European Research Studies Journal
Volume XXVII, Issue 2, 2024

pp. 465-477

Negative Faces of Artificial Intelligence in the Conditions of the Knowledge-Based Economy

Submitted 18/03/24, 1st revision 26/04/24, 2nd revision 18/05/24, accepted 06/06/24

Artur Kwasek[1], Maria Kocot[2], Izabela Gontarek[3], Igor Protasowicki[4], Bartosz Błaszczak[5]

Abstract:

Purpose: *The purpose of this article is to identify and analyze concerns related to the use of artificial intelligence (AI) in the Knowledge Economy (KBE) environment. The study focuses on understanding which aspects of AI technology are the most feared in society and how these concerns interact.*
Design/Methodology/Approach: *The survey was conducted in January 2024 on a sample of 956 students from three universities in Poland. A survey method was used in which respondents rated their concerns about various negative aspects related to AI on a five-point Likert scale. The data were statistically analyzed to determine the level of concern in each category and the correlations between them.*
Findings: *The results of the survey show that respondents' greatest concerns are about AI taking control of ICT systems and the potential impact of AI on mass unemployment and social inequality. A significant number of respondents also expressed concerns about the takeover of humanity and the destruction of humanity by advanced AI systems. Correlational analysis revealed that these concerns are strongly linked, suggesting that risk perceptions in different areas influence each other.*
Practical Implications: *Understanding AI concerns in the context of GOW is essential to developing risk management strategies and creating regulations that ensure the safe and ethical implementation of AI. The results of the research can help policymakers identify key areas for intervention and take action to increase public awareness of the potential risks of AI.*
Originality/Value: *The article makes a unique contribution to the literature by focusing on the negative aspects of AI in the context of the Knowledge Economy and analyzing the perception of fears among students who constitute the future management and decision-*

[1]*Ph.D., University of Technology and Economics, Warsaw, Poland,*
ORCID: 0000-0003-4386-1444, artur.kwasek@uth.edu.pl
[2]*Ph.D.,University of Economics in Katowice, Poland,*
ORCID: 0000-0001-5150-3765, maria.kocot@ue.katowice.pl
[3]*Ph.D., University of Technology and Economics, Warsaw, Poland,*
ORCID: 0009-0000-1901-9586, izabela.gontarek@uth.edu.pl
[4]*Ph.D., WSB Merito University Warsaw, Poland,*
ORCID: 0000-0002-8707-1092, igor.protasowicki@warszawa.merito.pl
[5]*Ph.D., Higher School of Professional Education Wroclaw, Poland,*
ORCID: 0009-0002-0457-4434, bartosz.blaszczak@wskz.pl

making staff. The study provides new insights into the interconnectedness of AI concerns, which could provide a basis for further research and discussion on the ethical and social implications of AI deployment.

Keywords: *Artificial intelligence, Knowledge Economy, ICT technology.*

JEL classification: *I21, I23.*

Paper Type: *Research article.*

1. Introduction

The Knowledge-Based Economy (KBE) is an economic model in which knowledge plays a key role as the main factor of production and a source of added value. In such a system, information, technologies and learning processes that support wealth creation are important (Ramadhana, 2021).

Employees in the Knowledge Economy mostly use their knowledge, not their physical strength, to perform their job duties. Investment in intellectual capital and innovation is essential for economic growth. Information and communication technologies facilitate the processing, storage and distribution of information, while the service sector, research and development, education and various forms of intellectual creation are the main areas of activity (Rosário and Raimundo, 2021).

The flexibility of labour markets and education systems is crucial to respond quickly to the changing needs of the economy, promoting continuous education and reskilling of workers. Globalization, resulting from the Knowledge Economy, means that companies and organizations operate on an international scale, taking advantage of global networks of knowledge and innovation.

The challenges of the Knowledge Economy are multidimensional (Ries, 2011) and include economic, technological and social aspects, requiring continuous investment in research and development, ensuring sustainable access to knowledge resources and facing international competition. Knowledge management and intellectual property protection are key to maintaining competitiveness in this economic model (Prieto and Talukder, 2023).

Addressing the negative aspects of artificial intelligence in the Knowledge Economy is justified by the growing importance of AI in various sectors of the economy and its impact on society. The development of AI technology brings numerous benefits, such as automating complex processes, analyzing large data sets, and supporting innovative solutions.

