sciendo

Exploring Enterprise Resource Planning (ERP) Development: Challenges, Opportunities and How Can Help Companies Navigate Turbulent Contemporary Times

Ciprian-Sorin CHIRVASE
Bucharest University of Economic Studies, Bucharest, Romania
**Corresponding author, sorin.cchirvase@icloud.com*

Andreea ZAMFIR
Bucharest University of Economic Studies, Bucharest, Romania
andreea.zamfir@man.ase.ro

Abstract. *The author has carried out a research paper on how ERP systems have evolved, presenting their main characteristics, and conducting a debate between the benefits and challenges but also the opportunities of implementing such a system. Certainly, ERP systems have reached an absolute level of importance over time, being able to be compared with the backbone of the organizations where they are implemented. Research of the available specialized literature was carried out to find gaps in relation to the challenges and opportunities of implementing the three technologies Enterprise Resource Planning, Internet of Things and Artificial Intelligence in a single global system. After the study, it was concluded that by implementing a global system that integrates Enterprise Resource Planning, Internet of Things and Artificial Intelligence but also interconnects all the companies of the same supply flow, organizations can reach the highest level in terms of efficiency, forecast and monitoring but also perfect flexibility by adding Robotic Process Automation to the system. The results of this study complement specialized literature and make an important contribution to the field of study.*

Keywords: Enterprise Resource Planning (ERP); Internet of Things (IoT); Artificial Intelligence (AI); Robotic Process Automation (RPA); Supply Chain; Service Sector, Digital Transformation.

Introduction

The first signs of life for ERP systems appeared in the 1960s when most companies designed, developed, and implemented applications dedicated to their business model without being able to be multiplied to other companies or domains (accounting automation, stock control, salary calculation). These systems were then combined with the procurement of raw materials and production, thus opening the first doors to Management Resource Planning (MRP).

Over time, this system has evolved to integrate the financial part, sales and HR, encompassing the entire operational process of an organization, thus offering the possibility that these systems can be applied in other areas, thus becoming much more complex, renaming itself Enterprise Resource Planning, the first such systems being born at the end of the 1980s. Starting with the 1990s, they became more and more popular in large corporations and multinational companies, adding new modules such as APS (Advance Planning and Scheduling), CRM (Customer Relationship Management) and SCM (Supply Chain Management). The implementation of these new modules brought them real success at the world level, and starting in the 2000s, they opened to a new market for small and medium-sized companies.

The development of ERP systems coincides with the hardware and software development of computer systems, but also with the informational explosion of the 1990s and the development

DOI: 10.2478/picbe-2023-0169
© 2023 C. S. Chirvase; A. Zamfir, published by Sciendo.
This work is licensed under the Creative Commons Attribution 4.0 License.

of information technology and communications. It is estimated that by 2028, the global market for ERP solutions will exceed a market value of over 93 billion dollars, and the Romanian market is also growing, showing a trend and a growth rate similar to the international one, but still with a much lower market value.

Literature review

Enterprise Resource Planning (ERP)

The main two characteristics of primary importance of the contemporary business environment are competitiveness and dynamism, which lead organizations to struggle for survival due to the difficulties in planning and managing operational flows. The implementation of an ERP system becomes the main solution in leading organizations to reach the desired level of competitiveness and performance, but also of other goals and priorities (Chipriyanova & Chipriyanov, 2022). The supply chains of all companies were strongly affected both during the Covid-19 pandemic and due to the crisis resulting from the war in Ukraine, resulting in delays, cancellations and price increases. Most of the companies have never encountered such crises before, but they will have to survive from now on and find new methods and means to remain efficient and competitive in the current global business environment (Andrieș & Ungureanu, 2022). The accelerated development of the age of technology and information has led companies to an intense rivalry, regardless of their size and the sector in which they operate, and in the companies' attempt to remain competitive, they implement ERP systems that improve their performance, the one that attracts new customers and the maintenance of old customers. Also, in order to remain competitive, it is vital to be able to make correct and timely decisions, and this is only possible with the help of information that can be accessed easily and from anywhere, fast and accurate (Cordova et al., 2021). Integrated systems of the ERP type incorporate the entire set of activities and functionalities of the organizations' departments (Purchasing, Logistics, Warehouse, Production, Financial and HR), which are presented in the form of a software or an application, being used to improve and organize processes of work but also to increase the efficiency and effectiveness of operations (Azhar et al., 2022).

