.

The second graph shows that the number of individuals working remotely expressed as a percentage regarding the total number of employees, has increased consistently from 2013 to 2017. The last three years recorded in the Eurostat database captures an increase in the rate: at the end of 2018 there were 8.4% employees working from home, and at the end of 2020 this average reached the value of 9.3%, which implies an increase of almost one pp.

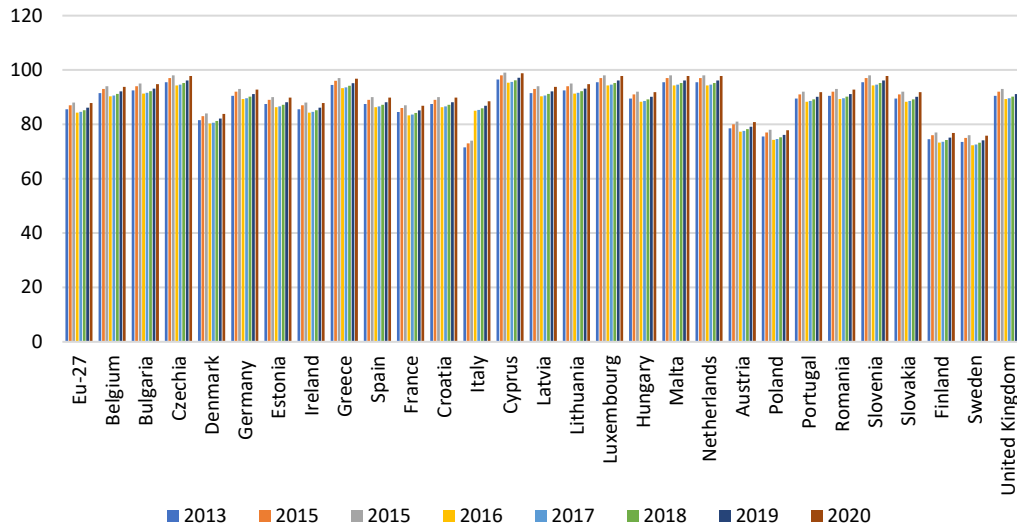
Figure 2. *Employed persons working from home (% of total employment)*



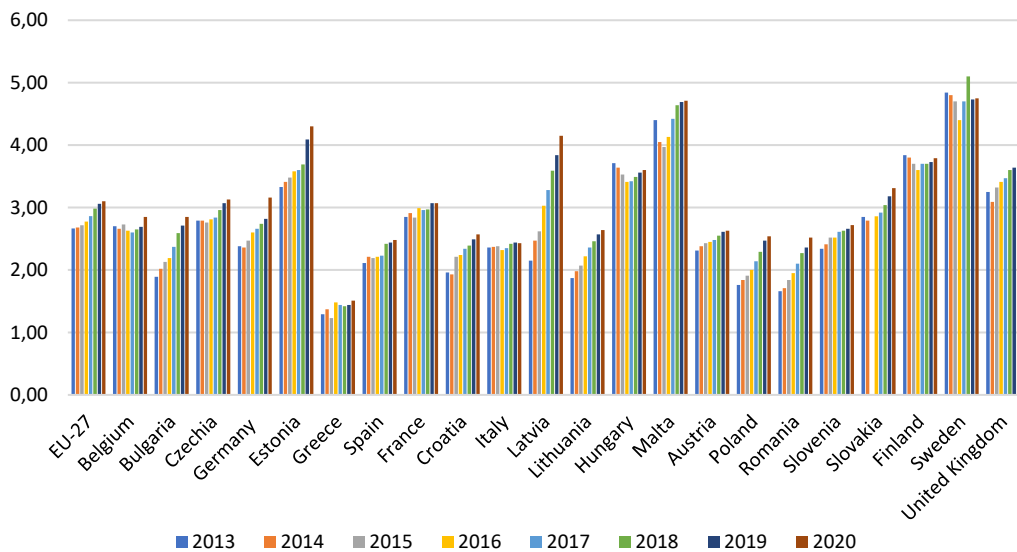
Source: Authors own processing of data from Eurostat database.

