

Role of Information Communication Technologies Regarding Employment Aspect in Mining Industry

Ján PETROVSKÝ^{1}, Lucia KLEINOVÁ², Rastislav PETROVSKÝ³, Ivana KRAJŇÁKOVÁ⁴
and Karolína BORTÁKOVÁ⁵*

Authors' affiliations and addresses:

¹ Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies
Letná 9, 042 00 Košice, Slovak Republic
e-mail: jan.petrovsky@tuke.sk

² Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies
Letná 9, 042 00 Košice, Slovak Republic
e-mail: lucia.kleinova@tuke.sk

³ Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies
Letná 9, 042 00 Košice, Slovak Republic
e-mail: rastislav.petrovsky@tuke.sk

⁴ Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies
Letná 9, 042 00 Košice, Slovak Republic
e-mail: ivana.krajnakova@tuke.sk

⁵ Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies
Letná 9, 042 00 Košice, Slovak Republic
e-mail: karolina.bortakova@tuke.sk

***Correspondence:**

Ján Petrovský, Technical University of Košice
Faculty of Mining, Ecology, Process Control and
Geotechnologies, Letná 9, 042 00 Košice, Slovak
Republic
e-mail: jan.petrovsky@tuke.sk

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Abstract

The information and communications technologies represent a significant field in each sector of the economy. Currently, they are very rapidly growing means that bring new aspects in the particular industrial sectors. Employment is a very important perspective here. As the mining industry belongs to the primary sector of the economy, it represents an essential part in a form of the first input branches. Nowadays, the information and communications technologies bring to the forefront novel methods and approaches that have been gradually becoming significant. The explored area covers all the 27 European Union member countries dated to the year 2020. The data set comprises the time period from the year 2008 to the year 2020. Employment in the mining industry from a view of the information and communications technologies is understood in the two ways – as a manufacturing side and as a side of the services offered here. Moreover, the altogether perspective is illustrated too. The nature of the data is investigated through the Jarque-Bera test, while the main analytical technique is the correspondence analysis. The scrutinised member countries of the European Union demonstrate the various development in the employment from a view of the information and communication technologies in the mining industry as a part of the primary sector of the economy.

Keywords

information and communications technologies, employment, mining industry, manufacturing, services



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Introduction and Literature Review

A field of information communication technology is a very demanding and rapidly growing sector in the economy of each country. It represents a considerably strong area that many the active policies and programmes are touching currently. The situation in the primary sector of the economy, aiming at the obtaining of the natural resources is not different. The mining industry possesses the very similar characteristics as the industrial sectors of the secondary level.

The mining enterprises have a large impact on the social welfare in some territories. Besides this, the environmental management plays an important role here. The very currently applied corporate social responsibility also reflects in its rules a behaviour of the information and communications technologies that are ready to incorporate several techniques in order to enhance the environmental responsibility (Gavurova et al., 2022a; Yousefian et al., 2023). It is difficult to distinguish what kind of adaptability is a crucial one in this field. There is a little assignment that more adaptable environment is, more enhanced managerial process could be carried out (Štefko et al., 2023).

Another view at the mining industry processes demonstrate a perspective of the primary and secondary supply. It is important to have enough labour force to cover all the demands in the manufacturing process (Zhang et al., 2023a; Zhang et al., 2023b). There is a need to model and to estimate the inputs in order to know at least an approximate value of the observed dimensions (Gavurova et al., 2018). A certain territory could perceive the managerial processes with all the inputs differently and it is valid in the mining sector too. Whether it is a primary sector or a secondary sector, it is not a key issue (Lipták et al., 2015). The following research after obtaining the initial outcomes can be directed to the similarities of the managerial processes and not only of them, but also to the likeness of the essential attributes of the mining industry as a part of the whole economy of each country (Kočanová et al., 2023).

After knowing the first outcomes, the green economy principles are very next step as currently, there is a very large pressure to keep the manufacturing and as well as the services green and covered by the new responsible business rules (Juhásová, 2020; Androniceanu et al., 2021; Stjepanovic et al., 2022). The regional unemployment imbalances in different countries, focusing on long-term unemployment, should be taken into account also (Privara et al., 2018; Přívara et al., 2019). The labour market and workforce as its main driving plays a key role in these processes too (Privara, 2022). The research conducted by Vorobeva & Dana (2021) highlights how migrant entrepreneurs employed various tactics to cope with the market shock, such as diversifying their businesses, implementing innovative technologies, and adapting their products and services (Kabir, 2021; Sahoo & Pradhan, 2021; Vorobeva & Dana, 2021).