In the vast majority of cases, large companies with a very large and complex operational and financial volume opt for the implementation of ERP systems, but because it has been observed over time that they bring added value by creating an operational flow adapted to each individual organization and the introduction of functional automations in within applications, instead of manual activities in the past, even small and medium-sized companies are more and more attracted to such systems (Azhar et al., 2022). Small, medium and large companies can develop sustainably only if they opt for the implementation of ERP systems that bring about a significant improvement of financial activities (Barna et al., 2021). Modern management is continuously and constantly innovated due to the combination of technology and management techniques through these software tools called ERP systems, together with the professional skills of managers, building operational processes based on logical and efficient reasoning, offering managers an extraordinary visibility over the entire operational process of the organization so that it can reach unimaginable levels in the past of strategy and tactics (Chipriyanova & Chipriyanov, 2022). Modern ERP systems are becoming more and more integrated, more efficient and more strongly interconnected, but they also offer multiple options to ensure or increase the safety and security of data because we live in the era of Cyber Insecurity where there are so many threats to data (McCrevan, 2020).

Although ERP systems offer immense promises and advantages, if the implementation is not carried out successfully, devastating losses can occur, including the destruction of competitive advantages, the reduction of organizational performance, even leading to bankruptcy. That is why

the focus must be directed towards understanding the organization and its purpose, the unique context in which it takes place and the problems within and around it, by continuously monitoring and reinterpreting so that the ERP implementation is continuously modified and aligned with the context of the organization (Tan et al., 2020). The success of companies' operations depends to a great extent on their own flexibility and agility in adapting to changes in the market, because only changes can be considered as a constant in the current global market, that's why organizations are reorienting towards the implementation of ERP systems that include all the functions and processes of the company as a whole, improving communication and information transfer but also a better productivity of the processes, ultimately leading to the most important part, namely the improvement of business processes, which translates into the improvement of the customer experience and the achievement of advantages competitive in the market (Jovanoska, 2022).

According to Azhar et al. (2022) research, incorporating the entire flow of information from all departments of an organization, it offers companies the opportunity to have a very good real-time visibility of the current situation at any moment, fast, reliable and accurate, being of great help in making the fairest decisions considering the entire informational ensemble. It also improves and reduces the necessary time dedicated to communication and transmission of information, thus creating an interval of free time that can be dedicated to other activities with a much greater value impact on the organization. On the same page, Vargas and Comuzzi (2020) stated that ERP systems offer organizations better communication between departments, reduction of stocks and operational costs, but they also offer much better and prompt reactions to changes in the market. Cordova et al. (2021) is arguing that over time, experience has revealed a multitude of problems that have arisen following the implementation of ERP systems, such as the stress level of employees is much higher than normal, because normal people show resistance to change, lack of testing corresponding to the systems, problems with the interface or problems with the time zone.

The implementation of ERP systems brings an increased efficiency in the use of resources, the optimization of the flow of materials, the intensification of the informational flow, the reduction of the product cost, the improvement of management control over various processes and activities, and the possibility to further develop and optimize, step by step, the system together with the operating processes (Chipriyanova & Chipriyanov, 2022). In order to complete a successful ERP implementation, an effective collaboration between all the departments of the organization is necessary, as a lot of time and effort is needed, this comes on top of a considerable financial investment, thus creating an association of this implementation with a risky and very difficult procedure (Vargas and Comuzzi, 2020).

On the other hand, ERP systems come in time to offer increased confidence to the organization by providing consistent, accurate and reliable data leading to a much more productive work environment, reduced operational costs, standardizing, and organizing internal processes to improve the organization's performance through better productivity and order management (Azhar et al., 2022).

