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Proceedings of the 6th International Conference on Economics and Social Sciences (2023), ISSN 2704-6524, pp. 877-886

The 6th International Conference on Economics and Social Sciences
Geopolitical Perspectives and Technological Challenges for Sustainable Growth in the 21st Century
June 15-16, 2023
Bucharest University of Economic Studies, Romania

AI – The New Player in Digital Economy

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DOI: 10.24789788367405546-081

Abstract

The current economic environment is strongly defined by digitalisation and its focus on guiding businesses, organisations, and governments to achieve their sustainability goals. Lately, alongside digitalisation, the implementation of the newest technologies has been followed by the introduction of AI in the business models and strategies, which allows the business environment to enhance even more in the digital economy. Therefore, the current paper aims to offer a short overview of how the introduction and the usage of AI technologies have impacted the economic environment and how liable the enterprises were to implement them in their activities, by reviewing the scientific literature and analysing the conclusions to this date. While researching, the authors will also plan to identify if the newest technologies have helped businesses gain more competitive advantages and to be more efficient in their activities, by approaching business processes more digitally, therefore considering AI the newest player in digital economy. Analysing and summarising the most important publications for the topic of this research, the authors had outlined the context for a better understanding of how the AI technologies have reshaped the economic activities and the business environment, focusing on gaining the highly desired competitive advantages that organisations are aiming for and the convenience that is nowadays driving the consumers behaviour in both consumption and daily activities. By the conclusions of this research, the statement provided by the author is describing how AI might represent the new player on the market, since it can act exactly as businesses and individuals, sometimes simultaneously being based on human-like Machine Learning and Decision Making focused on Deep Learning.

Keywords: AI, digitalization, digital economy, technology, sustainability, economic environment.

JEL Classification: A10, D1, E1, O1, O13, O14.

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1. Introduction

Artificial Intelligence (AI) has become a buzzword in the world of technology, and its impact has been felt in almost every aspect of modern society. From healthcare to manufacturing, and transportation to education, AI has revolutionised the way individuals live and work.

AI has the potential to disrupt traditional business models, improve operational efficiency, and create entirely new industries. It can help businesses to better understand customer behaviour, predict trends, and optimise their supply chain. It can also automate repetitive and time-consuming tasks, allowing employees to focus on higher-value tasks that require creativity and critical thinking. In short, AI has the potential to revolutionise the way entrepreneurs do business. On the other hand, the development of the latest digital technologies along with the evolution of internet and mobile devices, alongside with financial crises and economic growth, have issued heavy pressure on the global economics and on national economics, especially on budget deficit, financial services, and the business environment, affecting the profitability and the revenues of the economic players (Dirican, 2015).

Digital economy is a term used to describe the economic activities that result from billions of daily online connections between people, businesses, devices, data, and processes. It encompasses all aspects of the economy that are enabled by digital technologies, including e-Commerce, online advertising, digital payments, and more. With the rise of AI, the digital economy is poised to undergo a radical transformation.

Meanwhile, as contouring the context of the research, it should be taken into consideration that regarding technology and growth, there were significant optimists and pessimists, represented by technology hubs, and alternatively, the economists, statisticians, sociologists, and government officials. And as the study conducted by Brynjolfsson et al. (2018) has concluded, an underrated area of scientific research is represented by how the latest AI technologies will drive new processes and business models to develop and to reshape the mainstream of the business environment. This is one important aspect especially for today's environment in which the impact of the latest COVID-19 pandemic has been overcome by adopting and implementing as soon as possible the new available and developed digital technologies, imposing the main economic paradigm to shift predominantly towards a digital economy, deeply shaping the digitized and digitalized current economic environment.