Since March 2020 world has been fighting the COVID-19 pandemic, leading to a supply shock, job layoffs, reduced work time and wages, and decreased disposable incomes and taxes (Privara, 2022; Přívara, 2019a, 2019b). The study published by Přívara et al. (2020) highlight the importance of high-skilled immigration in fostering economic growth, innovation, and addressing skill shortages in the European Union industries. Moreover, there is a need to forget the potential threats in a way of the changing environment of the macroeconomic indicators that are able to modify in a very difficult way the business area (Gavurova et al., 2021; Wang et al., 2022). Knowledge altogether with the knowledge management opens the door into the realisation of the novel methods in the primary sector of the economy as it is the basement for all the industrial processes subsequently (Figueiredo and Piana, 2018; Grondys et al. 2021). Information and communication technologies also represent a significant challenge for the field of education and the creation of skills of experts in the sector of critical infrastructure, where securing the raw material base of the state belongs (Kelemen and Jevčák, 2018a). It brings new requirements for improving the quality of the decision-making processes of managers and decision-makers, into which more and more predictable but also unpredictable factors and uncertainty enter. Reactions to these praxeological requirements create a path for innovative solutions also with the support of fuzzy theory, as we perceive it in various application areas of the economy within the countries of the European Union, for example in relation to renewable energy sources (Štefko et al., 2021), or in socio-economic planning and risk assessment (Gavurova et al., 2022b). New methods make it possible to examine the interdependence between financial development, fiscal instruments and environmental deterioration in developed and converging EU countries, which, like Slovakia, are undergoing, for example, the transformation and decline of mining with a strong impact on the environment and public health (Zioło et al., 2020), or assessing the contribution of data mining methods to reduce the negative environmental impacts (Vorobyeva et al., 2020).

Additionally, the mining industry is being touched also by the Industry 4.0 nowadays. This significant evolution brings many new movements and alteration in the labour market itself. The human workforce is in a question related to its substitution for the automatised processes (Novakova, 2020). The next point influenced by the information communication technology in the real economy is supply management. Information and communication technologies bring the phenomenon of threats. Strengthening the vulnerability of systems to support decision-making processes, business management, means sharing experience in the field of security and the security agenda across individual sectors, as well as knowledge from interdisciplinary research on security

issues (Kelemen et al., 2018b; Androniceanu et al., 2022). This can be perceived as a very significant distortion of the market situation (Evangelista and Hallikas, 2022).

The main objective of the paper is to reveal the potential attributes of the employment processes in the manufacturing sector and the services sector of the mining industry. The first section describes the current state of the art after the brief entrance into the discussed topic. The second section shows the data description and the methodology applied in the analytical section that demonstrates the main outcome of the study in an illustrative way through the diagrams and in a numerical way through the testing procedures. The final section offers a summarisation of the obtained findings with the discussion points for the further research.

Data and Methodology

The source of the data and the methodology is adapted to the explored field as it is a specific sector of each country's economy.

The data set is in a form of a panel data that is transformed to a standard table in order to carry out the analytical processing. It comes from the Eurostat database provided by the main statistical office of the European Union as an official source of the data for the territory of the European Union member countries.

The whole data set is divided into the three sectors. The first one is devoted to the manufacturing area in the information and communications technologies. The second one covers the services area of the information and communications technologies sector with all the belonging areas of the services provision. Thirdly and finally, there are the numbers devoted to the whole information and communications technologies sector as it comprises many other fields and hence, this perspective offers a comprehensive view at the sector altogether.

The main analytical technique is the correspondence analysis. It is focused on the visualisation approach in a form of the balloon plot demonstrating the distribution of the explored entities in the given area. Successively, the testing phase is following. It is concentrated on an investigation of the origin of the numerical part of the examined data set. The Jarque-Bera test expresses an outcome in the previously mentioned point.

The observed period covers the years beginning in the year 2008 and ending in the year 2020. All the member countries of the European Union are involved in the data set – Austria, Belgium, Bulgaria, Switzerland, Cyprus, Czechia, Germany, Denmark, Estonia, Greece, Spain, Finland, France, Croatia, Hungary, Ireland, Iceland, Italy, Lithuania, Luxembourg, Latvia, the Netherlands, Norway, Poland, Portugal, Romania, Sweden, Slovenia, Slovakia, and the United Kingdom of Great Britain and Northern Ireland – sorted in the alphabetical order according to their abbreviation based on the official abbreviation source of the International Organization for Standardization. Moreover, North Macedonia and Montenegro are added as the candidate countries for the European Union as the original data source offers the data also for their territories. Additionally, the European Union as the whole is comprised too as it is marked EU 27 as the twenty-seven-member union dated to the present period.

Results

The whole analytical section is divided into the three thematical subsections. Firstly, the outcomes of the correspondence analysis in a form of the visualising balloon plot is demonstrated. Secondly, the testing phase is shown and finally, the comparative subsection reveals the potential relation in the discussion.

