

# THE TECHNOLOGICAL REVOLUTION'S IMPACT ON BUSINESS MANAGEMENT

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## Abstract

The rapid advancement of technology in the era of the fourth industrial revolution has significantly transformed organizational management practices. This study examines the influence of technological progress on organizational management, specifically analyzing the effects of data analysis and digital management methods in response to these changes. The main objective is to determine how these technological advancements impact enterprises of various sizes in the Czech Republic. The research employed comparative and analytical approaches, utilizing survey data collected from numerous organizations. Concrete methods used in the study include a comprehensive questionnaire survey, comparative analysis, and statistical correlation analysis to assess the significance of technologies based on the classification of enterprise size. The findings demonstrate substantial disparities in the implementation and advantages of technology contingent upon the magnitude of the organization, with smaller and larger enterprises exhibiting enhanced flexibility and deliberate assimilation of novel technologies. The main conclusion is that proficient administration of technology results in competitive advantages and operational efficiencies. Companies are advised to customize their technology strategies based on their available resources and market requirements. Further analysis explores the connections between investments in technology and other organizational elements such as financial resources and personnel, highlighting the importance of developing coherent plans that successfully incorporate technology into the overall structure of the organization.

**Keywords:** Technology Integration, Industry 4.0, Organizational strategy, Business Competitiveness

## INTRODUCTION

Organizations have undergone tremendous changes in the last few decades, mainly due to the constant advances in technology and digitalization. Organizations want to build a competitive advantage in a highly competitive environment, but it is important to note that some are stumbling because they are not keeping up with the current trends that are necessary for a business to thrive today. The technological revolution has not only caused fundamental changes in the way businesses operate but also in their management strategies and operations.

Data analytics and digital management have become two of the main pillars of this revolution. This is the fourth industrial revolution, which is specific to its rapid development and has the potential for positive changes in the organizational and management framework of the enterprise. Unfortunately, however, there is a lack of a unified perception and approach to the implementation of

Industry 4.0, and organizations face technological, operational, and organizational challenges and are forced to cope with many uncertainties (Suleiman et al., 2022). The technological revolution is also impacting the human resources in a company and their wages, with Lee and Clarke (2019) stating that earlier in the 2nd and 3rd industrial revolutions, people were concerned about mechanization reducing employment levels, but it has been shown that the overall gains from technological advancements are not only benefiting organizations but also the workforce as their wages are increasing, making some occupations less profitable.

Given the ever-evolving nature of the industry and rapid technological innovation (Min, 2022), it is essential that companies use data analytics that consider the effects of integrating different technologies. This approach is essential for the successful implementation of innovative research, development, and management strategies (Kim et al., 2023). However, according to Wambsganss et al. (2023), the introduction of new technologies poses

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significant challenges for enterprises in terms of their technology strategy and new business models (Van Zeebroeck, Kretschmer, and Bughin, 2023), which is because enterprises must deal with the unfamiliarity of previously distinct technologies. However, according to Huamanchumo (2021), technological innovation facilitates strategy formulation. If an organization wants to get ahead of the competition and gain a competitive advantage (Hernandez and Salcedo, 2020), it needs to use technology platforms that require unique management strategies that many technology platform owners do not address (Venter and Grobbelaar, 2023). According to Fosfuri, Giarratana, and Sebrek (2020), organizations that focus on a broad product strategy and provide tailored services to their customers and are as flexible as possible thrive more (Rosa et al., 2022). Artificial intelligence, or whether it has positive or negative effects on businesses, is a much-discussed topic nowadays. Rosales et al. (2020) observe that a wide range of industries are implementing AI technologies, and with proper talent training, AI can create more jobs and opportunities. Artificial intelligence has a significant role to play, especially because of big data, intelligent manufacturing, cyber-physical systems, and real-time scheduling algorithms (Zeba et al., 2021). Organizations are using AI, analyzing big data, and extending digital government because they are more adaptable, efficient, and responsive to customer wants and needs (Newman, Mintrom, and O'Neil, 2022). As technology continues to evolve, educating employees within the enterprise is important to positively influence the implementation of new technology and reduce the risk of implementing it (Jin et al., 2023). Rahmani et al. (2022) assert that e-learning greatly enhances employee education by providing a variety of methods to improve employee knowledge, skills, and attitudes using the latest technology. The popularity of e-learning continues to grow due to its ability to provide learning opportunities, a necessary way to prepare people for data-driven and connected industrial systems (Gowripeddi et al., 2021), anywhere and anytime. Identifying and addressing the factors that can affect its success while taking full advantage of its potential benefits and avoiding potential drawbacks is essential to ensuring the successful implementation of e-learning. According to Ozturkler (2021), due to rapid technological advancement, training activities are very important to maintain competitive advantage and a good position in the market environment. Gajek et al. (2022) also confirm this fact, arguing that employees must receive technology education, particularly in the area of process safety. Based on research, Scepanovic (2019) concludes that the scale and complexity of the technological revolution are unlike anything humanity has experienced so far, and this technological revolution represents the way people

