THE INTELLIGENT ENTERPRISE: AI'S ROLE IN TRANSFORMING BUSINESS

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Abstract

The present research paper aims to provide a brief overview of the current state of knowledge about the theoretical approach of adopting, implementing, and using Artificial Intelligence (AI) in the contemporary business environment. Over the last several years, the business environment has been significantly reshaped by the accelerated digital transformation, forced by the COVID-19 pandemic, which bought along unpredictable challenges for society, including the economic and business environments. Hence, in the present ongoing expanding digital age, the adoption of AI technologies might represent a strategic partner for businesses to keep their competitiveness and relevance in the market. This research paper explores how the use of AI technologies facilitates rapid data analysis and business development, by providing valuable insights about the theoretical framework and the most frequent ten AI technologies that have been adopted and implemented into business processes, operations, and strategies. Those insights have been curated keeping in mind the main scientific requirement of the study: to formulate an eligible answer for the research question of the paper while focusing on how the current transformation drives organizations to create a new business model – *The Intelligent Enterprise*. At the same time, a short quantitative study has been conducted by the authors to highlight the change in the percentage of organizations across the European Union's member states that have implemented and currently use AI technologies in their economic activities. By formulating the conclusions provided by the analysis of the findings exposed in the present study, the authors have identified the main connection between the use of AI technologies and *The Intelligent Enterprise*, opening the road for more detailed research to be conducted, contributing to the scientific literature.

Keywords
artificial intelligence, intelligent enterprise, business development, business environment, digital transformation

JEL Classification
D21, L1, O33, Q55

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Introduction

Nowadays, the socio-economic environment is strongly influenced by using the latest digital technologies and AI instruments. That does not represent grass-root level information in the scientific literature, which has studied, analysed, and tried to identify the alternative scenarios that can be driven in the future by the current trends of business models, strategies, and operations.

One strong driver of the current digital development and the introduction of AI instruments in economic activities is represented by the COVID-19 pandemic. The challenging situation that the economic environment experimented with has accelerated the reshape of the business environment, shifting the paradigm to a more digitalized economic environment, where digital technologies and therefore the AI is used by businesses in order to enhance their adaptive capabilities of managing changes in the market dynamics, customer behaviour, supply shortages, business decisions, business strategies, and business models overall (Calderon-Monge and Ribeiro-Soriano, 2024).

That is the most important aspect that should be taken into consideration while analysing businesses which are leveraging cutting-edge technologies to improve their operations, especially the technologies and instruments provided by the development of the digital technologies. At the same time, AI possess the capability to encompass a variety of advance analytics, applications, and logic-based methods, that have been adapted to be strongly similar to the human behaviour, alongside its capacity to learn how to reduce or avoid errors in decision-making and problem-solving processes (Dumas et al., 2023).

As part of the outgoing digital transformation, the use of AI can provide numerous opportunities for businesses that aim to revolutionize their operations across various sectors. For example, decision-making processes implemented with the help of AI can be easily adapted to loans, credits, and general forecasting, while additionally, it can automate previously human-driven processes and enhance workflows in which humans and AI can collaborate effectively (Perifanis and Kitsios, 2023).

Currently, for scholars, the role of AI and its implementation in the business environment remains a popular topic of research, particularly in the perspective of the present development of *The Intelligent Enterprise*. That is the main objective on which the current research paper is focused on. For optimizing the implementation of AI in reshaping organizations into Intelligent Enterprises, qualitative and quantitative studies are required. Hence, the current paper aims to highlight the most frequently digital and AI technologies implemented, while corelating them with the AI use alongside the member states of the European Union.

Therefore, after consulting the scientific literature, the authors have determined a framework exploring the requirements and the ease of implementation for the most used AI technologies, while correlating them with the statistical data provided by Eurostat regarding the adoption and use of the emerging technologies by businesses and organizations in the European Union. In consequence the requirements for developing the Intelligent Enterprise have been identified, studied, and presented in the conclusions of the current research paper.

1. Review of the scientific literature

As the majority of scholars have settled to an agreement, The Intelligent Enterprise - simultaneously acknowledged as a smart digital enterprise - represent an organization that has implemented, and which do use advanced technologies. Those technologies, derived by the development of Artificial Intelligence, such as Data Analytics, Machine Learning, Natural Language Processing, Robotic Process Automation, and Computer Vision, can be used to automate processes, improve operational efficiency, and optimize the decision-making processes. At the same time, the main reason for implementing such technologies into business operations, procedures, and strategies is strongly driven by the organizations` economic goal of optimizing performance and creating added value in all aspects of the business (Bharadiya, 2023).