2. Problem Statement

The digital economy, in short words, represents mainly the recent and significant changes in the economic paradigm in which various segments of the economies are nowadays realised through processes and procedures based on the latest digital technologies developed by computer-assisted digitisation of data (Williams, 2021). This definition has been widely accepted by economists since it does not just imply changes in the classical principles of economic construction or is either involving the radical change of the economic mechanism. Mostly, it is the term that describes

how digital technologies are adopted, implemented, and used in the classical economics, while representing important tools of Industry 4.0 and unfortunately, with the level of development varying from one continent to another, and from one country to another country on the same continent, and even from one region to another region of the same country (Kolesnikov et al., 2020).

Generally observing, AI can be interpreted differently by different categories of scientific specialists, as the main definition given by economists is explaining AI as *automation*, *robots*, or *machines*. But on the other hand, this is a very narrow definition for an engineer which considers automation as the technology which allows processes or procedures to perform with minimal or none human assistance. Otherwise, it still represents more than just automation or the usage of digital technologies in business activities, as the Artificial Intelligence can be defined as *"a growing resource of interactive, autonomous, self-learning agency, which enables computational artefacts to perform tasks that otherwise would require human intelligence to be executed successfully"* (Lu, Zhou, 2019, p. 4).

At the same time, the technologies connected to the AI have been strongly growing and developing. Therefore, the first impression of AI representing only automation, robots, or machines has now broadened even more, including more interaction between the software and hardware platforms, developing technologies such as: deep learning machines; computer vision and image recognitions; smart robots; natural language processing and virtual personal assistants. Technologies that are being used daily by both individuals and businesses, slowly reshaping the business environment and 'forcing' the economic paradigm to shift to more digitised processes and procedures, highlighting the foundation of digital economy (Shevchuk, 2016).

As digital transformation can be described as the adoption, usage, and integration of the latest technologies into all areas of business procedures or processes, the implementation of digital technologies will definitely imply the need of transforming the traditional business strategies into business models that will reach the full potential of the business environment, determined by the development of the digital economy paradigm, as the past several years represented the transition from an analogue society to a digitised society, in which new methods of communicating, new business processes and procedures, new business models, and new disruptive technologies will influence changes and transformations on several aspects of the economic environment, such as: increasing efficiency; enabling higher revenues, controlling resource waste, gaining more sustainability. But, on the other hand, the implementation of AI in the current economic environment will impact the business environment as well, reshaping the way in which businesses are conducted, business models are implemented and conceived, and restructuring the jobs available on the labour market (Reier Forradellas, Garay Gallastegui, 2021).

At the time when the divergence of Artificial Intelligence was going on strongly, a study conducted in 2016 on the economic impacts of AI during the next 10 years (2016-2026) suggested that on private sector and venture capital investment, the economic impact of developing and adopting the AI technologies in the business

environment should be between $ 359.9 billion and $ 773.2 billion. On the other hand, analysing a set of benchmarks of significant technologies that share similar characteristics with the AI technologies (such as general IT investment, broadband internet, industrial robotics, and mobile phones), the same study has concluded that the economic impact of the AI might be between $ 1.49 trillion and $ 2.95 trillion over the same period of time (Chen et al., 2016). But given the fact that the economic environment since 2016 has been strongly impacted by the COVID-19 pandemic and its limitations, the current economic impact of adopting, implementing, and using the AI technologies in business could be much higher than the estimated values of the study. Therefore, since the economic paradigm has shifted to the digital economy, the investments in digital technologies and AI technologies have been continuously growing and will definitely be still growing due to the context being reshaped by the next industrial revolution.

On the other hand, Hang and Chen (2022) have shown in their paper that, even if it has been proved that it can create competitive advantages and can also underpin the main barriers that prevent it from reaching its fully grown potential, it might not benefit businesses as much as it was considered to. As the main studies analysed in the paper have concluded, the investment in AI might help firms and organisations to generate revenue much quicker, but only 40 % out of the 2500 enterprises stated that their business benefited from higher revenue after investing in adopting and implementing AI technologies. At the same time, it has been agreed that the short-medium-term impact of AI might not be as strong as the scientific literature was once promoting, since by interviewing senior managers in retailing, the conclusion was that, currently the business environment has not completely understood how to benefit from the main advantages of the full potential driven by the implementation of the latest AI technologies, at least not yet.