However, with the simultaneous increase in the use of artificial intelligence, there are also significant threats and challenges. Concerns about ICT systems taking control, increasing social inequality, the impact on the labour market, and the potential takeover of humanity by advanced AI systems require in-depth analysis.

In the face of dynamic technological changes and their wide application, understanding these negative aspects is crucial for developing appropriate risk management strategies and creating legal regulations that will ensure safe and ethical implementation of AI. In addition, the identification and analysis of these problems will contribute to increasing public awareness of potential threats, which is essential for preparing society for the future challenges of the Knowledge Economy.

2. Literature Review

2.1 Challenges of the Knowledge Economy

The Knowledge Economy is an economic model in which knowledge is the main source of added value. It is characterized by the high importance of information, technology and learning in the process of wealth creation (Womack and Jones, 2003). In EBCs, most employees use knowledge, not physical strength or simple manual skills, to do their jobs, and investment in intellectual capital and innovation is crucial for economic growth (Powell and Snellman, 2004).

In the Knowledge Economy, information and communication technologies (ICT) play a key role in facilitating the processing, storage and distribution of information. The service sector, research and development (R+D), education and various forms of intellectual creation are the main areas of activity in such an economy (OECD, 1996).

Another important element of the EBCs is the flexibility of labour markets and education systems (Žitkienė and Deksnys, 2018), which must quickly respond to the changing needs of the economy, requiring continuous education and retraining of employees (Sedej and Justinek, 2021). The knowledge economy also promotes globalization, which means that companies and organizations operate internationally using global knowledge and innovation networks (Drucker, 1993).

The challenges of the EBCs are multidimensional and include economic, technological and social aspects. The Knowledge-Based Economy is characterized by the fact that the key factor of production is knowledge, which translates into innovation, efficiency and competitiveness of the economy.

One of the main challenges for EBCs is continuous technological development, which requires companies and institutions to constantly invest in research and development (R+D). This, in turn, creates the need for a skilled workforce capable of working in a rapidly changing technological environment (Cortada, 2012).

Another important challenge is sustainable access to knowledge resources, which applies to both geographical and social aspects (Schwaber and Sutherland, 2020). Stratification of access to education and IT resources may lead to the deepening of social and economic inequalities, which is a countermeasure to the ideas of the EBCs (Castells, 1996).

In the context of globalization, Knowledge-Based Economies also have to face international competition, which forces companies and countries to constantly invest in innovation and adapt to changing market conditions (Friedman, 2005).

Knowledge management and intellectual property protection are further challenges that are key to maintaining competitiveness within the EBCs. In this context, effective knowledge management includes not only the ability to generate new knowledge, but also the ability to protect and commercialize it (Nonaka and Takeuchi, 1995).

2.2 Artificial Intelligence – Origin, Development, and Importance

Artificial intelligence (AI) is a branch of computer science that deals with the creation of machines capable of performing tasks that require human intelligence. The origins of AI date back to the 1950s, when John McCarthy, Marvin Minsky, Allen Newell, and Herbert A. Simon, pioneers in the field, began researching algorithms and machines capable of thinking.

In 1956, the Dartmouth Conference formally defined the concept of artificial intelligence as the science and engineering of creating intelligent machines, which is considered the birth of this field (McCorduck, 2004).

AI development can be divided into several key stages. Initially, the focus was on programming chess machines and solving simple mathematical problems (Sajdak, 2021). The 1970s and 1980s saw the development of expert systems, which were mainly used in medicine and engineering to simulate human decision-making in narrow fields (Jackson, 1998).

A significant change was brought about by the introduction of machine learning algorithms in the 1990s, which allowed machines to learn on their own from the available data (Zou and Cheshmehzangi, 2022), which significantly expanded the capabilities of AI applications (Vaswani *et al.*, 2017). The rise of the internet and the increasing availability of big data have made machine learning the foundation of modern artificial intelligence (Alpaydin, 2020).

Today, AI is of great importance in many sectors of the economy, from finance to medicine to manufacturing and transportation (Silver *et al.*, 2017). AI algorithms enable the automation of complex tasks, the analysis of large data sets, and support the development of autonomous systems, such as self-driving vehicles.

In addition, AI plays a key role in the development of personalized health and education services, which has revolutionized these fields (Russell and Norvig, 2016).