The first explored sector of the information and communication technologies is the manufacturing sector.

The next balloon plot on Figure 1 offers an overview of the shares of the individual countries and all the observed years for the manufacturing sector.

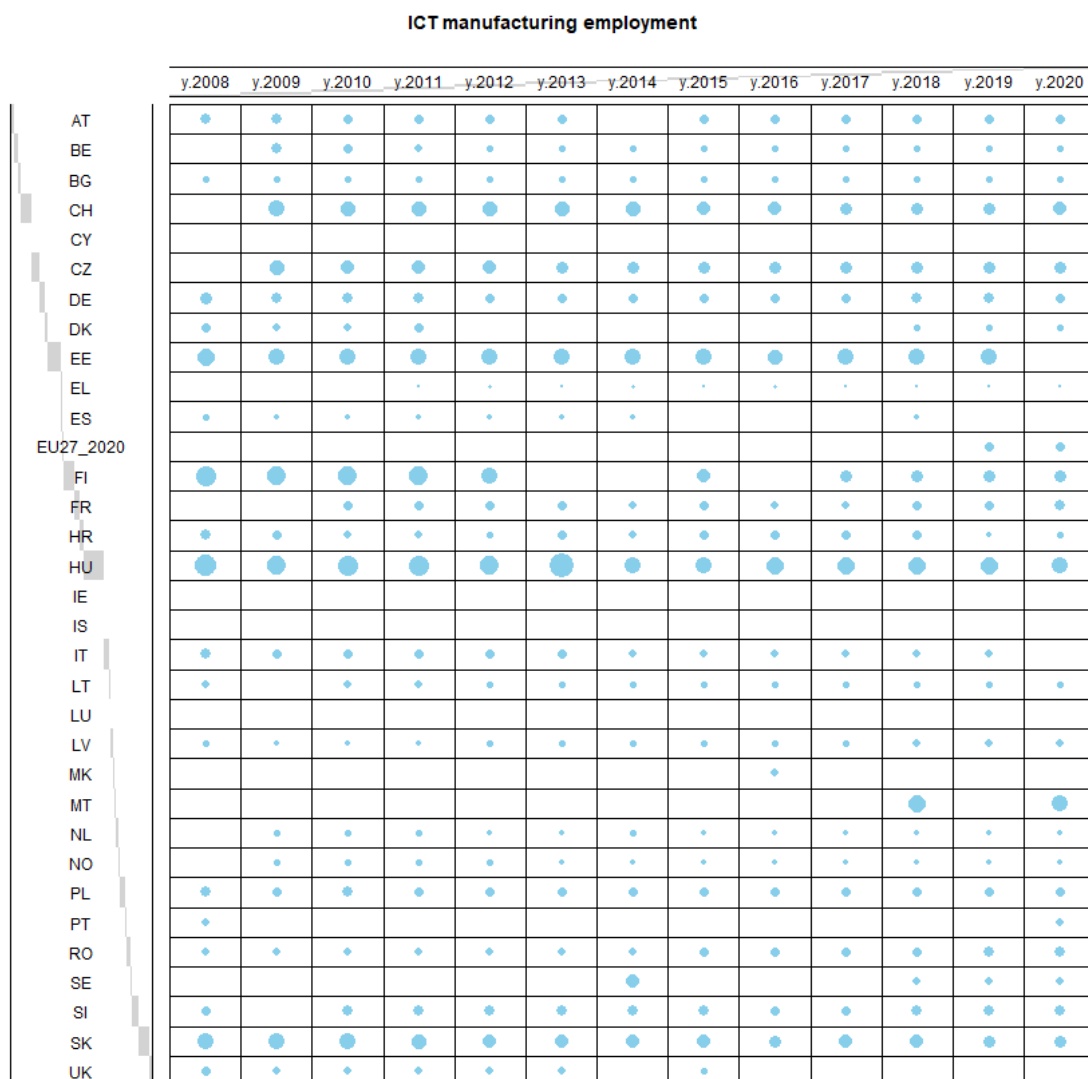


Figure 1: The information and communication technologies – employment in the manufacturing sector

Source: own elaboration.

As it is demonstrated on the above-placed figure, it is obvious that a development of the employment in the manufacturing are of the information and communication technologies sector is growing throughout the observed period. Only the sole country represents an opposite development – a decrease is seen in a case of the United Kingdom of Great Britain and Northern Ireland. All the other countries keep an increasing trend or at least the stabilised situation.

The second examined sector of the information and communication technologies is the services sector.

The subsequent balloon plot on Figure 2 offers a view at the shares of the individual countries and all the observed years in the sector related to the services provision.