Regarding this vision, AI technologies assisted the business environment in revolutionizing business analytics, especially through the usage of Machine Learning and Natural Language Processing. The instruments provided by these emerging technologies do develop the environment needed for systems and algorithms to learn from previous experiences and to analysed complex data, facilitating a deeper understanding of market trends and consumer behaviour. Meanwhile, AI improves data integration, real time analytics, and predictive accuracy, which helps organizations to overcome the limitations of traditional business methods and procedures. Therefore, by automating business operations and processes, the use of AI contributes significantly to the digital transformation of the business environment, offering valuable insights for business development in the current economic mainstream (Chowdhury, 2024).

To highlight this aspect, a study conducted by Agarwal et al. (2024) exposed businesses` preferences for using technologies provided by the development of AI, such as Blockchains, Machine Learning, and Robotic Process Automation, as instruments for facing the new challenges driven by the instability of the business environment strongly reshaped by the impact of the COVID-19 pandemic. Hence, organizations have been revitalized to design and build solutions that aim to flatten the curve, driving the increase in the demand for machines, digital technologies, and robots. The unpredictable environment has accelerated the slow-paced shift to a more digital and data-driven business environment. As the study exposed in its findings, 39 forms of digital and AI technologies has been used in eight different industries for overcoming challenges and adapting business strategies, based on the implementation of digital technologies into business processes and operations.

Even if there are limited on-field studies that do analyse the use of the instruments provided by the development of AI from organizations' capabilities perspective, the on-going trend of researching the theoretical approaches provides a strong starting point. In this regard, definitions are slightly varying, but the general agreement in the scientific literature highlights what a business should be able to accomplish with the adoption and integration of AI instruments in its operations, procedures, and strategies. It has been recognized by the scholars that the use of AI technologies provides businesses the ability to use data, methods, and operations in a way that facilitates the processes of automation, decision-making, and collaboration, that would have been more difficult by following the traditional approaches. Thus, for understanding the strategic potential of

AI capabilities to transform the business environment, the concept of AI should be integrated to include all relevant organizational resources (Enholm et al., 2022).

At the same time, the study conducted by Oyekunle and Boohene (2024) revealed in its findings that as enterprises keep continuing to adopt and to integrate AI technologies and digital instruments into their business processes and operations, a balance must be approached for considering the workforce implications, which are essential to harness the complete potential of AI. The study also found that the adoption of Artificial Intelligence in the business environment is a complex process, shaped and determined by a range of factors, both internal and external. Organizational leadership, culture, resource availability, data security, technological infrastructure, and workforce's readiness and willingness, all play important roles in the digitalization and automatization transformation that businesses can decide to implement. Hence, as a recommendation formulated based on the results of the study, only a holistic understanding of all the involved factors will allow organizations and businesses to fully navigate the complex space of AI adoption and implementation, unlocking its transformative powerful potential.

On the other side, the scientific literature also has addressed the strategic use of AI for improving corporate strategy through recognizing consumer behaviour, predictive analytics, choosing the best options for developing the IT infrastructure, implementing decision support systems, and identifying the best opportunities for innovation, while eliminating challenges related to machine products and improving product quality and business performance. At the same time, the knowledge provided by the scientific literature is relevant, both theoretically and practically, showcasing the possibilities to generate new management theories and business strategies, driven by the development of AI instruments and its adoption and implementation into business strategies, across various fields and industries (Kitsios and Kamariotou, 2021).

By providing rapid analysis and interpretation of data, AI technologies enable businesses to take informed decisions, to optimize their operational processes and to develop innovative strategies that can drive business innovation and new business models to be established. Meanwhile, this adaptability and efficiency contributes directly to the increase in competitiveness of various business sectors and industries (Eboigbe et al., 2023).