The development of the telework segment is also illustrated by the number of individuals connected to the online environment. Broadband and connectivity measure the ability of households to carry out various activities on the Internet. Even if this indicator is not directly correlated with the degree of teleworking of the services offered on the labour market, it represents a qualitative indicator through which the quality of the services that individuals can offer is projected.

Thus, it can be seen that the need for a quality internet network has become an extremely necessary and important element in society, regardless of the degree of development of a country (OECD, 2021). Both developed and developing economies are investing capital to improve the internet traffic network. Households also, especially in the period immediately following the outbreak of the pandemic, have invested more in broadbands and connectivity gadgets, both in personal and professional interest.

Figure 3. Broadband and connectivity (% of households)

Source: Authors own processing of data from Eurostat database.

Figure 4. ITC personnel (% of total employment)

Source: Authors own processing of data from Eurostat database.

Figure number 4 represents the number of people working in the ICT field, expressed as percentage of employees from labour market. It can be seen that since 2013 there has been an increasing rate of this category. The causes are represented by the importance that this sector has in the process of development and efficiency of economic activities. Starting with the end of 2018 – the beginning of 2019, there is a much higher growth rate of this segment on the labour market, compared to previous years.

Although the aim is to increase investment in this sector, as it increases the productivity of companies, the countries with the highest share of individuals working in the ICT sector are those that have invested more in the reconversion and re-specialization of individuals, so that the workforce could adapt more easily. In consequence, the number of individuals who went into inactivity was reduced accordingly (Watanabe et al., 2018).

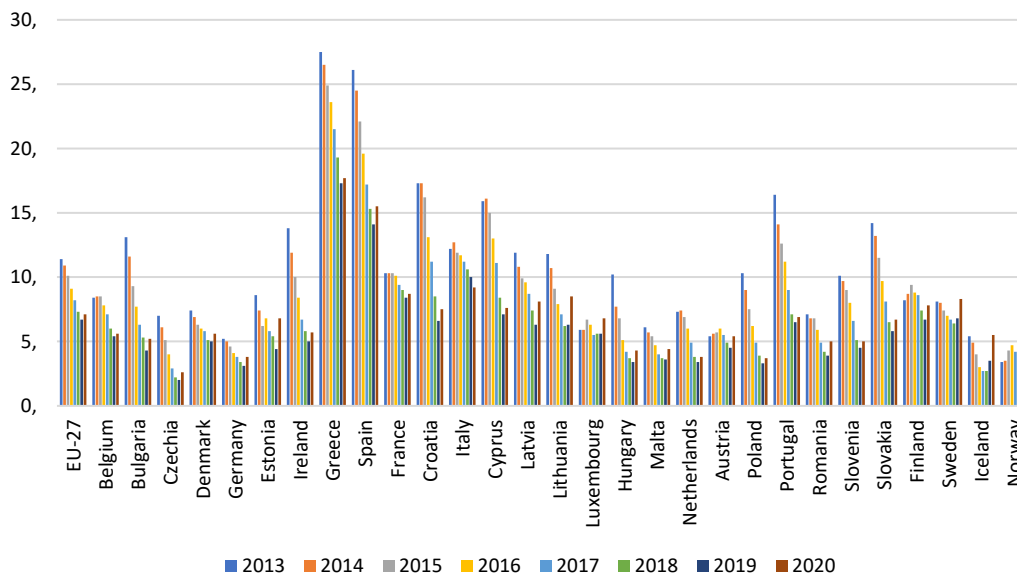
Figure 5. Individuals' level of digital skills with basic or above basic overall digital skills (as % of all individuals)



Source: Authors own processing of data from Eurostat database.

As can be seen in Figure 5, the share of people with basic or even intermediate digital skills in some cases is quite different across European level. The Nordic countries have the most employees with basic or above basic skills. There is a directly relationship between the dimensions of this indicator and the GDP of the respective countries (Grigoli et al., 2020), which can be analyzed by correlating this map with the first figure. This is because the degree of development of an economy is related to the level of technological development and digitization of services, both in communication and production field, both in the private and public sector. As a result, the identification of these economies can be achieved by observing the share of individuals with digital skills, which comes as a natural consequence given that the workforce must adapt to the new conditions.