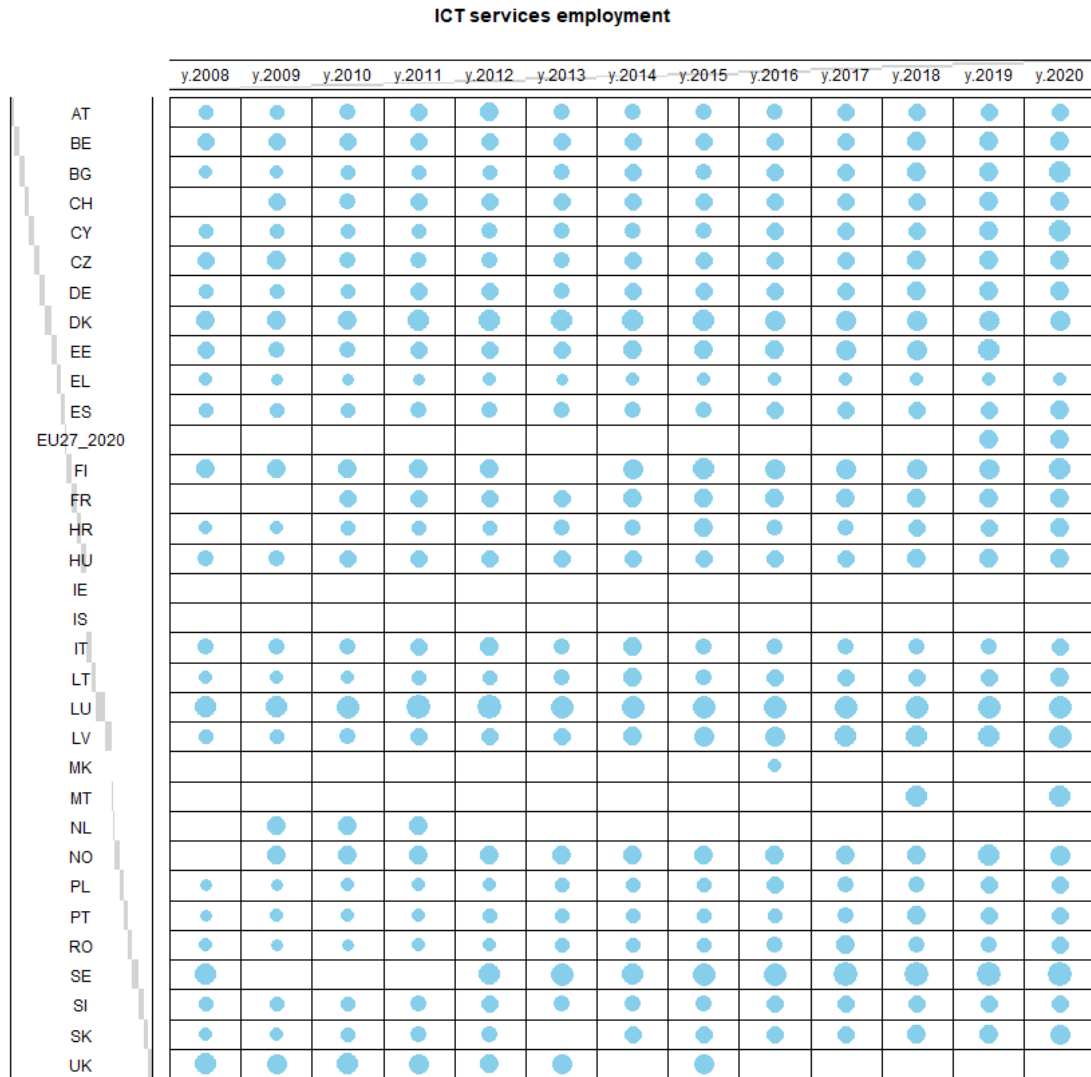


Figure 2: The information and communication technologies – employment in the services sector

Source: own elaboration.

According to the above-mentioned balloon plot, it is evident that the services sector has very similar development as the manufacturing sector. Only Ireland and Iceland have no available data. It is a point to discuss whether there are some attributes, which could be assigned only to these countries, causing their similarity. The further scrutinisation would be beneficial.

The third part of the analytical section is an exploration of the whole sector, that is, the information and communication technologies sector altogether.

The successive balloon plot on Figure 3 demonstrate a situation in the whole sector of the information and communication technologies according to the individual countries and the explored years.