communicate, live, work, and even think. According to Quinn (2019), the technological revolution is also characterized by price reversals. Employee adoption of mobile technology is necessary for competency development, especially for knowledge transfer (Ku-Ciapski, 2019). The mere presence of remarkable technological advancements cannot guarantee social and economic progress, but it is necessary to spend resources on modern communication and information technologies to continuously improve quality and ensure sustainable development (Kalenyuk, Bo-hun, and Djakona, 2023). According to Russo (2020), almost half of the companies surveyed want to invest in technology to remain competitive in the market and be able to exploit new opportunities. It is essential for governments to create a strong institutional structure, especially through initiatives such as education, welfare, and training programs, which are essential to exploiting the new technical opportunities that innovation brings with it (Focacci and Perez, 2022).

Automation technologies, such as sensors, robots, and programmable devices interconnected with the internet, characterize Industry 4.0 (Giustozzi, Saunier, and Zanni-Merk, 2018). Large enterprises implement automation technologies at a higher level than medium and small enterprises, which makes sense given the larger pool of skilled workers (Pap-ulova, Gazova, and Sufliarsky, 2022). According to Garcia-Loro et al. (2021), Industry 4.0 has affected almost all layers of society and has also changed the way we interact with the world, and the world in turn interacts with us. According to Mesárová, Kordos, and Sokol (2019), Industry 4.0 positively affects the economy and society in general, but many organizations that are transitioning to Industry 4.0 take little account of the human factor (Angelopoulou, Mykoniatis, and Boyapati, 2020), which is the biggest risk of the industry 4.0 implementation process (Masár and Hudáková, 2020). The industry 4.0 movement now permeates the entire production system, from the labor to the social, economic, political, and legal dimensions of life (Fuster, 2019) and shows great potential (Li and Huang, 2021). These developments include the comprehensive digitization of industrial processes and products through the application of cyber-physical systems and self-motivation, both in production facilities and in logistics and operational processes (Figueiras et al., 2021). Jaskov (2020) asserts that Industry 4.0 enhances performance and productivity, with potential impacts on business downturns at both macro and micro levels. Nowadays, many manufacturers and organizations are transitioning to Industry 4.0 with great success, which also has a huge impact on the dynamics of the labor market (Su et al., 2022). They have recognized the benefits of digitized production and have started to implement highly mechanized and data-driven processes that allow them to offer superior services

and products to their customers (Angelopoulou, Mykoniatis, and Boyapati, 2020). The global industry is currently undergoing significant transformations due to Industry 4.0. This revolutionary concept is reshaping not only business practices but society. Every organization is feeling the impact of physical, virtual, and combined technologies, which are becoming increasingly important in all aspects of production management. The primary goal of incorporating Industry 4.0 into production management is to modernize, automate, and digitize the manufacturing process. The aim is to achieve more efficient and productive production while maintaining lower costs (Richnák, 2021; Elafri et al., 2022). Ameywal et al. (2022) use technologies like artificial intelligence, the internet of things, machine learning, cloud computing, big data, digitalization, deep learning, and cyber-physical systems to manage the production flow, thereby minimizing production time and ensuring on-time delivery. According to Taner and Parlak Biçer (2021), the use of technology and project management ensures the successful operation of the business and contributes to the organisation's development. Therefore, it is also necessary to design the right communication technology to use all technological management capabilities and prevent problems (Reyez et al. 2020).

The purpose of this paper is to investigate and determine the impact of technology in organizations, as well as to provide enterprises with information about technology.

Organizations must react and adapt to the wide range of factors that influence today's world. These factors can, of course, include technological equipment and general access to technology. According to Gong et al. (2021), technology plays a significant role in the process of creating products and services. It is critical for organizations to understand the future trend of technology development to improve and innovate the products in their portfolio.

The subsequent matter under scrutiny expands upon the preceding one and explores the individual associations between the components being investigated inside organizations, as well as the interconnections between them. Li, An, and Liu (2021) emphasize the significance of identifying essential characteristics, particularly in the context of planning techniques that enhance internal processes inside a company. Therefore, institutions and organizations can attain superior outcomes, enhance their competitiveness in the market, and accomplish their objectives.