ERP systems are based on a business model that includes planning, control, and optimization phases, helping companies to achieve their business goals, simplifying processes, and providing accurate information, giving companies a competitive advantage in the market by differentiating themselves from their competitors (Andrieș & Ungureanu, 2022). The implementation of ERP systems has led to better visibility, transparency and control for top management, as well as an increase in productivity, a decrease in direct and indirect personnel costs, and an increase in business figures (Ungureanu, 2022). On the other hand, ERP systems present difficulties in adapting to specific processes in different organizations, there is also the

possibility of reducing flexibility and quality control, and the initial investments required for implementation are impressive (Chipriyanova & Chipriyanov, 2022).

Cloud ERP brings added value to businesses by introducing a much stronger flexibility, namely offering the advantage to organizations to access their data, information and the entire set of reports and forecasts online, while also continuing to offer the same functions as the ancestors of traditional ERP. Cloud ERP is presented in the form of three technologies, Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS). Also, the flexibility brought as added value by Cloud ERP can be divided into economic flexibility by introducing flexible prices according to the choice of each consumer, flexibility in performance through the availability of the system anytime and anywhere, flexibility of operational processes because it introduces the option to vary the necessary resources depending on the volume, and flexibility in the market, offering the company solutions to perform better than its competitors (Azhar et al., 2022). An incorrect analysis of the operational processes, the lack of expertise in testing, can cause major problems in the ERP implementation, as well as the configuration of an inefficient and inadequate workflow, can cause a decrease in the organization's performance. However, the business environment in Romania does not favor a successful implementation of ERP systems because if we look at the Index of the Digital Economy and Society (DESI-2021) which measures the digital skills of the population, Romania is in last place among the 28 European states (Ungureanu, 2022).

Internet of Things (IoT)

IoT devices are rapidly disrupting entire business models, it is predicted that they will reach a market share of 31 billion units by 2025 from 13 billion in 2021 (Olcott, 2022). IoT devices represent a very complex concept, representing a form of communication, with wireless connectivity, sensors and codes, where all the objects we currently use are connected to the Internet and thus can be connected to other devices and machines so that any object from this world can connect and communicate in an intelligent way (Tucker et al., 2018).

IoT technology has become more and more widespread, more and more devices are appearing on the market that can be interconnected, gather information, and at the same time offer a multitude of useful information. Companies invest in tools and processes that will increase productivity and profits, but ultimately customer satisfaction, so by connecting them with IoT devices we can increase the volume of data, improving the efficiency of any operational process (Fryer, 2020). On the same page Tucker et al. (2018) stated that all IoT products can bring unlimited benefits and it is still a technology at the beginning of the road, the future being boundless, connecting a smart map and the GPS system car trips are transformed into safer and less stressful trips, being able to connect from anywhere to a public transport system or order a taxi. The very rapid development of IoT technology provides an opportunity for innovation and reinvention even in the energy management sector in any energy consuming or producing sector to adapt to the new sustainable and smart times (Ma et al., 2021).

IoT technology integrated with traditional ERP systems leads to a much more structured, consistent and optimized infrastructure from an operational point of view. Inventory planning, asset utilization and understanding trends are just a few examples where this type of information can improve operational efficiency. More and more warehouses use Wi-Fi connected devices plus a camera and a multitude of sensors ("Connected manufacturing with IIoT", 2020). Tucker et al. (2018) is arguing that in this period, Cyber-attacks are more and more numerous and stronger, and in the case of IoT technology, there are more and more worries about data security. On the other

hand, although IoT devices present multiple security challenges, the aviation industry constantly uses them to send real-time information from onboard aircraft about engine performance (Olcott, 2022). It is necessary that, at the global level, companies rethink the risks of cyber-attacks and develop a new strategy, because every new customer or new supplier that encounters a certain organization also brings with it potential cyber risks, so that only those with high protection and offers visibility in real time on the security performance of cyber-attacks (Olcott, 2022).

Artificial Intelligence (Al)

Although the term Artificial Intelligence has been introduced in specialized literature since the 1950s, it has recently gained popularity and value due to the development of technologies to process a very large volume of data and a large coverage of the network with Internet connection. At this moment, Al has an important palette of applicability in project management, the introduction of processes in order to reduce risks, assistance in the daily routine of tracking the project phases, but also the monitoring of the entire flow (Ong and Uddin, 2020).