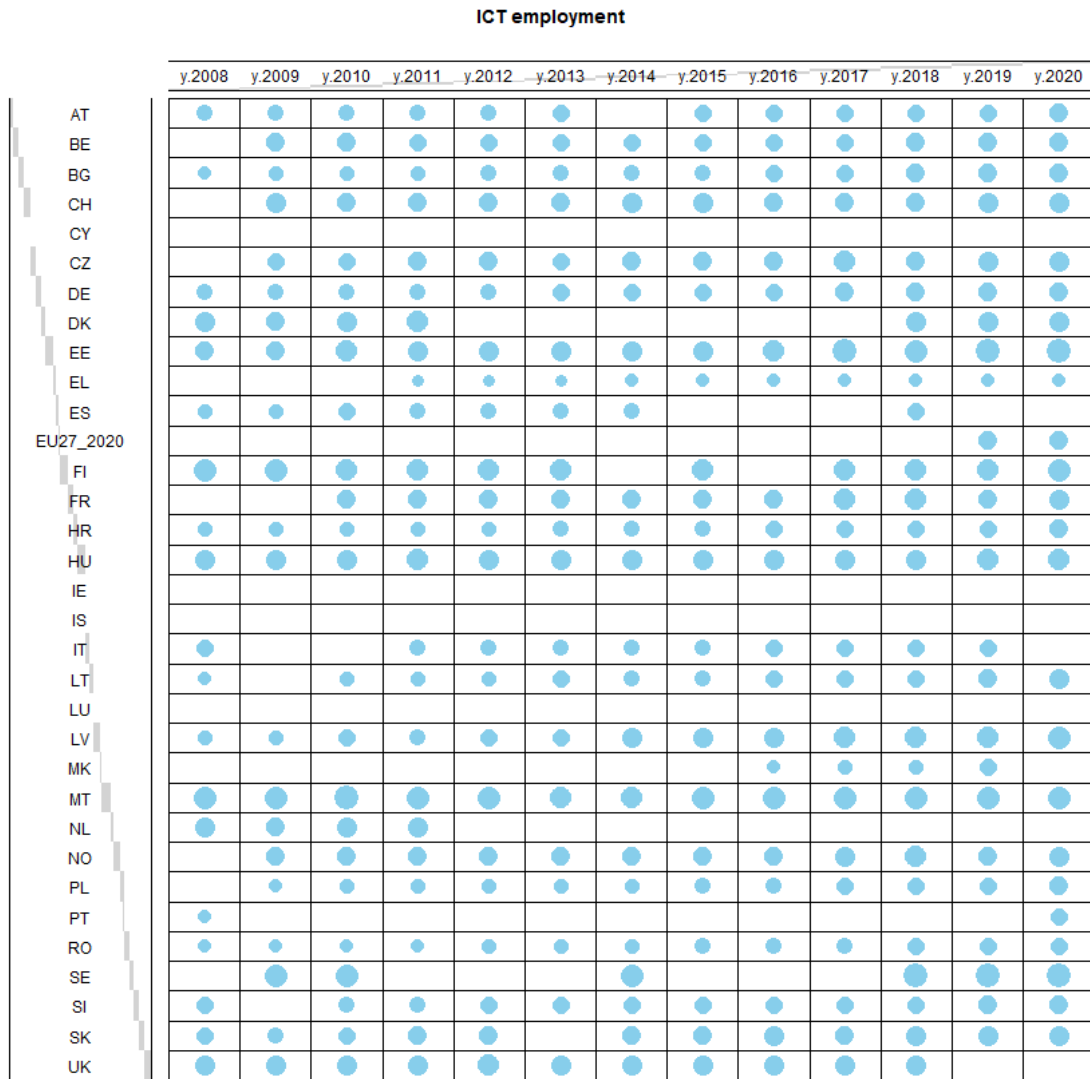


Figure 3: The information and communication technologies – altogether employment

Source: own elaboration.

The third balloon plot visualised on Figure 3 demonstrates a considerably different situation as in the separate sectors of the information and communications technologies. There are several changes of the trend development. Firstly, there are the countries that were shifted throughout the explored period – namely, Estonia, Denmark, and Sweden for instance. Secondly, a decreasing trend is found for a triplet of the explored entities – Hungary, Greece, and partially Poland.

Subsequently, the Jarque-Bera test is processed in order to find out whether the data comes from the normal distribution.