Hence, based on the key points exposed by scholars, AI is significantly transforming organizations' processes and operations, reshaping the business environment. Primarily, AI disrupts the traditional business models based on human decision-making, replacing them with automatic decision-making systems, able to improve businesses' agility to achieve their strategic and economic goals. Secondly, the use of AI in business processes determines the increasement in business performance, while promoting sustainable practices. Thus, it should be underlined that AI is more than a technological tool, and it is in fact representing an essential and strategic asset for businesses to evolve, driving unprecedented opportunities for innovation and development (Kaggwa et al., 2024).

Simultaneously, the adoption and implementation of AI technologies into the business environment is not only transforming the way organizations operate, but it is also redefining the future scenarios of doing business. Therefore, the powerful *Intelligent*

Enterprise is the organization that is strongly aware of the fact that AI should be integrated into business procedures, operations, and strategies in a responsible way, ensuring transparency and ethics in decision-making processes, aiming for building consumer trust and for creating a positive impact in the global society (Abdulqader et al., 2024).

Therefore, once adopted, integrated and used in a balanced approach, AI technologies can be easily aligned with businesses' strategic values and goals, while its role in decision-making processes will continue to significantly reshape the business environment. To defend the findings determined by the analysis of the scientific literature, qualitative and quantitative studies have been conducted.

2. Research methodology

As the scientific literature contains numerous studies regarding AI adoption, implementation, and usage in the business processes, operations, strategies, and models, the current paper aims to underline the most frequently implemented AI instruments and technologies in the business environment, that actively contributed to reshaping the business environment.

Hence, authors' main goal is to provide a comprehensive review of the current trends that can be identified regarding AI integration into the business environment. To provide the evidence, both qualitative and quantitative research methods have been utilized. The scientific literature has been carefully curated for selecting the AI technologies and instruments that have been significantly preferred by the businesses to be implemented into their processes, operations, and strategies. The selection has been made by summarizing and analysing the bibliographical properties of the scientific papers referred to in the literature review. Meanwhile, the latest report provided by Eurostat has been used to calculate the relative change in the percentage of businesses across the European Union's member states that have adopted and implemented AI technologies into their economic activity. All the scientific papers that have been selected have been searched in open-access databases, such as Google Scholar, considering authors' position regarding the accessibility of scientific research and findings, that should be available beyond the academic community. Hence, the scientific papers included have been curated by using the search engine provided by the platform and the keywords `AI` and `Intelligent Enterprise`.

Thus, for an easier understatement of the aimed goal, the following research question has been formulated: *What are the present trends in adopting the AI technologies into the business environment?*

Stating a clear answer to the research question will contribute to the scientific literature, since it will provide an easy-to-follow description of the business environment that has been continuously reshaped by the latest accelerated digitalization driven by the COVID-19 pandemic, leading therefore to the development of the Intelligent Enterprise.

Results and discussions

Starting as far back as the Industrial Revolution, technological innovations have transformed previous manual lucrative tasks, overcoming the limits of human physical abilities. Artificial Intelligence possess the potential to increase even more the digital

technological transformation, and even to slowly replace human activities in various industries and fields, while generating new and unpredictable opportunities for research, innovation, and general development. Hence, scholars have offered many insights for highlighting the opportunities and challenges brought along by the adoption and implementation of AI technologies into the business environment, providing possible future scenarios for industries and society (Dwivedi et al., 2021).

However, as Hansen and Bøgh (2021) stated in the study that they have been conducted, there are some differences between the behaviour of Small Medium Enterprises (SMEs) and big organizations in approaching the adoption and implementation of digital and AI technologies in their processes and operations. SMEs are characterized by a more flexible internal structure, which allows them to better harness the open invitation to innovation and quick adaptation to changes, while large companies with complex hierarchical structures might present a slower reaction time, due to their rigid environment, in which individual authority is more limited. At the same time, the technologies provided by AI and digital transformation are often underused in SMEs, as the implementation process might face challenges that small businesses are less prepared to overcome, such as internal resource-use processes, infrastructure, or monetary resources, considering the implementation costs as one of the most powerful factors.

After identifying the most frequently adopted, implemented, and used AI technologies in business operations and procedures, Table no. 1 was constructed. The table presents a compact overview of the theoretical framework of implementing and adopting the latest AI technologies, provided by the continuous development of digitalization. The theoretical framework taken into consideration by the authors has been constructed based on the scientific papers and studies consulted and referred to in the review of the current available literature. For determining the ease of implementation, the authors have created three clusters, considering the requirements for adopting the technology and the economic impact that the use of the specific technology could have on business' activities.