The era of which we are contemporaries is dominated by the evolution of technology and certainly the most important innovation is Artificial Intelligence (Al) which produces transformational effects that spread like an earthquake in practically all fields of society. If we look more closely at the business environment, Al brings added value through the tools that automate redundant tasks, that identify data patterns in order to improve process performance by automating routine processes, but at the same time it also offers new, different and valuable perspectives (Naidoo & Dulek, 2022). From the very beginning, AI was used to automate specific processes and repetitive tasks, but over time, companies transitioned to using AI in decision-making, solving problems, creating products, but also developing the ability of machines to work together with the people. One of the biggest problems now is the integration of technology within organizations, the change of processes and organizational culture. On the other hand, the way decisions are made automatically can disadvantage certain groups, creating social dysfunctions. However, the major problem is represented by the invasion of personal privacy (Benbya et al., 2020). Over time, Al has become an essential technology for any business, being able to be implemented in absolutely any activity sector, leading organizations in a disruptive process both internally and externally (Ruiz-Real et al., 2021).

The performance of traditional Business Intelligence systems will reach new higher levels by introducing Al technology, because one of the main purposes of this technology is to model the way people collect data, the way they perceive problems and how they react to solve them, being designed so that to learn from the input data and make rational decisions (Wang, 2021). Al has a huge potential to transform businesses and disrupt entire sectors, however companies that want to integrate this technology face many challenges in finding the sectors where it can bring added value or which decisions can be automated but also a transformation of the entire organization is necessary to integrate technology into the workforce (Kerzel, 2021).

Modern logistics systems are supported by very powerful technological networks that generate a huge volume of data, sensors, machines, systems or intelligent devices, thus leading to increasing the value of Al technology. Many sectors have shown themselves open to implementing AI to transform real-time data into immediately actionable decisions (Chien et al., 2020). In his paper, Hongjin (2021) introduced an artificial intelligence model to identify the risk factors of the financial supply chain, improving the traditional algorithms to recognize the risk factors by combining them with IoT functionalities. Integration of Al within organizations brings added value in improving the efficiency of forecasts so that the entire supply chain can meet the toughest

demands of a continuously fluctuating and unpredictable market (Tripathi, 2020). On the other hand, Johnson et al. (2021) presents the possibility of automating some key tasks in the process of scientific research in management and business, and the result indicates that Al technology presents a perfect fit for this purpose, but the major concern that appears is that this technology can automate the entire scientific research sector, which leads to many benefits but also many dangers for society in general.

Methodology

Systematic research of the existing available specialized literature was carried out in relation to the challenges and opportunities offered by Enterprise Resource Planning (ERP), Internet of Things (IoT) and Artificial Intelligence (AI).

Research Questions

1. What are the opportunities in using Internet of Things (IoT) versus the challenges to transform the Enterprise Resource Planning (ERP) system of organizations in the service sector?
2. What are the opportunities in using Artificial Intelligence (Al) versus the challenges to transform the Enterprise Resource Planning (ERP) system of organizations in the service sector?

Protocol

To survive in these turbulent times, companies need a technological transformation and this research debates the opportunities and challenges of using these three technologies ERP, IoT and Al. Articles related to this subject will be searched in the EBSCO Database and from the list obtained, only those whose title and abstract are relevant to the research will be selected in a first phase, and then in a secondary phase those whose text is not relevant will be eliminated. The information will be systematically collected in close connection with the opportunities and challenges of using the three technologies together and will be synthesized in a narrative form.

Search of Relevant Articles

An article search was carried out in February and March 2023 using EBSCO Database as a source (Business Source Complete, EconLit with Full Text, Psychology and behavioral Sciences Collection, Computer Source, eBook Business Collection, Regional Business News, Library, Information Science & Technology Abstracts, GreenFILE, Teacher Reference Center, European Views of the Americans: 1493 to 1750, eBook Collection, eBook Open Access OA Collection).