Table 1: Data testing

sector	year	test statistic value	p-value
manufacturing	2008	31.695	1.311E-07
manufacturing	2009	14.338	0.0007702
manufacturing	2010	20.464	3.599E-05
manufacturing	2011	25.634	2.714E-06
manufacturing	2012	17.869	0.0001318
manufacturing	2013	216.41	0
manufacturing	2014	10.478	0.005305
manufacturing	2015	9.1585	0.01026
manufacturing	2016	17.461	0.0001616
manufacturing	2017	14.622	0.000668
manufacturing	2018	10.383	0.005564
manufacturing	2019	12.855	0.001617
manufacturing	2020	10.45	0.005382
services	2008	0.81343	0.6658
services	2009	0.77155	0.6799
services	2010	0.36175	0.8345
services	2011	0.30912	0.8568
services	2012	0.64732	0.7235
services	2013	0.49571	0.7805
services	2014	1.8925	0.3882
services	2015	1.4588	0.4822
services	2016	1.581	0.4536
services	2017	1.8977	0.3872
services	2018	2.615	0.2705
services	2019	2.5553	0.2787
services	2020	3.7852	0.1507
altogether	2008	2.5291	0.2824
altogether	2009	2.384	0.3036
altogether	2010	1.6873	0.4301
altogether	2011	1.817	0.4031
altogether	2012	1.9947	0.3689
altogether	2013	3.2344	0.1985
altogether	2014	2.5643	0.2774
altogether	2015	3.1165	0.2105
altogether	2016	2.7791	0.2492
altogether	2017	2.4448	0.2945
altogether	2018	2.8442	0.2412
altogether	2019	2.5599	0.278
altogether	2020	2.9959	0.2236

Source: own elaboration.

The outcome of the testing is quite homogeneous. It is seen that the manufacturing sector shows a completely different outcome than the services sector. While the services sector and the altogether information and communications technologies shows that the numbers come from the normal probability distribution, the manufacturing sector's characteristics is opposite, that is, its numbers are not distributed according to the normal probability distribution. Therefore, it would be a subject of the further research how to analyse this field.

Discussion and Conclusion

The techniques of the cluster analysis are able to reveal the inner relations with an emphasis on the time series data (Šubová, 2023). The outcomes of this analysis would serve as an essential foundation for the policymaking processes and subsequently, it creates the initiating points for the benchmarking processes. As the mining industry is a key part of the primary sector, it influences many factors that possess an impact on the macroeconomic indicators as well as the indicators related to the participants of the whole economy in the particular country. These factors can represent a very close issue to the socio-economic dimensions of the society (Solomon et al., 2008). Another perspective is an employment of the artificial intelligence for the role of the information and communications technologies in the explored sector (Bag et al., 2021). The very demanding process is to reveal the further characteristics inside the observed data set. There are many methodologies how to investigate it, but it is up to the data nature to select the appropriate technique. As carried out by the other authors, the most important point is to interpret the results in accordance with the explored field and hence, to offer an outcome for the policymaking and benchmarking process.

There are several restrictive factors that could influence the analytical outcomes. Firstly, the observed time period would be longer in a case of earlier update by the statistical offices of the explored countries and hence, by the covering statistical authority of the European Union. Also, the older data is needed to be made public in order to demonstrate the development in the past and therefore, the policymakers can learn from the occurred lessons throughout the examined period. Regarding the individual data, the more precise division of the data set would make it clearer in the field of employment. Not only the two sections – on the one hand, manufacturing and on the other hand, services – would open the door to the more classifications that would reveal the inner relationships within the observed framework. Another point is represented by the exactness of the public data. Although, Eurostat as the main official statistical office of the European Union offers the quality data, some erroneous entities can appear. It would be appropriate to take into account all the flags marked in the data set, but this extracts several observed points and diminish the degrees of freedom from a statistical point of view. To summarise all the limitations up, there is needed to take into consideration many other issues that could cause the distortion of the analytical outcomes.

The sector of the information and communications technologies represents a very specific sector. There are several aspects of employment considered in the analysis. They introduce a perspective view at the two main areas of this sector – manufacturing and services. Besides these areas, an altogether view is offered in order to demonstrate the situation as a whole. Employment as a perspective of the macroeconomic development is not only about its impact in the particular sector of the economy. It also plays a role in the construction of the national as well as international policies aimed at the development and the enhancement of the support mechanisms focused on employment.