## MATERIALS AND METHODS

The objective of this study is to evaluate the influence of technical progress on organizational management and examine how these effects differ according on the size of the firm. Furthermore, it examines the interconnectedness of different organizational aspects that are impacted by technology.

The theoretical part of the study employed data from research articles to ascertain the importance of technology in firms and investigate methods for efficiently overseeing operations and relationships within the framework of the fourth industrial revolution. The text explores how firms are now adopting and implementing technological trends in their corporate processes, while also examining the possibility for future success.

Based on the literature review, the following hypotheses were formulated:

H1: There is a relationship between technology and firm size categorization.

H2: There is an interrelationship between factors examined in organizations.

In 2023, the practical component involved the examination and collection of data from companies located in the Czech Republic. The study chose a varied sample of enterprises that operate in the market environment of the Czech Republic. This sample includes organizations of various sizes and from different industries. Almost all businesses strive to integrate and utilize technology in their production processes to consistently enhance their performance and outcomes.

The present study entailed the selection of data from many firms functioning within the market environment of the Czech Republic. The sample was heterogeneous, including businesses of various magnitudes and spanning across multiple sectors. Almost all businesses endeavor to include and employ technology in their production processes to continually enhance their performance and results. A questionnaire survey was developed internally to gather data. The questionnaire survey comprised eight questions focusing on the theoretical understanding of technology and the technological revolution in relation to market-operating enterprises.

To address the research questions, several analytical techniques were employed:

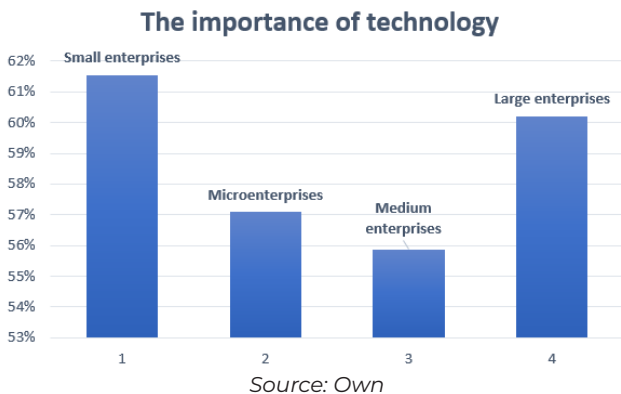
Conducted to identify and compare technology adoption levels and benefits among micro, small, medium, and large enterprises. Analysis of Variance (ANOVA) was used to test for significant differences. Correlation Analysis: Utilized to explore the relationships between technology adoption and other organizational factors such as capital, human resources, and investment. Pearson correlation coefficients ( $r$ ) were calculated to determine the strength and direction of these relationships.

**RESULTS**

As previously mentioned in the literature study, technology has a significant impact on nearly every industry and is present worldwide. In the Czech Republic, the situation is identical. The Czech Republic, despite its modest size, recognizes the importance of digitalization and technical breakthroughs for enterprises of all sizes. These advancements not only benefit individual businesses but also have a substantial impact on the country's economy. By studying and elucidating the findings, this knowledge can be invaluable for all firms aiming to adopt or currently using diverse technologies to improve their position in an already fiercely competitive environment.

The first hypothesis examined the significance of the technologies utilized by each of the entities under study, considering their respective sizes, which encompass micro, small, medium, and large enterprises. The findings were analyzed using the averaging approach, which helped get a fundamental knowledge of how various firms interpret and use technology in their distinct surroundings. The average metrics for the significance of microenvironmental components offer varying viewpoints on how these institutions interact with technological advancements.

**Graph 1.** Importance of technology by size of enterprise



**Correlation analysis**

The data underwent analysis using a correlation study to investigate the links among the four components. An inquiry was carried out to examine the interdependence among the elements. The relationships between the factors were clarified, and after analyzing the correlations, clear results and recommendations were given for the dependencies that were assessed.