The search was carried out using as search words “Enterprise Resource Planning (ERP)” and “Service Sector” than using “Internet of Things (IoT)” and “Enterprise Resource Planning (ERP)”, continuing with “Artificial Intelligence (Al)” and “Enterprise Resource Planning (ERP)”. The entire search was filtered on Academic Journals as article type, published between 2020 and 2023 only in English and Romanian.

Selection Criteria

From an initial list of approximately 600 articles, the selection criteria were applied based on title and abstract as the first phase and then based on the full text as the second phase, finally selecting 25 articles which fir the level of relevance for this research.

Data Extraction:
From the selected articles, information was independently and systematically collected about the opportunities and challenges of using Internet of Things (IoT) and Artificial Intelligence (Al) together with and to transform ERP systems within organizations in the service sector.

Data Synthesis
A narrative (qualitative) synthesis of the data was made, where concepts were investigated and how they relate to each other in order to research possible challenges or opportunities to add value to the current business environment by incorporating the three Enterprise Resource Planning (ERP), Internet of Things (IoT) and Artificial Intelligence (Al) technologies into a single system.

Results and discussions

Enterprise Resource Planning (ERP & Cloud ERP) is one of the technologies that completely and radically changed the way we do business, more than that it brought with it multiple opportunities for development and innovation both within the organizations in which they were implemented as well as globally in the business environment.

Table 1.1 Results and Challenges

Technology	Benefits	Challenges
Cloud ERP	- Improve process performance. - Accurate Information can be accessed fast, easily, anywhere, online. (OP2) - Visibility over the entire operational processes. - More integrated, more efficient, and strongly interconnected. (OP3) - Improving communication and information transfer. - Improve customer experience. (OP4) - Offering possibility to take on time and fair decision. - Reduction of Stocks and Operational Costs	- Safety and Security of Data. - Failure in implementation can lead organizations to bankruptcy. (OP5) - Big financial investment. - Difficulty in adapting to specific processes in different organizations. (OP5) - Adapting the system to the organization process and culture. (OP5) - The accuracy of the data inserted in the platform (OP1)
IoT	- Connected objects, communicating, and transferring data in between. (OP3) - More and more new smart devices on the market that can collect and transfer information. (OP1) - Increase the volume of collected data. (OP1) (OP2) - More structured, consistent, and optimized infrastructure. (OP3) - Automated Inventory and warehousing. (OP4) - Tracking of goods and transportation (OP4) - More volume of real time information. (OP1) (OP2)	- Safety and Security of Data.
Al	- Introduce processes to reduce risks. (OP5) - Assistance in daily routines, tracking project phases, monitoring complete flow. (OP5) - Automate redundant tasks. (OP2) - Automate routine processes. (OP2) - Decision making, solving problems, creativity. - Learn from input data and make rational decisions. (OP2) - Transform real time data into immediate actionable decisions.	- Integration of Al in organization due to the change in processes and culture. - Automated decisions can disadvantage certain groups creating social dysfunction. - Invasion of personal intimacy - Risks in developing danger for society in general

Technology	Benefits	Challenges
Table 1.2 Opportunities		
Opportunity 1	Connecting ERP with IoT technology will support collecting additional data and information with the help of sensors, detectors, cameras and other technologies that can capture information from the environment.	
Opportunity 2	Incorporating AI, together with IoT into the Cloud ERP system, will automatically analyze, extract and synthesize relevant data for certain purposes needed in making reports, forecasts, strategies or decisions.	
Opportunity 3	Connecting all ERP systems within the entire supply chain flow between the client, supplier, carrier, manufacturer regardless of the size of the flow same as all smart objects are communicating and transferring data	
Opportunity 4	Real time visibility on inventory, warehousing or transportation tracking in the same ERP platform will move the customer experience to a higher level	
Opportunity 5	Al, using its main functionalities, to introduce new processes, solve problems and make decisions with a dose of creativity will solve part of the challenges of the ERP system, namely the possible failed implementations, the adaptation of the system to the existing organizational processes and culture.	