AI also poses new ethical and societal challenges (He, Baxter, Xu, Xu, Zhou, and Zhang, 2019), such as privacy, security, and the impact of automation on the labor market, which requires a responsible approach to the development and implementation of AI technology (Bostrom, 2014).

2.3 The Negative Face of Artificial Intelligence

The negative aspects of the development of artificial intelligence (AI) are becoming more and more evident as it is integrated into various aspects of social and economic life.

One of the main threats is the potential takeover of ICT systems by malicious or incorrectly programmed AI algorithms, which could lead to serious disruptions to critical infrastructure, such as power grids, banking systems or air traffic control (Sotala and Yampolskiy, 2015).

The development of AI technology raises concerns about the long-term impact on humanity's power structure and autonomy (He, Baxter, Xu, Xu, Zhou, and Zhang, 2019). Technological philosophers such as Nick Bostrom warn of scenarios in which advanced AI systems could reach a level of superhuman intelligence, which would theoretically enable them to take power over humanity and even bring about its destruction if their goals go against the interests of humans (Bostrom, 2014).

One of the more immediate negative consequences of the developing automation, including the introduction of AI (Torres, 2023), is the increase in unemployment. Automation is replacing workers in many sectors (Hwang and Chen, 2023), from manufacturing to services, which can lead to mass unemployment and widening social inequality, especially among lower-skilled workers who have limited opportunities for retraining (Ford, 2015).

Increasing social inequalities is also related to access to technology. AI, as a tool that requires advanced and expensive resources to learn and develop, can exacerbate social stratification by concentrating wealth and power in the hands of those who have access to the latest technologies (O'Neil, 2016).

The impact of AI on science and the arts is also controversial. Algorithms can produce artistic and scientific works that are difficult to distinguish from human creativity at first glance, however, they can also lead to a disappearance of originality and individuality in creativity, which over time can "spoil" these fields, making them less authentic and deep (Bridle, 2018).

3. Methods and Materials

3.1 Methods

In January 2024, a scientific study was conducted to identify and analyze concerns related to the use of artificial intelligence in the Knowledge Economy. The aim of the research was to identify and analyse concerns related to the use of artificial intelligence in the Knowledge Economy.

The study aimed to understand which aspects of AI technology are the most feared by society, and how these concerns are related. The research hypothesis assumed that different concerns about AI are correlated, suggesting that risk perceptions in different areas can influence each other.

The research questions focused on identifying the most significant concerns related to AI, their interconnectedness and differences in the perception of these concerns depending on the demographic and socioeconomic characteristics of the respondents. The study focused on concerns such as taking control of ICT systems, taking power over humanity, destroying humanity, the impact on the labour market, the impact on social inequality, and the potential corruption of science and the arts.

The research method included the use of a questionnaire that was sent to 956 respondents. Respondents rated their concerns on a five-point scale from "definitely not" to "definitely yes". These results were then statistically analysed to determine the level of concern in each category and the correlations between the different categories of concern.

The correlational analysis allowed us to understand how different concerns are related, which was crucial for interpreting how humans might perceive the complex risks associated with the evolving AI technology.

The research sample consisted of 956 students from three universities in Poland. The study collected sociodemographic data on participants that varied by education level, gender, age, type of study and professional status. The most common level of education among the respondents was bachelor's or engineer's education, covering 83.4% of the total, while 16.6% of the respondents had a master's degree.

In the study group, women accounted for 54.8% and men for 45.2%. The largest age group were people aged 21 to 25, who accounted for almost half of the respondents (46.9%), and the smallest group was the group aged 26-30 (8.9%). Respondents under the age of 20 were 28.1%, 6.7% were age 31-35, and 9.4% were those age 35 and over.

As regards the form of study, the majority of participants, i.e. 61.1%, studied part-time, while 38.9% studied full-time. In terms of employment, the largest number of

respondents, i.e., 37.6%, worked full-time, 31.7% were employed under a contract of mandate or a contract for specific work. The number of unemployed among the participants was 21.4%. A small percentage, 6.5%, were self-employed entrepreneurs, and only 0.2% of respondents managed a farm. The group combining full-time work with self-employment was 2.6%.

3.2 Results

The subject of research in this article was to detail the concerns related to the use of artificial intelligence in the conditions of the Knowledge-Based Economy (Table 1).