Regarding telework, the high level of technology comes as a precondition for the possibility of conducting remote operations. For services that can be performed remotely, certain inputs are needed and also specific resources. Studies have shown that the importance of the factors already specified is seen in the ability of these new opportunities to lead to a macroeconomic restructuring aimed to a sustainable circular economy. The most important resource regarding the process described is the workforce, from the point of view of adaptation and using the new methods (Bai et al., 2021).

Figure 6. Unemployment (as % of total work force)

Source: Authors own processing of data from Eurostat database.

Although the unemployment rate has fallen over almost a decade, due to the national development of each country, the integration of individuals into the labour market and labour mobility, companies have had to make part of the staff available to cover the costs incurred and to remain on the market. Starting with 2019, there was an increase in the rate of technical unemployment. This phenomenon can last for a long time if no integration measures are taken. Much of the increase in this rate is caused by a lack of specialization in the workforce. The states that have started the recovery process are those in which companies and companies invest in staff retraining (Reich and Coglianesse, 2021). The largest share of the unemployed is in rural areas, which are considered disadvantaged due to lack of resources and mobility compared to those in urban areas. This category of people is prone to remain unemployed for a longer period of time because reemployment (taking into account the costs of information on new jobs and specialization costs) is in some cases too expensive (Antipova, 2021).

4. Conclusion

The analyzed data shows a dependence of the economic development of the countries and the degree of digitization. We noticed that the countries with the highest rate of capital accumulation are those that carried out digitization and technological processes before the pandemic. The sectors of activity that have adapted the fastest are those that were developed from this point of view even before the pandemic.

There is a vital factor that links the level of digitization and increasing the efficiency of production processes: the human factor. The labour market must be prepared to adapt to

the new requirements of the market, otherwise even more individuals will face technical unemployment. From an economic point of view, digitization implies a greater efficiency of the inputs. As for individuals, they need to adapt and the event to retrain in order to meet market conditions in the future.

People who want to stay in the labour market for as long as possible need to develop digital skills in order to be able to work in the new environment. People whose work does not involve critical thinking and often perform repetitive activities are prone to be replaced by automated processes, which are often more efficient and accessible than the regular workforce.

The authorities and companies need to focus on labour force integration activities, focusing the most on people in rural areas who do not have the same accessibility to work as individuals in urban areas. These people are a category of individuals who can bring added value to the economy, but because of their conditions do not operate in the market.

In the future, more and more jobs will become remote. The natural trend of things tends towards digitalization, which means that the labour market must adapt. Connectivity will play an even more important role in the future because telework will force individuals to transform their private space into a personal work center, using appropriate tools to be able to complete the tasks they have to perform.

References

- Antipova, A., 2021. Analysis of the COVID-19 impacts on employment and unemployment across the multi-dimensional social disadvantaged areas, *Social Sciences & Humanities Open, Journal Pre-proof*, No. 100224, November, <<https://doi.org/10.1016/j.ssaho.2021.100224>>
- Auld, G. and Renckens, S., 2021. Private sustainability governance, the Global South and COVID-19: Are changes to audit policies in light of the pandemic exacerbating existing inequalities?, *World Development*, Vol. 139, Issue 105314, March, <<https://doi.org/10.1016/j.worlddev.2020.105314>>
- Bai, C., Quayson, M. and Sarkis, J., 2022. The role of micro- and small-scale enterprises in enhancing sustainable community livelihood: Tigray, Ethiopia, *Environ Dev Sustain*, Vol. 27, May, pp. 1989-2011, <<https://doi.org/10.1007/s10668-022-02359-7>>
- Bai, C., Quayson, M. and Sarkis, J., 2021. COVID-19 Pandemic Digitization Lessons for Sustainable, *Sustainable Production and Consumption*, Issue 34722843, pp. 1989-2011, 10.1016/j.spc.2021.04.035.
- Bick, A., Mertens, K. and Blandin, A., 2020. Work from Home after the COVID-19, *Outbreak, ResearchGate*, July 2020, <<https://doi.org/10.24149/wp2017r1>>
- Brynjolfsson, E. and McAfee, A., 2016. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*, Reprint edition; W.W. Norton & Company: New York, NY, USA; London, UK.
- Coibion, O., Gorodnichenko, Y. and Weber, M., 2020. Labor Markets during the COVID-19 Crisis: A Preliminary View, National Bureau of Economic Research, April, Issue 27017, 10.3386/w27017.