Source: author's own analysis

However, the implementation and operation of the ERP system largely depends on the data that is inserted into the platform, information that is entered by people manually, people who are part of different areas and cultures of the world who may have a high or low level of knowledge and digital skills, therefore it is necessary to carry out periodic trainings to learn the necessary skills. Most of the time, in order to provide the best, most accurate and reliable visibility, an ERP system will require more data to be inserted into the platform, which will lead to the hiring of additional labor, which is not only an additional cost but also the creation of new processes and procedures, which will complicate an already complex system. In this phase, the interconnection between the ERP system and IoT technology will simplify the complexity of the operational processes, gathering the necessary data and information with the help of sensors, detectors, cameras and other existing or future technologies that can capture information from the environment. Moreover, the ERP system can connect with other platforms that have already implemented a network of objects with IoT technology, for example Google Maps, Weather Forecast, Shipment Tracking or applications that introduce scanned documents directly into the platform.

While the volume of data included in the platform is getting bigger and bigger, there is a need for data analysis, extracting and synthesizing relevant data for certain purposes needed in making reports, forecasts, strategies or decisions. The ability of a platform to understand this information, analyze it and formulate an answer is given by Artificial Intelligence. Incorporating AI, together with IoT into the Cloud ERP system of organizations, creating an all-in-one solution, the solution becomes transformational, offering the best results, companies reaching their maximum potential, offering enhanced productivity and efficiency, making forecasts with a percentage of effectiveness much higher but also offering a prompter visibility on the problems that appear in the operational processes and the implementation of quick solutions. Any successful organization has a portfolio of clients and suppliers of services, materials or transport, and the fluidization of the supply chain is fully represented by the interconnection of ERP systems between the client, supplier, carrier, manufacturer regardless of the size of the flow. Every possible company uses an ERP system different from the other company, there is a large and competitive market in this regard, it is almost impossible to have the same platform for everyone, but the creation of a standard in terms of interconnection between platforms at a global level among all players it is possible, of course where it is necessary in the form of a "single contact socket". When a company has signed a contract with a client or supplier, an automated exchange of information between ERP systems should also be regulated.

Also, there is an area to be explored in creating even better flexibility in ERP systems, when small changes in the operational flow or exceptional situations are needed, to be implemented much more easily and the system to adapt by itself, through the integration of RPA technology (Robotic Process Automation).

Limitations

The selection of the articles was made by one person, the author and not according to the standard procedure of the systemic research methodology where the selection is made by three people, two people read and select the articles and the third person destroy all possible ties, due to this fact there is the possibility of the risk of bias.

Conclusion

Any organization that wants to be efficient and competitive both nationally and internationally will have to implement an ERP system, but if it wants to go to the next level, to excel in the field in which it operates, something more is needed, it is necessary to opt for transformational solutions by implementing an ERP cloud together with IoT and AI.

Moreover, companies can reach the highest level in terms of efficiency, forecasting and monitoring only by interconnecting the ERP systems of all companies in the same supply chain from the initial point until the moment the product ends up being used by the final consumer. On top of that, improving flexibility by integrating RPA (Robotic Process Automation) technology and adapting ERP systems when they encounter situations that cannot be included in standard operational flows will be considered the "pearl in the crown".

The results obtained from this research that led to the proposals described in the previous paragraphs contribute to the field of studies by filling the gaps in the existing specialized literature being of extraordinary importance and bringing unlimited added value through practical application in real life cases in absolutely any field or part of the world. It would be interesting to further research different and multiple concrete flows from the market and the companies that are part of them in order to research and analyze the data to understand in more detail how the applicability of the theory proposed above will lead organizations to the highest level in performance and competitiveness.

Acknowledgements. *This paper was co-financed by The Bucharest University of Economic Studies during the PhD program.*

References

Andrieş, A. M., & Ungureanu, I. (2022). ERP and Performance of Companies in Romania. *Journal of Risk and Financial Management*, *15*(10), 433.

Azhar, Z., Wei Jie Quah, K., & Goh, J. Y. (2022). Cloud ERP and Value Creation: A Case Study of EngCo. *Global Business & Management Research*, *14*.

BARNA, L. E. L., IONESCU, B. Ş., & MOISE, D. F. (2021). Influenţa sistemelor informatice integrate asupra performanţei şi sustenabilităţii firmelor. *Audit Financiar*, *19*(162).