**Table 1:** Correlation analysis

	Capital	Technology	Human Resources	Investment
Capital	1			
Technology	0,091132	1		
Human Resources	-0,010790	0,18228044	1	
Investice	0,416119	0,22886291	0,102919439	1

Source: Own

According to the conducted research, small enterprises demonstrate a significant level of openness to technological advancements, as indicated by a score of 0.62. This receptiveness allows them to be more adaptable in responding to market fluctuations and efficiently utilizing new technical tools. This technological capability offers a benefit in terms of both flexibility and innovation. However, it is important to mention that micro enterprises have a value of 0.57%, which is somewhat less than that of small enterprises. Nevertheless, it is not necessarily the case that they have failed to keep up with technical advancements. On the contrary, their attitude may be characterized as cautious and conventional. Medium enterprises have a technological relevance score of 0.56 (56%), which is the lowest among all enterprises. Despite the average degree of technology utilization in this sector, there is still significant opportunity for growth. Both large and small enterprises have a technology relevance score of 0.60 (60%), indicating a strong emphasis on investing in technology and creative techniques to maintain competitiveness in their respective sectors.

In summary, the technology perspectives offer valuable insights into various strategies and technologies that can significantly influence the future competitiveness and performance of enterprises operating in specific markets and industries.

### **Technology-Capital (0.0911)**

The correlation between technology and capital is positive, but it is characterized by a low level of strength. From this, it may be inferred that businesses with greater wealth are more inclined to invest in technological equipment, although the correlation is not significant. However, it is not an absolute belief that enterprises with limited money cannot effectively implement technological innovation.

### **Capital-Human Resources (-0.0108)**

The link between human resources and capital is negative. Consequently, human resources and capital are not interdependent, and the quantity of capital does not have a substantial impact on human resources. This implies that even businesses with less funding may effectively oversee their human resources.

### **Technology-Human Resources (0.1823)**

There is a favorable correlation between technology and human resources; however, the relationship is not very significant. Therefore, it implies that enterprises that allocate money to technology also prioritize their human capital, indicating that businesses that currently invest in technology expect their employees to receive training and possess the skills necessary to effectively utilize the technology.

### **Capital-Investment (0.4161)**

There exists a direct and robust association between capital and innovation. Consequently, organizations with higher capital are inclined to make larger investments. Among the data analyzed, this correlation stands out as the strongest, suggesting that enterprises with greater capital tend to allocate more resources to various sectors, including technology, compared to organizations with lower capital.

### **Human Resources-Investment (0.1823)**

Furthermore, a positive association exists between human resources and investment. However, it's important to recognize that this specific relationship is relatively weaker compared to the other elements under analysis. Therefore, investment has a minimal impact on human resources, and the association between these elements does not exhibit significant value. Ultimately, these ideals might have detrimental effects on the firm. It is essential to allocate financial resources to invest in human resources for the organization's continuing development, both in terms of material growth and human well-being.

### **Technology-Investment (0.2289)**

The most recent association between investment and technology is positive. Like the previously analyzed categories, there is a positive link, indicating that enterprises that invest in technological equipment and technology in general are also likely to invest more money overall. In summary, technical progress affects the company's entire investment. In general, there appear to be some moderate and weak correlations among these variables. The findings indicate that capital can impact investment decisions, and organizations that allocate money towards technology also emphasize the growth and development of their human resources. To determine the precise effects and relationships among these components, a comprehensive study and statistical analysis would be necessary. This would offer more precise and in-depth understanding of the correlated factors and the nature of their relationship.

## **DISCUSSIONS**

Depending on the technologies and their use within the organizations, the research was conducted through a questionnaire survey that the organizations completed, and the results can be drawn from this to answer the research questions. RQ1: What is the importance of technology in relation to firm size categorization?

Based on the calculation of the average of the questionnaire survey by firm size categorization, technologies by firm size categorization have the highest significance for small and large enterprises. Micro and medium enterprises have medium levels of technology salience. According to Perdan et al. (2022), this may be due to the limited resources that these categories of enterprises have. Therefore, it is crucial to emphasize the importance of leadership and governance, and to clarify the significance and applicability of technology. The government can then help these enterprises minimize the cost of technology adoption through subsidies, grants, or tax breaks. Joseph Ng (2023) confirms this fact, arguing that medium enterprises face significant challenges in implementing strategies due to limited resources, potentially leading to underutilization of technology. Thus, an important aspect in terms of the relevance of technology according to the categorization of firm size is their resource capacity, and it is essential that all types of enterprises invest their resources in technological equipment to continuously develop their potential.

RQ2: What are the interrelationships between the factors examined in organizations?

The linkages within the firm are a key aspect for organizations to achieve sustainable development and gain competitive advantage in the current uncertain times, with sustainable competitive advantage correlating with organizational performance (Astuti, Dadrini, and Chariri, 2023). The largest correlation examined for companies is between capital and investment, which may ultimately affect technology investment, as companies with more capital also invest more in technological equipment. According to Dai, Hou, and Li (2021), there is a need to make targeted investments to upgrade regional industry and guide organizations to invest their capital in continuous upgrading. Conversely, the analysis reveals that the relationship between capital and human resources has the lowest value, indicating that even organizations with limited capital can effectively manage their human resources, provided they set up their processes correctly. Fernández-Alles et al. (2022) support this by stating that limited resources, including capital, may not negatively impact human capital, which can compensate for these constraints and serve as a solid foundation for organizational prosperity.