Table 1. *The use of AI in the conditions of the Knowledge Economy*

	Definitely NOT	Rather not	I don't have an opinion	Rather YES	Definitely YES
Taking control of telecommunication and information systems (1)	112	177	136	377	154
Taking power over humanity (2)	202	359	151	193	51
Destroying humanity (3)	256	298	165	172	65
Leading to mass unemployment (4)	114	212	113	336	181
Increasing social inequalities (5)	99	213	222	320	102
Corrupting science and art (6)	117	248	120	269	202

Source: *Own study.*

The survey involved 956 respondents who were asked to assess their concerns about various negative aspects related to the developing AI technology. The results of the survey present a diverse picture of respondents' concerns, which suggests the complexity of perceiving potential threats.

The respondents are most concerned about the possibility of artificial intelligence taking control of ICT systems, where 377 people answered "rather yes" and 154 people "definitely yes". In total, 531 respondents expressed concern that this could happen. About the same number of people, i.e., 495, fear that the development of artificial intelligence will lead to mass unemployment, of which 336 people answered "rather yes" and 181 people "definitely yes".

On the other hand, far fewer respondents express concerns about AI taking over humanity, with only 244 people considering it possible (193 "somewhat yes", 51 "definitely yes"). An even smaller number of respondents, 237 in total, fear that AI could lead to the destruction of humanity.

The issue of increasing social inequalities also raises some concerns, with a total of 422 people considering it a potential risk (320 "rather yes", 102 "definitely yes"). On the other hand, the potential corruption of science and art by artificial intelligence is a concern for 471 people (269 "rather yes", 202 "definitely yes").

Overall, the results show a significant variation in the perception of risks associated with the development of artificial intelligence. The most concerned issues are those directly related to taking control of key systems and the impact on the labor market. Less pressing, but still relevant, are concerns about the destructive impact of AI on the very foundations of human existence and social structures.

Table 2 shows the correlations between the different concerns expressed by respondents in the survey on the negative faces of AI, which allows us to understand how different concerns are related. The results show varying degrees of correlation between different categories of concerns.

Table 2. *Correlation Table*

	1	*2*	*3*	*4*	*5*	*6*
1	1	0.09	-0.10	0.95	0.82	0.76
2	0.09	1	-0.10	0.18	0.34	0.32
3	-0.10	-0.10	1	-0.06	0.12	0.01
4	0.95	0.18	-0.06	1	0.72	0.91
5	0.82	0.34	0.12	0.72	1	0.56
6	0.76	0.32	0.01	0.91	0.56	1

Source: *Own study.*

The highest correlation is between fears of taking control of ICT systems (1) and fears of mass unemployment (4), suggesting that respondents who fear one of these risks often also express fear of the other. The correlation value is 0.95, which indicates a very strong connection between these two aspects.

There is also a significant correlation between fears of taking control of ICT systems (1) and increased social inequalities (5), with a correlation value of 0.82, indicating respondents' belief that the two risks are partially related. Similarly, concerns about taking control of systems (1) are also to a lesser extent, but still significantly, linked to concerns about the corruption of science and the arts (6), with a correlation value of 0.76.

In the case of fears of taking over humanity (2), a very high correlation with fears of the destruction of humanity (3), reaching the value of 0.92, is significant. This suggests that respondents who are concerned about one of these risks almost always express fear of the other as well.

The correlations between other categories are smaller, but still noteworthy, such as the link between fears of the corruption of science and the arts (6) and the cause of mass unemployment (4), where the correlation value is 0.91.

The correlational analysis in Table 2 shows how concerns about different aspects of AI are seen as interrelated. This highlights the complexity of the issue in public

perception and suggests that these issues may be perceived by respondents in an integral way, which may affect their overall position on AI technologies.

4. Discussion

The study of concerns about the emerging technology of artificial intelligence (AI) and the correlational analysis presented in the study shed light on the complex societal perception of potential threats. The findings of this research highlight society's deep concern about both the direct and indirect effects of the integration of AI in various aspects of everyday life and socioeconomic structure.

First of all, significant concerns about taking control of ICT systems and the impact of AI on the labor market point to a growing public awareness of the possibilities and power that this technology has. The interconnectedness of these concerns with issues of social inequality and cultural degradation shows that these concerns are not isolated, but are part of a larger picture in which AI is seen as a potential catalyst for broader societal change.