Meanwhile, the usage of AI can be remarked not only in business environments but in individuals' daily life as well, providing various services in Smart Cities through Big Data, even if these actions raise several concerns regarding ethics and confidentiality of data, improving urban governance and driving higher urban economic growth (Allam, Dhunny, 2019).

Therefore, AI is no longer a strange or new concept, but it is one that is in continuous development, as the usage of the latest technologies combined with the Big Data and Machine Learning are currently common in business models and society development, aiming to gain more economic growth and focusing in achieving the sustainability goals. As all the aspects have been taken into account, governments should distribute more funding in trying to fully develop the AI technologies for promoting the economic growth, especially due to the incensement in convenience brought by the Artificial Intelligence (He, 2019).

3. Research Questions / Aims of the Research

As scholars have already stated, humanity is currently positioning itself on the run of the fourth industrial revolution, in which the boundaries between the physical and the digital spheres have been highly overcome, while the empowerment

conducted by the emergent state of digital technologies led the need for adopting and implementing the latest technological instrument to increase *overnight*, especially in the actual economic environment, reshaped by the COVID-19 pandemic. Hence, businesses, individuals, and governments had to *embrace* the usage of Artificial Intelligence as a strong driver for maintaining the economic activities and for overcoming the sanitary crises. Therefore, while keeping in mind the need for collaboration to achieve the Sustainable Development Goals, the economic environment welcomed a new player, the AI. But the question is: *Will AI as the new player in Digital Economy act ethically?*

4. Research Methods

The main methods used by the authors in order to develop an answer for the research question are based on exploring the scientific background and on the critical analysis of the most recent publications on corelated topics and on former papers published in the scientific journals, using the keywords *Artificial Intelligence, Digitalisation* and *Digital Economy.* To provide a suitable answer, supported by the findings presented in this paper, the authors will summarise the main aspect highlighted by the scientific literature and will formulate the explanations needed for a deeper understanding of the topic.

5. Findings

5.1 General Implications of AI on Digital Economy

As a general implication of Artificial Intelligence on digital economy, it can be observed that even if in the last decade the predominant presumption was that technological progress would benefit all the individuals and organisations simultaneously, therefore nations and countries, the presumption has proved to be supported neither by the theoretical framework nor by the real evidence. On the other hand, during the past experiences, the literature has introduced several papers that are actually proving analytically, with econometrical models and calculations that the introduction of the latest digital technologies, hence the advance in the development of Artificial Intelligence has been both labour-saving and resource-saving in the context of the current competitive economy, in which a given amount of output is needed. In other words, the implementation of AI technologies has offered solutions for the great concern in developed countries regarding the natural resource-saving technological progress, so nowadays the linear cycle of consumptions has been replaced by the *use-recycle-reuse* consumption model. At the same time, since most individuals were concerned that Artificial Intelligence might be labour-saving, more specifically unskilled-labour-saving on a global level, the introduction of the latest technologies has influenced the demand for labour to increase, since at the existing factor prices, organisations were more likely tempted to increase their investments in digitisation and digitalisation, aiming to be more cost-efficient and to gain more profit in a shorter period of time, while increasing

their sustainable development and their production capacity. As a result, the development of AI technologies and other information technologies have led to greater concentrations of market power, so the economy might move to a new equilibrium conducted by the market power with higher rents for dominant economic players (Korinek, Stiglitz, 2021).

As long as the Artificial Intelligence can be considered to represent the capability of a machine to imitate the intelligence of the human behaviour alongside an agent's ability of achieving goals in a large spectrum of environments, AI might be deployed in the daily production processes of goods and services, while being able to change the methods of approaching business models and to generate new ideas for developing technologies in order to help solving complex issues, while still scaling the creative effort. Therefore, when analysing the implications of AI on digital economy, it should be taken into consideration that the technologies on which the Artificial Intelligence is based on, are capable of self-improve. Hence, leading the business environment to reshape, directly impacting the market structure, sectoral reallocation, and organisations (Aghion et al., 2018).