Based on these results and the discussion of the results, it can be concluded that this article provides unique and valuable perspectives and contributions to the local economy. Firstly, it emphasizes the notable discrepancies in the adoption of technology and its advantages among firms of varying sizes, offering a more distinct comprehension of how the allocation of resources impacts the integration of technology. This comprehension can assist policymakers and corporate executives in developing more efficient plans for the implementation of technology, specifically for small and medium-sized firms. Furthermore, the study highlights the crucial significance of leadership and governance in promoting the adoption of technology, emphasizing the necessity of favorable policies and incentives.

The main constraint of this study is its concentration on businesses in the Czech Republic, which may restrict the applicability of the results to other areas or nations with distinct economic circumstances and technology environments. Furthermore, the study is dependent on data obtained from self-reported responses from a questionnaire survey, which may be influenced by response biases. Subsequent studies could broaden the range by conducting a comparison examination with businesses in different geographical areas and integrating more unbiased criteria to evaluate the adoption of technology and its effects.

The study incorporates both theoretical and practical data to facilitate additional research. As a result, it has the potential to expand the scope of investigation to include other organizations and industries operating in the Czech Republic market. All organizations operating in the market environment can apply its findings, as the thesis makes a dual contribution, both practically and theoretically. Therefore, the facts, analysis, results, and conclusions suggest that the thesis has achieved its objective.

## CONCLUSIONS

Technology is of the utmost importance and should not be undervalued. Suleiman et al. (2022) have observed that the technological revolution has brought up several uncertainties and challenges for enterprises. The current transformation, marked by swift progress in data analytics and digital management, requires a cohesive strategy for adopting Industry 4.0 technology. It is essential to fully understand the problems of technology from both a theoretical and practical perspective. This is because technology is vital for all businesses that operate in a market setting and strive for success. Holding the necessary technological tools and a thorough comprehension of their capabilities can have a favorable influence on an organization's competitiveness and sales. Enterprises must develop strong interconnections among the many components within the organization to ensure that the multiple links are mutually supportive and firmly formed. Organizations are increasingly utilizing technology to enhance their competitiveness and efficiency in the market. When considering the adoption of technology based on organization size, both small and large enterprises exhibit the highest level of importance placed on technology. Micro- and medium-sized firms have a moderate degree of technological importance. Of the variables examined, the highest value is linked to capital and investment, indicating that companies with higher financial resources are more inclined to invest, especially in technical equipment. The point where capital and human resources overlap exhibits the lowest value, indicating that effective business practices can obviate the necessity for significant capital investment while still enabling the organization to flourish in the market. The results of this study highlight the significance of implementing a deliberate strategy while adopting technology. Both small and large firms can obtain substantial advantages from technological improvements by utilizing their respective adaptability and resources. Micro- and medium-sized firms can overcome resource limits by focusing on strategic investment and using effective management methods. This is consistent with the requirement for strategic investments in technology, as proposed by Huamanchumo (2021),

in order to promote a competitive edge. Venter and Grobbelaar (2023) emphasize that to succeed in a fiercely competitive climate, firms need to prioritize their ability to manage technology effectively. To summarize, the efficient incorporation of technology into company operations is a complex undertaking that involves careful planning, strong leadership, and ongoing investment in both technological resources and human resources. Organizations can improve their competitiveness and maintain long-term sustainability in a digitalized market environment by taking a comprehensive approach to technology management. This study offers unique insights into the dynamics of technology adoption and acts as a roadmap for future research and practical applications, ultimately contributing to the growth of the area of organizational management.

#### Conflict of interests

The author declares no any conflict of interests.