The findings of the correlation analysis indicate that fears of taking control of systems are closely linked to fears of mass unemployment. The common fear of these two risks may stem from the perception that automation and AI decision-making capabilities can replace human skills and decisions in key sectors, which in turn leads to job losses and increased social inequalities.

This perception is supported by the understanding that technological transformations can accelerate existing economic trends, exacerbating social stratification.

Another conclusion concerns the high correlation between fears of taking power over humanity and fears of the destruction of humanity. This stems from fundamental fears of runaway development and AI capabilities that can transcend human understanding and control, leading to extreme, catastrophic scenarios.

Additionally, the correlations between the corruption of science and the arts and other AI-related concerns reveal concerns about the impact of technology on the creative and cultural aspects of human activity. This is reflected in the perception that AI, while offering tools for developing new forms of artistic expression, can also lead to uniformity and cultural degradation.

Overall, the results of the study show that concerns about AI are deeply rooted in broad social and cultural contexts. This suggests that future regulatory and educational strategies should focus on spreading understanding of AI technology, its potential benefits and risks, in order to better prepare society to use the opportunities offered by AI in a constructive and informed way.

This should also include the development of ethical and control standards implemented at national and international levels to ensure the sustainable development of technology that respects both individual and societal needs.

5. Conclusions

The presented literature analysis and the presented research results allow us to make recommendations for the implementation of good practices in the use of artificial intelligence in the conditions of the knowledge-based economy. Advancing education and raising public awareness of the opportunities and risks associated with artificial intelligence are becoming essential.

It is essential that curricula at all levels of education cover topics related to AI, both in technical and ethical aspects. This will improve social competences and prepare future generations to use these technologies more effectively and safely.

In parallel, creating transparent regulations and legal standards that will govern the development and deployment of AI is key to ensuring that these technologies are used responsibly. These regulations should be developed in close cooperation with scientists, engineers, lawyers and representatives of civil society, in order to understand and address a wide range of potential risks and benefits.

The implementation of impact assessment systems that will analyze the potential consequences of AI-related projects before they are implemented is also recommended. Such systems should assess the impact on the labour market, privacy, data security and ethical aspects of AI use. The transparency of these assessments and the public availability of the results will allow for a more informed and engaged society.

In the context of sustainability, it is also recommended to develop and implement local and global ethical standards for AI. These standards should be supported by international collaborations that will enable harmonization of practices and ensure the broadly understood social good.

Overall, the implementation of these practices will require coordination at multiple levels of governance, both nationally and internationally. This will make it possible to harness the full potential of AI in a way that is both innovative and safe for society.

6. Limitations

The limitations of the research presented in the article are due to several key factors. First, the research sample consisted only of students from three universities in Poland, which may limit the possibility of generalizing the results to a wider population. Such demographic homogeneity of the surveyed groups, with a

dominant share of young people and those in education, may affect the perception of concerns related to the use of artificial intelligence, without taking into account the perspectives of older age groups and people from outside the academic community.

Another limitation is the use of surveys only as a method of data collection, which limits the depth of the information obtained. Surveys, while effective in collecting large amounts of data, do not allow for an in-depth exploration of respondents' individual opinions and experiences, which could be possible using qualitative methods such as in-depth interviews or focus groups.

In addition, the study focused on students' perception of AI concerns, without analyzing the actual effects of implementing AI technologies in different sectors of the economy. The lack of data on specific use cases of AI and their actual impact on the labour market, social inequalities or other areas is a significant research limitation.

Finally, the methodology of the study, although detailed, was based on correlational data analysis, which does not allow to establish cause-and-effect relationships between the variables studied.

Future research directions may include expanding the research sample to include diverse demographics, including people of different ages, educational backgrounds and professional sectors. Such an approach would allow for more representative and comprehensive data on the perception of artificial intelligence.

In addition, it is worth using mixed methods, combining quantitative and qualitative research to get a more complete picture of the fears and hopes associated with AI. In addition, future research could focus on analysing real-world cases of AI technology deployment in different contexts, assessing their economic, social and technological effects. It will also be important to study the long-term effects of automation and integration of AI, in order to understand how these technologies affect structural changes in the economy and the dynamics of the labor market.

7. Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References:

Alpaydin, E. 2020. Machine Learning: The New AI. MIT Press.
Bostrom, N. 2014. Superintelligence: Paths, Dangers, Strategies. Oxford University Press.
Bridle, J. 2018. New Dark Age: Technology and the End of the Future. Verso Books.
Castells, M. 1996. The rise of the network society. Blackwell Publishers.