References

- Androniceanu, A., Nica, E., Georgescu, I., and Sabie, O. M. (2021). The influence of the ICT on the control of corruption in public administrations of the EU member states: a comparative analysis based on panel data. *Administratie si Management Public*, 37, 41–59. <https://doi.org/10.24818/amp/2021.37-03>.
- Androniceanu, A., Georgescu, I., & Sabie, O. M. (2022). The impact of digitalization on public administration, economic development, and well-being in the EU countries. *Central European Public Administration Review*, 20(1), 7–29. <https://doi.org/10.17573/cepar.2022.2.01>
- Bag, S., Gupta, S., Kumar, A., and Sivajarah, U. (2021). An integrated artificial intelligence framework for knowledge creation and B2B marketing rational decision making for improving firm performance. *Industrial Marketing Management*, 92, 178–189. <https://doi.org/10.1016/j.indmarman.2020.12.001>.
- Evangelista, P., Hallikas, J. (2022). Exploring the influence of ICT on sustainability in supply management: Evidence and directions for research. *Cleaner Logistics and Supply Chain*, 4, 100051. <https://doi.org/10.1016/j.clscn.2022.100051>.
- Figueiredo, P. N., and Piana, J. (2018). Innovative capability building and learning linkages in knowledge-intensive service SMEs in Brazil's mining industry, *Resources Policy*, 58, 21–33. <https://doi.org/10.1016/j.resourpol.2017.10.012>.
- Gavurová B., Balloni A. J., Tarhaničová M., and Kováč V. (2018). Information and Communication Technology in the Role of Information System of Healthcare Facility in the Slovak Republic. *Economies*, 6 (3), 47. <https://doi.org/10.3390/economies6030047>.
- Gavurova, B., Privara, A., Janikova, J., and Kovac, V. (2021). Quantification of Tourism Sector Parameters Related to Competitiveness of Countries According to Macroeconomic Indicators. *Journal of Competitiveness*, 13(3), 56–72. <https://doi.org/10.7441/joc.2021.03.04>.

- Gavurova, B., Schonfeld, J., Bilan, Y., and Dudas, T. (2022a). Study of the Differences in the Perception of the Use of the Principles of Corporate Social Responsibility in Micro, Small and Medium-Sized Enterprises in the V4 Countries. *Journal of Competitiveness*, 14 (2), 23–40. <https://doi.org/10.7441/joc.2022.02.02>.
- Gavurova, B., Kelemen, M. and Polishchuk, V. (2022b). Expert model of risk assessment for the selected components of smart city concept: From safe time to pandemics as COVID-19, *Socio-Economic Planning Sciences*, Volume 82, Part B, 2022, 101253. <https://doi.org/10.1016/j.seps.2022.101253>
- Grondys, K., Slusarczyk, O., & Androniceanu, A. (2021). Risk Assessment of the SME Sector Operations during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 18(8), Article Number: 4183. <https://doi.org/10.3390/ijerph18084183>
- Juhásová, S. (2020). Analysis and prediction of the development of private banking in the Slovak. IAI Academic Conference Proceedings: International Virtual Academic Conference: Education and Social Sciences, Business and Economics, International Academic Institute, 53–63. Available online: <https://ia-institute.com/iai-academic-conference-proceedings-virtual-conference-15-october-2020/>.
- Kabir, H. (2021). Notion of Belonging in the Nation-State: Gendered Construction of International Migration Aspirations among University Students in Bangladesh. *Migration Letters*, 18(4), 463–476. <https://doi.org/10.33182/ml.v18i4.1158>
- Kelemen, M. and Jevčák, J. (2018a). Security Management Education and Training of Critical Infrastructure Sectors' Experts. In: *New Trends in Aviation Development 2018 : The 13. International Scientific Conference*. - Danvers (USA): Institute of Electrical and Electronics Engineers, 2018 s. 68-71 [online]. - ISBN 978-1-5386-7917-3
- Kelemen, M., Szabo, S. and Vajdova, I. (2018b). Security Management in the Air Transport: Example of an Interdisciplinary Investigation of Special Security Questions, Challenges to national defence in contemporary geopolitical situation, 1, 105-108, <https://doi.org/10.47459/cndcgs.2018.15>
- Kočanová, D., Kováč, V., Serzhanov, V., and Buleca, J. (2023). Differences and Similarities in Patterns of Ageing Society in the European Union. *E+M Economics and Management*, 26(1), 45–64. <https://doi.org/10.15240/tul/001/2023-1-003>.
- Lipták, F., Klasová, S., and Kováč, V. (2015). Special Economic Zone Constitution According to Cluster Analysis. *Procedia Economics and Finance*, 27, 186–193. [https://doi.org/10.1016/S2212-5671\(15\)00988-0](https://doi.org/10.1016/S2212-5671(15)00988-0)
- Novakova, L. (2020). The impact of technology development on the future of the labour market in the Slovak Republic. *Technology in Society*, 62, 101256. <https://doi.org/10.1016/j.techsoc.2020.101256>.
- Privara, A., Rievajová, E., & Dziura, B. (2018). Unemployment Aspects of Regional Development (The Cases of the Czech and Slovak Republics). *Advanced Science Letters*, 24(9), 6320–6322. <https://doi.org/10.1166/asl.2018.13042>
- Privara, A., Rievajová, E., & Murat Yüceşahin, M. (2019). Labour Market Disadvantages Faced by Migrant Workers from Czech Republic, Hungary, and Slovakia in Britain. *Migration Letters*, 16(4), 585–594. <https://doi.org/10.33182/ml.v16i4.720>
- Privara, A. (2019a). Citizenship-for-Sale Schemes in Bulgaria, Cyprus, and Malta. *Migration Letters*, 16(2), 245–254. <https://doi.org/10.33182/ml.v16i2.735>
- Privara, A. (2019b). Explaining emigration patterns in Estonia, Lithuania, Slovenia and Slovakia. *Geografický Časopis - Geographical Journal*, 71(2). <https://doi.org/10.31577/geogrcas.2019.71.2.09>
- Privara, A., Rievajová, E., & Barbulescu, A. (2020). Attracting High Skilled Individuals in the EU: The Finnish Experience. *Migration Letters*, 17(2), 369–377. <https://doi.org/10.33182/ml.v17i2.927>
- Privara, A. (2022). Economic growth and labour market in the European Union: lessons from COVID-19. *Oeconomia Copernicana*, 13(2), 355–377. <https://doi.org/10.24136/oc.2022.011>.
- Sahoo, M., & Pradhan, J. (2021). Adaptation and acculturation: Resettling displaced tribal communities from wildlife sanctuaries in India. *Migration Letters*, 18(3), 237–259. <https://doi.org/10.33182/ml.v18i3.877>
- Solomon, F., Katz, E., and Lovel, R. (2008). Social dimensions of mining: Research, policy and practice challenges for the minerals industry in Australia. *Resources Policy*, 33 (3), 142–149. <https://doi.org/10.1016/j.resourpol.2008.01.005>.
- Stjepanovic, S., Tomic, D., and Skare, M. (2022). A new database on Green GDP; 1970-2019: a framework for assessing the green economy. *Oeconomia Copernicana*, 13(4), 949–975. <https://doi.org/10.24136/oc.2022.027>.
- Štefko, R., Nastišin, L., Nebeský, L., and Fedorko, R. (2023). Consumers' Online Brand-Related Activities on Facebook as a Competitive E-Commerce Channel. *Journal of Competitiveness*, 15(1), 91-112. <https://doi.org/10.7441/joc.2023.01.06>
- Štefko, R.; Gavurova, B., Kelemen, M.; Rigelsky, M. and Ivankova, V. (2021). Relationships between Renewable Energy and the Prevalence of Morbidity in the Countries of the European Union: A Panel Regression Approach. *Int. J. Environ. Res. Public Health*, 18, 6548. <https://doi.org/10.3390/ijerph18126548>
- Šubová, N. (2023). Comparison of EU Countries Based on Social Policy Instruments to Mitigate Financial Vulnerability of Households. *Politická ekonomie*, 71(1), 23-45. <https://doi.org/10.18267/j.polek.1377>.