#### References

- AMEJWAL, M., EL JAOUHARI, A., ARIF, J., FELLAHI, S. & JAWAB, F. (2022). Production Flow Management Based on Industry 4.0 Technologies. *LOGISTIQUA*2022. 40-46. ISSN 2166-7349. doi:10.1109/LOGISTIQUA55056.2022.9938064
- ANGELOPOULOU, A., MYKONIATIS, K. & BOYAPATI, N. R. (2020). Industry 4.0: The use of simulation for human reliability assessment. *ISM* 2019. 42, 296-301. ISSN 2351-9789. doi: 10.1016/j.promfg.2020.02.094
- ANGELOPOULOU, A., MYKONIATIS, K. & BOYAPATI, N. R. (2020). Industry 4.0: The use of simulation for human reliability assessment. *International Conference on Industry 4.0 and Smart Manufacturing*. 42, 296-301. ISSN 2351-9789. doi: 10.1016/j.promfg.2020.02.094
- ASTUTI, P. D., DATRINI, L. K. & CHARIRI, A. (2023). Understanding the Antecedents and Consequences of Sustainable Competitive Advantage: Testing Intellectual Capital and Organizational Performance. *Economies*. 11(4). ISSN 2227-7099. doi:10.3390/economies11040120
- DAI, Y. X., HOU, J. N. & LI, X. (2021). Industry policy, cross-region investment, and enterprise investment efficiency. *Research in International Business and Finance*. 56. ISSN 0275-5319. doi: 10.1016/j.ribaf.2020.101372
- ELAFRI, N., TAPPERT, J., ROSE, B. & YASSINE, M. (2022). Lean 4.0: Synergies between Lean Management tools and Industry 4.0 technologies. *IFAC Papersonline*. 55(10), 2060-2066. ISSN 2405-8963. doi: 10.1016/j.ifacol.2022.10.011
- FERNÁNDEZ-ALLES, M., HERNÁNDEZ-ROQUE, D., VILLANUEVA-FLORES, M. & DÍAZ-FERNÁNDEZ, M. (2022). The impact of human, social, and psychological capital on academic spin-off internationalization. *Journal of International Entrepreneurship*. 20(3), 433-473. ISSN 1570-7385. doi:10.1007/s10843-022-00311-4
- FIGUEIRAS, P., LOURENCO, L., COSTA, R., GRACA, D., GARCIA, G. & JARDIM-GONCALVES, R. (2021). Big Data Provision for Digital Twins in Industry 4.0 Logistics Processes. *IEEE METROIND4.0 & IOT*. 516-521. doi:10.1109/METROIND4.0IOT51437.2021.9488507
- FOCACCI, C. N. & PEREZ, C. (2022). The importance of education and training policies in supporting technological revolutions: A comparative and historical analysis of UK, US, Germany, and Sweden (1830-1970)\*. *Technology in Society*. 70, 251-274. ISSN 0160-791X. doi: 10.1016/j.techsoc.2022.102000
- FOSFURI, A., GIARRATANA, M. S. & SEBREK, S. S. (2020). Resource partitioning and strategies in markets for technology. *Strategic Organization*. 18(2), 251-274. ISSN 1476-1270. doi:10.1177/1476127018791329
- FUSTER, V. T. (2019). The Challenges of the Fourth Technological and Industrial Revolution in a European Peripheral Society and Its Consequences in Political Governance and Legal Regulation. With Special Reference to the Valencian Community. *Revista General De Derecho Administrativo*. (50). ISSN 1696-9650. <https://www-webofscience-com.ezproxy.techlib.cz/wos/woscc/full-record/WOS:000460613300014>