Benbya, H., Davenport, T. H., & Pachidi, S. (2020). Artificial intelligence in organizations: Current state and future opportunities. *MIS Quarterly Executive*, *19*(4).

Chien, C. F., Dauzère-Pérès, S., Huh, W. T., Jang, Y. J., & Morrison, J. R. (2020). Artificial intelligence in manufacturing and logistics systems: algorithms, applications, and case studies. *International Journal of Production Research*, *58*(9), 2730-2731.

Chipriyanova, G., & Chipriyanov, M. (2022). Business Intelligence Competence and Enterprise Resource Planning (Erp) Systems Tools. *Business Management / Biznes Upravlenie*, (2), pp. 5–20.

Connected manufacturing with IIoT. (2020). *Metal Center News*, pp. 14–18.

Cordova, R. S., Maata, R. L. R., Epoc, F. J., & Alshar'e, M. (2021). Challenges and Opportunities of Using Blockchain in Supply Chain Management. *Global Business & Management Research*, *13*(3)

Fryer, D. (2020). Transformative systems for the future: small businesses are under pressure to implement new technologies to stay competitive as the business landscape continues to evolve. *Food Manufacturing Africa*, 8(2), 9-9.

Hongjin, S. (2021). Analysis of risk factors in financial supply chain based on machine learning and IoT technology. *Journal of Intelligent & Fuzzy Systems*, 40(4), 6421–6431.

JOVANOSKA, I. (2022). The Role of the Enterprise (Erp) Resources Planning System in Improving Business Processes. *Economic Development / Ekonomiski Razvoj*, 24(1), pp. 120–132.

Johnson, C. D., Bauer, B. C., & Niederman, F. (2021). The automation of management and business science. *Academy of Management Perspectives*, *35*(2), 292-309

Kerzel, U. (2021). Enterprise AI Canvas Integrating Artificial Intelligence into Business. *Applied Artificial Intelligence*, 35(1), pp. 1–12.

Ma, S., Zhang, Y., Ren, S., Yang, H., & Zhu, Z. (2021). A case-practice-theory-based method of implementing energy management in a manufacturing factory. *International Journal of Computer Integrated Manufacturing*, *34*(7-8), 829-843.

McCrevan, P. (2020). What More Can My ERP Do? Enterprise Resource Planning is becoming more integrated, efficient, and interconnected, with increased security for manufacturing operations and processes. *Foundry Management & Technology*, 148(1).

Naidoo, J., & Dulek, R. E. (2022). Artificial intelligence in business communication: A snapshot. *International Journal of Business Communication*, *59*(1), 126-147.

Olcott, J. (2022). New Supply Chain Risks Require Board Oversight. *NACD Directorship*, 48(4), p. 75.

Ong, S., & Uddin, S. (2020). Data science and artificial intelligence in project management: the past, present and future. *The Journal of Modern Project Management*, *7*(4).

Ruiz-Real, J. L., Uribe-Toril, J., Torres, J. A., & De Pablo, J. (2021). Artificial intelligence in business and economics research: Trends and future. *Journal of Business Economics and Management*, *22*(1), 98-117

Tan, B., Pan, S. L., Chen, W., & Huang, L. (2020). Organizational Sensemaking in ERP Implementation: The Influence of Sensemaking Structure. *MIS Quarterly*, *44*(4).

Tripathi, M. (2020). Artificial Intelligence: Transforming Supply Chain Management. *Journal of Case Research*, *11*(2).

Tucker, K., Bulim, J., Koch, G., & North, M. M. (2018). Internet industry: A perspective review through internet of things and internet of everything. *International Management Review*, *14*(2), 26.

Ungureanu, I. (2022). ERP and Financial Performance - Case Study on Romanian Companies. *Review of Economic & Business Studies*, 15, 47–59.

Vargas, M. A., & Comuzzi, M. (2020). A multi-dimensional model of Enterprise Resource Planning critical success factors. *Enterprise Information Systems*, 14(1), 38–57.

Wang, H. T. (2021). Business Intelligence in the Realm of Big Data, Semantic Web and Artificial Intelligence. *Proceedings of the Northeast Business & Economics Association*.