5.2 AI and the Economic Impact on Current Digital Economy

As it can be easily observed, AI is strongly impacting the current environment.

As it can be easily consulted in Table 1, the impacts of AI in the current environment are diverse and the list might be continued in future research. But most importantly, AI has reshaped the current economic environment, *forcing* the shift towards digital economy, for both enterprises and individuals, with the general aim of providing sustainable solutions for most of today's problems.

This is an important aspect that should be taken into consideration when analysing how AI technologies have actually impacted the economic environment, businesses, individuals and therefore the consumers' behaviour in the current state of the digital economy on which most of the markets are based.

Hence, since the digital technologies and therefore the development of AI have strongly impacted how markets function, the impressive reduction in costs for searching, transportation and production has created as well new opportunities for higher market efficiency, therefore highlighting once more how the implementation of the latest technological recourse led to more efficiency and higher revenues, conducting at the same time to competitive advantages, while keeping in mind that the increased importance of innovation and of managing and analysing consumers' data highly contributed to new challenges in competition and consumer privacy (Chen, 2020).

At the same time, AI should not be organised and controlled only by private entities or organisations. At the macroeconomic level, the adoption, introduction, and usage of the latest Artificial Intelligence technologies should be framed by the government's policies. Therefore, the diffusion patterns and the consequences of diffusion should be framed by the state, in order to regulate the privacy, trade, and liability of AI technologies. The common goal in applying policies should be followed by both private organisations and governments, since the adoption

of AI technologies in business processes and models will directly impact the labour market, inequality, and competition, while compromising the values of the society. In this aspect, the consequences should be limited by education policies to protect the safety net and promote the antitrust enforcement (Agrawal et al., 2019), because otherwise there will be more disadvantages reflected than the benefits of using AI in the economic environment.

Table 1. AI's impact on the current environment

AI's impact on	Impacts' explanation
Future of labour demand	Since AI can automate tasks previously based on human work, the development of the recent technologies has been biased on automation, therefore there was no focus on creating new tasks that require labour force to be employed. Hence, labour demand has stagnated, labour share in national income has been declining, rising inequality, and determining lower productivity growth (Acemoglu, Restrepo, 2020).
Innovation	AI possesses the potential to change the innovation process from the ground up, by providing new effective incentives for innovation, for diffusion, and for competition in the Research and Development field providing disruptive tools and increasing the efficiency of research activities (Cockburn et al., 2018).
Income distribution and unemployment	Since it is clear that AI owns the potential to disrupt labour markets in a significant way, taking into account its long-run implications of being implemented in business models and business processes, the magnitude of the future disruption will depend mostly on the speed and the factor-bias of AI's progresses (Korinek, Stiglitz, 2018)
Renewable Energy and Resources	Decision-making models with transparency can be used to build Renewable Energy Systems based on Machine Learning and Deep Learning models, in order to obtain better management for Renewable Energy and Resources, imposing direct implications on waste management as well, improving therefore the movement towards sustainable consumption and development of production processes (Ersöz et al., 2022).

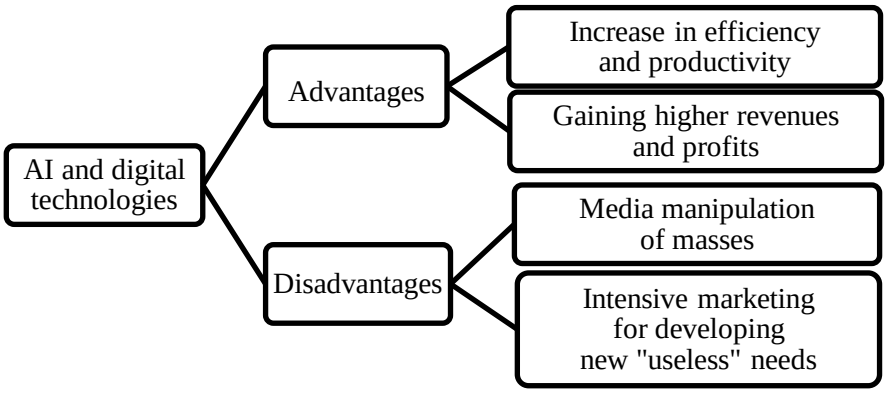
Source: Information collected and organised by the authors from the sources mentioned in the Impacts' explanation column.