Table no. 1. Most frequently ten used AI technologies

Frequently ten used AI technologies			
Technology	**Ease of implementation**	**Implementation Main Requirements**	**Economic Impact on Business**
Machine Learning (ML)	Moderate	Data, algorithms, and trained/skilled workforce	Enhance decision-making and improves customer targeting
Natural Language Processing (NLP)	Moderate	Text data, APIs, and language models	Automates customer support and enhances user experience
Robotic Process Automation (RPA)	Easy	Process mapping and software tools	Increases efficiency and reduces operational costs
Chatbots	Easy	Chatbot platforms,	Improves customer

Frequently ten used AI technologies			
Technology	**Ease of implementation**	**Implementation Main Requirements**	**Economic Impact on Business**
		training data, and text frameworks	service and reduces response time
Predictive Analytics	Moderate	Historical data and analytics tools	Supports strategic planning and increases sales forecasting
Image Recognition	Moderate	Training data and software tools	Enhances quality control and improves marketing strategies
Recommendation Systems	Moderate	User data, algorithms, and integration tools	Boosts sales and improves customer engagement
Speech Recognition	Moderate	Audio data and speech models/frameworks	Streamlines operations and enhances accessibility
AI-Driven Marketing Tools	Easy	Data analytics, marketing platforms, and consumer behaviour models	Increases ROI on marketing and targets audiences effectively based on preferences
Fraud Detection Systems	Moderate	Transaction data and machine learning models	Reduces financial losses and enhances security overall

Source: Authors` contribution from summarizing the scientific literature.

As it can be observed, the most frequently ten used AI technologies are the one that possess the capabilities to facilitate decision-making processes, increase the sales and total revenue, improve the quality and the time needed for business processes and operations, and refine customer experience by direct targeting, while enhancing consumer behaviour and customer support.

Regarding the ease of implementation, dividing the ten most frequently used AI technologies into three main categories is the most challenging part. Hence, the following categories have been taken into consideration: easy to implement; moderate difficulty to implement; and difficult to implement. As exposed in Table 1, the ten most frequently used AI technologies tend to navigate between easy and moderate difficulty to implement, which can be explained by the fact that being the most adopted and used ones, these AI technologies do not require a large amount of resources to be consumed or invested, while their benefits after adoption and usage do overcome the implementation efforts, leading to a greater return on investments. Therefore, the easiest AI technologies to be implemented are: Robotic Process Automation; Chatbots; and AI-Driven Marketing Tools. Meanwhile, Machine Learning, Natural Language Processing, Predictive Analytics, Image Recognition, Recommendation Systems, Speech Recognition, and Fraud Detection Systems do present a moderate difficulty in their

adoption and implementation into business processes and business operations (Bahoo et al., 2023).

At the same time, it is well-known that the adoption and implementation of AI technologies into the business environment require several factors to be taken into consideration. Those factors have also been the ones that have been followed in dividing the AI technologies into their category regarding the ease of implementation. Alongside the factors, the following should be mentioned: complexity of the setup; skill requirements; integration into the existing system/infrastructure; availability of tools and frameworks; data requirements; and added value (Tarafdar et al., 2019).

Concerning the implementation processes, data does represent the most frequent requirement. The use of AI does transform the way data is exploited for decisions across various industries, particularly in the current business environment characterized by a high level of digitalization. AI's capability to work with Big Data, to quickly process substantial amounts of data and to extract actionable insights is revolutionizing business operations and business strategies, developing at the same time the new business models. In parallel, Machine Learning algorithms facilitate resource allocation, improve the predictive analytics processes, and can easily automate repetitive tasks, while enforcing the adaptation of the optimal solution, based on informed decisions taken with unprecedented accuracy and speed. This shift highlights the critical role of implementing AI technologies in business strategies and models development, required in the current digitalized business environment (Brown and Petrov, 2024).

Hence, the usage of AI technologies clearly revolutionized organizations' approaches to developing business procedures, operations, strategies, and models. At the same time, these approaches have one particular aspect in common. These are required to be based on strategic decisions, which are currently facilitated by the implementation of AI into the business environment. By analysing Big Data, AI systems can generate predictions and suggestions with a higher speed and accurate insights, factors that facilitate the operational and strategic decisions (Prasanth et al., 2023).