- Dunz, N., Essenfelder, A., H., Mazzocchetti, A., Monasterolo, I. and Raberto, M., 2021. Compounding COVID-19 and climate risks: The interplay of banks' lending and government's policy in the shock recovery, *Journal of Banking & Finance*, September, Issue 106306, <<https://doi.org/10.1016/j.jbankfin.2021.106306>>
- Fernandez-Portillo, A., Almodovar, M. and Hernandez, R., 2020. European union countries, *Technology in Society*, Vol. 63, Issue 101420, November, <<https://doi.org/10.1016/j.techsoc.2020.101420>>
- Fossen, F.M. and Sorgner, A., 2018. The Effects of Digitalization on Employment and Entrepreneurship, Available at: <https://conference.iza.org/conference_files/MacroEcon_2018/sorgner_a21493.pdf> [Accessed on 25 March 2022].
- Grigoli, F., Koczan, Z. and Topalova, P., 2020. Automation and labor force participation in advanced economies: Macro and micro evidence, *European Economic Review*, Vol. 126, Issue 103443, July, <<https://doi.org/10.1016/j.eurocorev.2020.103443>>
- Kessler, S., 2017. IBM, remote-work pioneer, is calling thousands of employees back to the office, *Quartz*, March 21, Available at: <<https://qz.com/924167/ibm-remote-work-pioneer-is-calling-thousands-of-employees-back-to-the-office/>> [accessed on 16 October 2021].
- Mongrey, S. and Weinberg, A., 2020. Characteristics of Workers in Low Work-From-Home and High Personal-Proximity Occupations, *Becker Friedman Institute*, April, Available at: <<https://bfi.uchicago.edu/working-paper/characteristics-of-workers-in-low-work-from-home-and-high-personal-proximity-occupations/>> [Accessed on 17 April 2022].
- Nagurney, A., 2021. Optimization of supply chain networks with inclusion of labor: Applications to COVID-19 pandemic disruptions, *Int. J. Production Economics*, Vol. 235, February, <<https://doi.org/10.1016/j.ijpe.2021.108080>>
- OECD Broadband Statistics Update – OECD. Available at: <<https://www.oecd.org/sti/broadband/broadband-statisticsupdate.htm>> [accessed on 28 October 2021].
- Piroșcă, G.I., Serban-Opreșcu, G.L., Badea, L., Stanef-Puica, M.R. and Valdebenito, C.R., 2021. A Perspective within the Framework of Pandemic Crises, *J. Theor. Apps. Electron. Commer. Res.*, 16(7), pp. 2843-2857, <<https://doi.org/10.3390/jtaer16070156>>
- Portillo, A.F., Gonzalez, M.A. and Mogollon, R.H., 2020. Impact of ICT development on economic growth. A study of OECD European Union countries, *Technology in Society*, Vol. 63, Issue C, 10.1016/j.techsoc.2020.101420.
- Reich, G.C. and Coglianese, J., 2021. Projecting unemployment durations: A factor-flows simulation approach with application to the COVID-19 recession, *Journal of Public Economics*, Vol. 197, Issue 104398, May, <<https://doi.org/10.1016/j.jpubeco.2021.104398>>
- Shapiro, A.F. and Mandeman, F.S., 2021. Digital adoption, automation, and labor markets in developing countries, *Journal of Development Economics*, Vol. 151, Issue 201656, June, <<https://doi.org/10.1016/j.jdeveco.2021.102656>>
- Watanabe, C., Naveed, K., Tou, Y. and Neittaanmaki, P., 2018. Measuring GDP in the digital economy: Increasing dependence on uncaptured GDP, *Technological Forecasting and Social Change*, Vol. 137, December, pp. 226-240, <<https://doi.org/10.1016/j.techfore.2018.07.053>>
- World Bank, 2016. World Development Report 2016: Digital Dividends. World Bank Group, Washington D.C., Available at: <<https://www.worldbank.org/en/publication/wdr2016>> [Accessed 20 March 2022].