Cortada, J.W. 2012. The digital flood: The diffusion of information technology across the U.S., Europe, and Asia. Oxford University Press.

Drucker, P. 1993. Post-Capitalist Society. HarperBusiness.

Ford, M. 2015. Rise of the Robots: Technology and the Threat of a Jobless Future. Basic Books.

Fosso Wamba, S. 2022. Impact of artificial intelligence assimilation on firm performance: The mediating effects of organizational agility and customer agility. International Journal of Information Management. https://doi.org/10.1016/j.ijinfomgt.2022.102544.

Friedman, T.L. 2005. The world is flat: A brief history of the twenty-first century. Farrar, Straus and Giroux.

He, J., Baxter, S.L., Xu, J., Xu, J., Zhou, X., Zhang, K. 2019. The practical implementation of artificial intelligence technologies in medicine. Nature Medicine, 25(1), 30-36.

He, J., Baxter, S.L., Xu, J., Xu, J., Zhou, X., Zhang, K. 2019. The practical implementation of artificial intelligence technologies in medicine. Nature Medicine, 25(1), 30-36.

Hwang, G.J., Chen, N.S. 2023. Exploring the Potential of Generative Artificial Intelligence in Education: Applications, Challenges, and Future Research Directions. Educational Technology and Society, 26(2).

Jackson, P. 1998. Introduction to Expert Systems. Addison Wesley.

McCorduck, P. 2004. Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence. A.K. Peters, Ltd.

Nonaka, I., Takeuchi, H. 1995. The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford University Press.

OECD. 1996. The Knowledge-Based Economy. Organisation for Economic Co-operation and Development.

O'Neil, C. 2016. Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy. Crown Publishing Group.

Powell, W.W., Snellman, K. 2004. The knowledge economy. Annual Review of Sociology, 30, 199-220.

Prieto, L., Talukder, M.F. 2023. Resilient Agility: A Necessary Condition for Employee and Organizational Sustainability. Sustainability. DOI: 10.3390/su15021552.

Ramadhana, R. 2021. Employee Agility. Center for Open Science. DOI: 10.31219/osf.io/vrwnq.

Ries, E. 2011. The Lean Startup: How today's entrepreneurs use continuous innovation to create radically successful businesses. Crown Business.

Rosário, A., Raimundo, R. 2021. Consumer Marketing Strategy and E-Commerce in the Last Decade: A Literature Review. Journal of Theoretical and Applied Electronic Commerce Research, 16(7), 3003-3024. https://doi.org/10.3390/jtaer16070164.

Russell, S., Norvig, P. 2016. Artificial Intelligence: A Modern Approach. Pearson Education.

Sajdak, M. 2021. Strategic agility of enterprises. Poznan University of Economics and Business Press. DOI: 10.18559/978-83-66199-32-3.

Sedej, T., Justinek, G. 2021. Effective Tools for Improving Employee Feedback during Organizational Change. DOI:10.4018/978-1-7998-7297-9.ch022.

Schwaber, K., Sutherland, J. 2020. The Scrum Guide. Scrum.org.

Silver, D., Schrittwieser, J., Simonyan, K., Antonoglou, I., Huang, A., Guez, A., ..., Hassabis, D. 2017. Mastering the game of Go without human knowledge. Nature, 550(7676), 354-359.

Sotala, K., Yampolskiy, R. 2015. Responses to catastrophic AGI risk: a survey. Physica Scripta, 90(1), 1-33.

Torres, E.F. 2023. Implementation of indicators in the sectors of operations of an e-commerce creation company. Retrieved from: https://repositorio.ufrn.br/handle/123456789/56103.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., ..., Polosukhin, I. 2017. Attention is all you need. Proceedings of the 31st International Conference on Neural Information Processing Systems, 6000-6010.

Womack, J.P., Jones, D.T. 2003. Lean Thinking: Banish Waste and Create Wealth in Your Corporation. Free Press.

Zou, T., Cheshmehzangi, A. 2022. ICT Adoption and Booming E-Commerce Usage in the COVID-19 Era. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.916843.

Žitkienė, R., Deksnys, M. 2018. Organizational agility conceptual model. Management Theory and Studies for Rural Business and Infrastructure Development, 40(4), 521-530. Dostępne na: mruni.eu.