- GAJEK, A., FABIANO, B., LAURENT, A. & JENSEN, N. (2022). Process safety education of future employee 4.0 in Industry 4.0. *Journal of Loss Prevention in the Process Industry*. 75. ISSN 0950-4230. doi: 10.1016/j.jlp.2021.104691
- GARCIA-LORO, F., PLAZA, P., QUINTANA, B., SAN CRISTOBAL, E., GIL, R., PEREZ, C., FERNANDEZ, M. & CASTRO, M. (2021). Laboratories 4.0: Laboratories for Emerging Demands under Industry 4.0 Paradigm. *EDUCON*. 909-915. ISSN 2165-9567. doi:10.1109/EDUCON46332.2021.9454095
- GIUSTOZZI, F., SAUNIER, J. & ZANNI-MERK, C. (2018). Context Modeling for Industry 4.0: an Ontology-Based Proposal. *KES-2018*. 126, 675-684. ISSN 1877-0509. doi: 10.1016/j.procs.2018.08.001
- GONG, L., ZHU, D. G., LIU, Y., XIE, J., MO, Z. C. & ZHU, M. R. (2021). Technology Network Construction and Analysis Method for Technology Trends Discovery. *ICIEA 2021*. 464-468. ISSN 2156-2318. doi:10.1109/ICIEA51954.2021.9516339
- GOWRIPEDDI, V. V., BIJJAHALLI, M. C., JANARDHAN, N. & BHIMAVARAM, K. R. (2021). Role of Education 4.0 Technologies in Driving Industry 4.0. *Cross Reality and Data Science in Engineering*. 1231, 576-587. ISSN 2194-5357. doi:10.1007/978-3-030-52575-0\_48
- HERNANDEZ, J. G. V. & SALCEDO, M. T. A. (2020). The influence and benefits of technology as a strategy in organizations. *Multidisciplinary Journal for Education Social and Technological Sciences*. 7(1), 32-53. ISSN 2341-2593. doi:10.4995/muse.2020.10693
- HUAMANCHUMO, P. A. G. (2021). Technological singularity and transhumanism. *Teknokultura: Revista De Cultura Digital Y Movimientos Sociales*. 18(2), 195-200. ISSN 1549-2230. doi:10.5209/TEKN.74056
- JASKOVÁ, D. (2020). Labour Market Changes in the Regions of Slovakia in the Context of Industry 4.0. *Vplyv Industry 4.0 Na Tvorbu Pracovnych Miest* 2019. 183-191.
- JIN, Y. G., DONG, N. Y., TIAN, G. L. & ZHANG, J. R. (2023). Wisdom of the masses: Employee education and corporate risk taking. *Economic Modelling*. 118. ISSN 0264-9993. doi: 10.1016/j.econmod.2022.106102
- JOSEPHNG, P. S. (2023). Innovative Usage of Grid Solutions with a Technology Behavior Model in a Medium-Size Enterprise. *Applied System Innovation*. 5(1). ISSN 2571-5577. doi: 10.3390/asi6010011
- KALENYUK, I., BOHUN, M. & DJAKONA, V. (2023). Investing in Intelligent Smart City Technologies. *Baltic Journal of Economic Studies*. 9(3), 41-48. ISSN 2256-0742. doi: 10.30525/2256-0742/2023-9-3-41-48
- KIM, J., LEE, J., YANG, E. Y. & KANG, S. K. (2023). Technology forecasting from the perspective of integration of technologies: Drone technology. *KSII Transactions on Internet and Information Systems*. 17(1), 31-50. ISSN 1976-7277. doi: 10.3837/tiis.2023.01.003
- KUCIAPSKI, M. (2019). How the Type of Job Position Influences