- Yousefian, M., Bascompta, M., Sanmiquel, L., and Vitró, C. (2023). Corporate social responsibility and economic growth in the mining industry. *The Extractive Industries and Society*, 13, 101226. <https://doi.org/10.1016/j.exis.2023.101226>.
- Vorobyeva, O., Bartok, J., Šišán, P., Nechaj, P., Gera, M.; Kelemen, M., Polishchuk, V. and Gaál, L. (2020). Assessing the Contribution of Data Mining Methods to Avoid Aircraft Run-Off from the Runway to Increase the Safety and Reduce the Negative Environmental Impacts. *Int. J. Environ. Res. Public Health* 2020, 17, 796. <https://doi.org/10.3390/ijerph17030796>
- Ziolo, M., Kluza, K., Kozuba, J., Kelemen, M., Niedzielski, P. and Zinzak, P. (2020). Patterns of Interdependence between Financial Development, Fiscal Instruments, and Environmental Degradation in Developed and Converging EU Countries. *Int. J. Environ. Res. Public Health* 2020, 17, 4425. <https://doi.org/10.3390/ijerph17124425>
- Zhang, Ch., Xu, Z., Gou, X., and Škare, M. (2023a). The Dynamic Impact of Inflation on Supply Chain and Competitiveness: Bibliometric and Econometric Analysis. *Journal of Competitiveness*, 15(1), 146-167. <https://doi.org/10.7441/joc.2023.01.09>.
- Zhang, Z., Song, Y., Cheng, J., and Zhang, Y. (2023b). Effects of heterogeneous ICT on critical metal supply: A differentiated perspective on primary and secondary supply. *Resources Policy*, 83, 103690. <https://doi.org/10.1016/j.resourpol.2023.103690>.
- Wang, X., Xu, Z., Wang, X., and Skare, M. (2022). A review of inflation from 1906 to 2022: a comprehensive analysis of inflation studies from a global perspective. *Oeconomia Copernicana*, 13(3), 595–631. <https://doi.org/10.24136/oc.2022.018>.