5.3 AI – the New Player in the Digital Economy

There is no secret that the Artificial Intelligence has strongly affected numerous fields and disciplines, and economics is no exception of this, especially in a context in which creating human-like machines is the main goal for overcoming the high labour force expenses that the companies have with their employees, and in order to reduce their production costs while replacing the labour force with machineries that hold less power in determining interruptions in production processes and which will help organisations to increase the productivity and efficiency simultaneously, gaining more profits. Therefore, the evolving field of AI itself has over history bought various discussions in the use of technologies in economics. AI and several AI technologies and methods, such as Machine Learning, Big Data, expert systems, and knowledge-based systems, have been adopted and implemented by companies and organisations in order to achieve higher efficiency and higher revenues. At the same time, on the other hand, the AI technologies might be an obstacle in developing sustainable consumption and aiming for the ethics of the economic environment because they possess a high potential for misuse in activities such as media manipulation of mass population; spreading of deep fake information, and by using

the Machine Learning algorithms, certain racial or ethnic groups might be targeted or even individuals might be influenced through intensive marketing for developing new '*useless'* needs in order to be more tempted to buy and consume specific goods and services (Bickley et al., 2022). Therefore, as summarized in Figure 1, AI as a player in the current digital economy environment delivers both advantages and disadvantages, and it is up to the managers of the resources to decide how they will *play the cards*.

Figure 1. AI – "playing" in digital economy



Source: Adapted from Bickley et al., 2022.

On the other hand, while the current development of AI rests mostly on technologies based on Machine Learning, Deep Neural Networks, Big Data, Internet of Things, and Cloud Computing, it can be understood as general-purpose technology and it might have the potential to drastically reshape the economic environment, since firms and organisations of all sizes and with various activity fields have started to perceive their development goals through the usage of AI, the impact of the latest technologies represents still a matter of concern, on both economic and social environments. Thereafter, the technological progress in Artificial Intelligence, firms and organisations, individuals, and governments should work in common in order to avoid the full dependence on AI for the future markets, in order to actually provide the most facile framework for using the available resources efficiently and ethically, aiming to reach the Sustainable Development Goals (Wagner, 2020).

6. Conclusions

However, the adoption of AI in the digital economy is not without its challenges. Concerns around data privacy, security, and ethics need to be addressed, and at the same time, solutions for those concerns must be provided. The deployment of AI systems must be transparent and accountable, and there must be a balance between innovation and regulation. Furthermore, there is a risk that the benefits of AI may

not be evenly distributed and may exacerbate existing inequalities. Therefore, to be an *ethical player* in the current digitised economic environment, AI technologies must be developed simultaneously with framework regulations regarding the adoption, implementation, and use of the latest resources.

Despite these challenges, the potential benefits of AI in the digital economy are too great to ignore. Therefore, it is essential to continue exploring the potential of AI and to develop policies and frameworks that ensure its responsible and ethical deployment, keeping in mind that AI based on digital transformation and rapid technological advances will create high benefits not only for firms and organisations, but also at macroeconomic level, encouraging developing countries to embrace digitalisation and its instruments even more (Aly, 2022).

Concluding with a metaphor, as well as individuals, the AI and digital technologies might sometimes act as their algorithm has been developed to make decisions and to follow rational patterns, therefore AI might be considered a player on the digital economy, too. But, as long as it acts ethically and aims to improve the business processes and the economic environment for achieving higher sustainable development, the AI represents a more than welcomed *new player* in the current state of digital economy environment.

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