- Technology Acceptance: A Study of Employees' Intention to Use Mobile Technologies for Knowledge Transfer. *IEEE Access* [online]. 7, 177397-177413. ISSN 2169-3536. doi: 10.1109/ACCESS.2019.2957205
- LEE, N. & CLARKE, S. (2019). Do low-skilled workers gain from high-tech employment growth? High-technology multipliers, employment and wages in Britain. *Research Policy* 48(9). doi: 10.1016/j.respol.2019.05.012
- LI, H. Z., AN, N. & LIU, J. Y. (2021). Strategic planning, strategy map and management control: a case study. *Nankai Business Review International*. 12(3), 386-408. ISSN 2040-8749. doi: 10.1108/NBRI-10-2020-0054
- LI, M. X. & HUANG, G. Q. (2021). Production-intralogistics synchronization of industry 4.0 flexible assembly lines under graduation intelligent manufacturing system. *International Journal of Production Economics*. 241. ISSN 0925-5273. doi: 10.1016/j.ijpe.2021.108272
- MASÁR, M. & HUDÁKOVÁ, M. (2020). The Impact of Human Factor on Projects of Implementation Concept Industry 4.0 in Manufacturing Enterprises. *Vplyv Industry 4.0 Na Tvorbu Pracovnych Miest* 2019. 268-276.
- MESÁROVÁ, T., KORDOS, M. & SOKOL, J. (2019). The Impact of Industry 4.0 Initiative on Society. *Vplyv Industry 4.0 Na Tvorbu Pracovnych Miest*. 195-200.
- MIN, H. (2022). Smart factory: a game changer or another fad in the era of fourth industrial revolution. *International Journal of Technology Management*. 89(1-2), 26-45. doi: 10.1504/IJTM.2022.123006
- NEWMAN, J., MINTROM, M. & O'NEIL, D. (2022). Digital technologies, artificial intelligence, and bureaucratic transformation. *Futures*. 136. ISSN 0016-3287. doi: 10.1016/j.futures.2021.102886
- OZTURKLER, Z. (2021). Assessment of private Sector Employees in Terms of Education in Northern Cyprus. *Propositos Y Representaciones*. 9. ISSN 2307-7999. doi: 10.20511/pyr2021.v9nSPE1.854
- PAPULOVÁ, Z., GAZOVÁ, A. & SUFLIARSKY, L. (2022). Implementation of Automation Technologies of Industry 4.0 in Automotive Manufacturing Companies. *3rd International Conference on Industry 4.0 and Smart Manufacturing*. 200, 1488-1497. ISSN 1877-0509. doi: 10.1016/j.procs.2022.01.350
- PERDANA, A., LEE, H. H., ARISANDI, D. & KOH, S. (2022). Accelerating data analytics adoption in small and mid-size enterprises: A Singapore context. *Technology in Society*. 69. ISSN 0160-791X. doi: 10.1016/j.techsoc.2022.101966
- QUINN, W. (2019). Technological revolutions and speculative finance: evidence from the British Bicycle Mania. *Cambridge Journal of Economics*. 43(2), 271-294. ISSN 0309-166X. doi: 10.1093/cje/bey029
- RAHMANI, A. M., EHSANI, A., MOHAMMADI, M., MOHAMMED, A. H., KARIM, S. T. & HOSSEINZADEH, M. (2022). A new model for analyzing the role of new ICT-based technologies on the success of employees' learning programs. *Kybernetes*. 51(6), 2156-2171. ISSN 0368-492X. doi: 10.1108/K-02-2021-0164
- REYES, S., LUIS, M., ORDONEZ, S. & BARBARA, A. (2020). Communication management for industries 4.0. *Telematique*. 19(1), 75-90. ISSN 1856-4194.
- RICHNÁK, P. (2021). Key Concept of Industry 4.0 in Production Management in Slovak Wood Processing Management. *WOODEMA* 2021.
- ROSA, E. S., GODINA, R., RODRIGUES, E. M. G. & MATIAS, J. C. O. (2022). An Industry 4.0 Conceptual Model Proposal for Cable Harness Testing Equipment Industry. *3rd International Conference on Industry 4.0 and Smart Manufacturing*. 200, 1392-1401. ISSN 1877-0509. doi: 10.1016/j.procs.2022.01.340
- ROSALES, M. A., MAGSUMBOL, J. A. V., PALCONIT, M. G. B., CULABA, A. B., DADIOS & E. P. (2020). Artificial Intelligence: The Technology Adoption and Impact in the Philippines. *HNICEM*. ISSN 2475-7152.
- RUSSO, M. (2020). 39% of Firm Leaders Expect That They Will Invest in New Technology This Year. *Architect*. 109(6), 51-51. ISSN 1935-7001.
- SCEPANOVIC, S. (2019). The Fourth Industrial Revolution and Education. *MECO*. 704-707. ISSN 2377-5475.
- SU, C. W., YUAN, X., UMAR, M. & LOBONT, O. R. (2022). Does technological innovation bring destruction or creation to the labor market? *Technology in Society*. 68. ISSN 0160-791X. doi: 10.1016/j.techsoc.2022.101905
- SULEIMAN, Z., SHAIKHOLA, S., DIKHANBAYEVA, D., SHEBAB, E. & TURKYILMAZ, A. (2022). Industry 4.0: Clustering of concepts and characteristics. *PRODUCTION & MANUFACTURING*. 9(1). doi: 10.1080/23311916.2022.2034264
- TANER, Z. T. & PARLAK BICER, Z. Ö. (2021). Effect of Industry 4.0 on Project Management Factors. *Journal of Polytechnic-Politeknik Dergisi*. 24(4), 1461-1472. ISSN 1302-0900. doi: 10.2339/politeknik.741566
- VAN ZEEBROECK, N., KRETSCHMER, T. & BUGHIN, J. (2023). Digital "is" Strategy: The Role of Digital Technology Adoption in Strategy Renewal. *IEEE Transactions on Engineering Management*. 70(9), 3183-3197. ISSN 0018-9391. doi: 10.1109/TEM.2021.3079347
- VENTER, S. & GROBBELAAR, S. (2023). A Technology Management Capabilities Framework for Technology Platforms. *IEEE Transactions on Engineering Management*. 70(7), 2558-2573. ISSN 0018-9391. doi: 10.1109/TEM.2022.3172720
- WAMSGANSS, A., BRORING, S., SALOMO, S. & SICK, N. (2023). Technology strategies in converging technology systems: Evidence from printed electronics. *Journal of Product Innovation Management*. ISSN 0737-6782. doi: 10.1111/jpim.12693
- ZEBA, G., DABIC, M., CICA, M., DAIM, T. & YALCIN, H. (2021). Technology mining: Artificial intelligence in manufacturing. *Technological Forecasting and Social Change*. 171. ISSN 0040-1625. doi: 10.1016/j.techfore.2021.120971