At the same time, as presented by Akter et al. (2022) in their study, the investment in the so called `*ABCD technologies*` (Akter et al., 2022, p.6), including Artificial Intelligence, the Blockchain, Cloud technology, and the Data Analytics, is expected to increase significantly as the implementation of AI into the business environment is continuously, due to the development of AI technologies and instruments that it is still an on-going process. Hence, it is estimated that the investment of businesses across all industries in AI for automating value chain and customer experience will reach $191 billion by 2025, presenting an annual growth rate of 36.6%, aspect that can be verified by the general trend of organizations to adopt and implement AI technologies for overcoming the challenges of the current digitalized business environment.

Therefore, for scientific research purposes, the percentage of businesses across the member states of the European Union using AI technologies has been considered. Assuming that, for the present framework, the value for each member state explored does represent the popularity of the on-going Intelligent Enterprise business model. Hence, the quantitative analysis, of the data collected by the authors from Eurostat is based on Figure no.1 and Figure no. 2, using countries' code for the internet domain (for example: `RO` for Romania) and `EU 27` for the average value in the European Union.
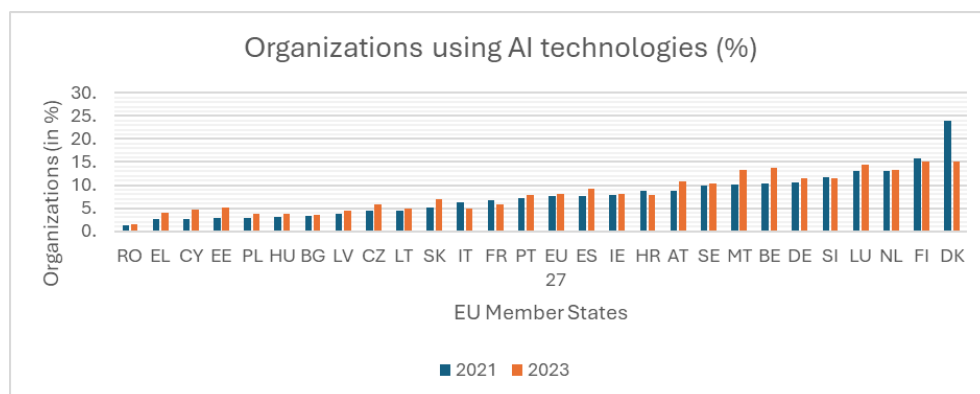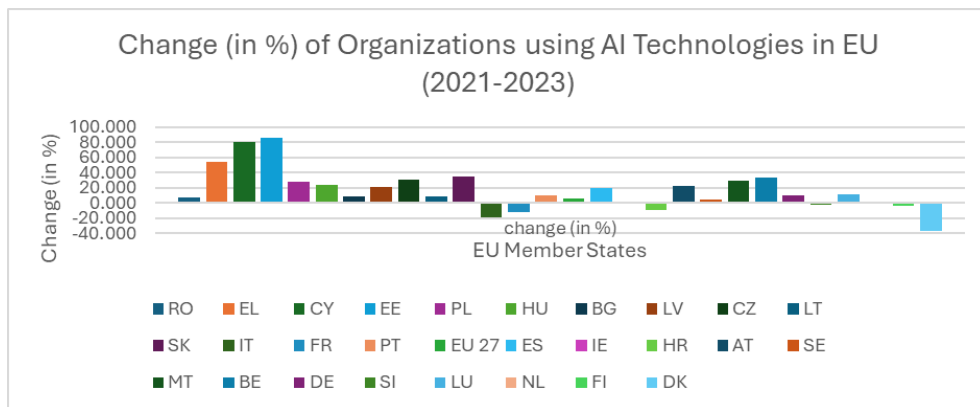
Figure no. 1: Organizations (in %) using AI technologies across EU, 2021-2023
Source: Authors` contribution with data collected from Eurostat.

For confirming the statement provided in the study conducted by Akter et al. (2022) and the hypothesis regarding the increasing popularity of the Intelligent Enterprise business model a short analysis of the usage of AI in the European Union's business environment has been run. In Figure no. 1, the percentage of organizations using AI technologies across the member states of the European Union is presented, using the values provided by the European Commission (2023) via Eurostat, for 2021 and 2023. As it can be observed, in 2021, the lowest percentage of organizations using AI technologies is present in Romania (1.4%), while the highest percentage is applicable for Denmark, where 23.9% of its organizations had adopted, implemented, and do use AI technologies. In 2023, surprisingly, the first and last place maintained, with Romania in the last spot (1.5%), and Denmark, once again in the first spot, with 15.2% of its organizations using AI technologies. Meanwhile, the average value across the European Union's member states, which is represented under the code EU 27 slightly increased from 7.6% to 8%.

These aspects are quite interesting for further and more focused research, with more data collected regarding digitalization, business environment, and the general use of digital and AI technologies across the European Union. For example, considering the digitalization level of a country as the score obtained by the respective member state at DESI (Digital Economy and Society Index), in 2021 Denmark is on the first position with a score of 70 out of 100, while Romania is on the last position, obtaining a score slightly above 30. As a composite index, DESI also focuses on the implementation of digital technologies, including the use of AI. Hence, there is no surprise that Denmark tops both the percentage of organizations using AI technologies and the DESI score, while Romania is positioning in the last place on both hierarchies.

Figure no. 2: Relative change of organizations using AI technologies
Source: Authors` own contribution with data collected from Eurostat.

At the same time, it is interesting to investigate the relative change in the percentage of organizations using AI technologies across the EU's business environment. Therefore, the results can be consulted in Figure no. 2, with the same properties as Figure no.1 regarding data presentation.

Briefly, it is easily observable the countries where the change is significant, such as Estonia (+85%) and Denmark (-36%), being the extremities of the values registered after processing the data collected from Eurostat. But those changes do not offer truthfully valuable insights, as the change has occurred between lower values. For example, in the case of Estonia, the change happened from 2.8% (in 2021) to 5.2% (in 2023), or Cyprus, where from 2.6% in 2021 grew to 4.7% in 2023, providing a relative change of almost 81%.

On the other side, the biggest surprise comes from Denmark, where from 23.9% in 2021, the percentage of organizations using AI technologies dropped to 15.2% in 2023, after a relative change of approximately -36%. But this phenomenon can have various explanations, especially if we do consider that nowadays, in 2024, or in 2023 when the latest data has been collected, compared to 2021 – which was still a year of global recovery after the pandemic impact - taking into account that nowadays more businesses are active in the economic environment of a member state. Therefore, the percentage of organizations that use AI technologies does not reflect the pure reality of the level of adaption and implementation of AI technologies into the business environment of a country, or globally, but it is a valuable starting point at grassroot level for further research.

Only as a reference, Romania presents a relative change of 7.14%, but that change is driven by the increase from 1.4% of organizations using AI technologies (in 2021) to 1.5% (in 2023), which can slightly indicate an increase in the popularity of the Intelligent Enterprise business model, but further detailed research should be conducting for validating the theoretical framework into the current business environment

Conclusions

In conclusion, in the current digital environment, the concept of *The Intelligent Enterprise* business model is increasing in popularity, while the adoption, implementation, and usage of AI technologies in business procedures and operations plays a key role in the present ongoing transformation.

Nevertheless, integrating the AI technologies into the business operations, processes, strategies, and models, cannot be considered only an option anymore. Nowadays, implementing the digital technologies and the tools provided by the AI into business activities is a strong necessity to meet the requirements of the current modern market dynamics, fast-paced and in continuous development. Hence, *the Intelligent Enterprise* business model is expected to gain more and more popularity in the following years, as businesses have understood that by using AI technologies, the repetitive task would be automatized, improving at the same time customer interaction and customer experience, actions that on the long run will contribute directly to organizations' return on investments, as a strategic partner for building an agile and resilient enterprise, ready to adapt to the on-going shift of the economic mainstream.

Meanwhile, the limitations of the current research should be acknowledged. As a theoretical framework, the study explores businesses capability to adopt, implement, and use AI technologies in the present economic environment in which the concept of *Intelligent Enterprise* is receiving ongoing popularity. Even if the authors have summarized and highlighted the main requirements for implementing the ten most frequently used, more detailed research is needed in the future to validate the hypothesis in the long term. At the same time, the current paper can contribute more to the scientific literature, representing a call for further collaboration between scholars in exploring in detail the popularity of the concept, specifically for the researchers focused on the European Union.

Acknowledgement

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