

## HOW DIGITAL TECHNOLOGIES INFLUENCE SUSTAINABILITY PRACTICES IN THE RETAIL INDUSTRY

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**Abstract:** *Digital technologies are becoming fundamental elements of the business environment, practitioners, policymakers and researchers. An essential component for companies in this new era is the Enterprise Resource Planning (ERP) system used for the companies' management. The ERP is part of an Information System (IS) that permits the interaction between people and technology, being represented as an agile, intuitive and planned tool. The purpose of an ERP is to provide information suitable to support decision-making and strategies inside a business or industry of the economy. Our study intends to explore how digital technologies influence the sustainable practices of retail in the new era of Industry 4.0.*

**Keywords:** Digital technologies; Industry 4.0.; sustainable companies; ERP systems; sustainability.

**JEL Classification:** K29; M14; L25; M21; F23.

### 1. Introduction

Digital and new technologies contribute to having a defined sustainability strategy and an agenda inside the new emerging circular economy cycle (Kristoffersen et al., 2021:241-242). Modern digitised companies currently play a crucial role in employing and finding new technologies progressing toward the United Nations' 17 SD goals defined in 2015. As a result of Industry 4.0., which includes the use of ERP systems, businesses have started to integrate into their processes essential elements such as supply chain, internal organisation (e.g. HR), Big Data and analytics tools etc.

The ongoing transformation of the industrial sector around the world is referred to as 'Industry 4.0', and the difficulties of it have been quickly accepted by large businesses, especially the ones introducing technological solutions. Corporate performance is a crucial element that supports the company's overall success and supports innovation inside businesses. A variety of software programs have been created gradually (Ghezzi & Cavallo, 2020), some of which have been merged into applications like Enterprise Resource Planning (ERP). The ERP is part of the Information System (IS), a social system that permits the interaction between people and technology. It is considered agile and intuitive, has a planned structure and supports decision-making and strategies inside businesses (Matende & Ogao, 2013:519-522). The ERP systems aim to integrate into the business processes

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technologies such as Big Data and analytics tools, or support sustainability reports and visions (Shadrack, 2020:39-40). They are used to oversee the organizations operations' (e.g. accounting, compliance, project management and distribution chain operations). Since the term Industry 4.0, often used as a synonym for smart manufacturing or factory, was initially mentioned in 2012 (BMBF), Rauch & Matt agree that a lot has changed in recent years, especially in the field regarding innovation and production digitization. 'The first years were largely dominated by discussing what the collective term Industry 4.0 means, how it can be defined and which core technologies support the fourth industrial revolution' (Rauch & Matt, 2021:4). Additionally, Narvaez Rojas et al. mention the term 'Society 5.0', a Japanese initiative that was created to play a more prominent part for the progress of the nation and its development. It emphasises the idea that no human being should be denied access to the technological progress of our society (Narvaez Rojas et al., 2021:1).

IT technology has given organisations a wide range of tools to help with managerial responsibilities while incorporating these advanced technologies into sustainable businesses. It reflects both internal purposes, for example, competitiveness and external aims, such as government requirements (Alraja et al., 2022:3). However, there is still much uncertainty regarding the impact of ERP usage on business performance and the factors influencing this relationship for companies in general, but especially for SMEs (AIMuhayfith & Shaiti, 2020). Regardless of the aim to implement ERP systems, small and medium-sized businesses must overcome multiple challenges of the human and financial resources necessary to systematically research the benefits and threats of implementing Industry 4.0 (Rauch & Matt, 2021:v).

As a result, this article contributes to the ERP literature by analysing how digital technologies and ERPs influence the growth of sustainable-oriented companies. This paper aims to review the current research surrounding the implementation of ERP systems, explore this relationship using a selective cluster of companies and analyse their level of technology based on successful ERP implementation. This paper includes a revision of the ERP systems, proposing a literature review that covers existing research on the topic. Secondly, the aim of this research is introduced, considering what it seeks to demonstrate, which is to determine how digital technologies influence sustainable practices of the retail sector in the new era of Industry 4.0. Finally, there were identified certain limitations of the paper and proposed future lines of study for policymakers, students and researchers.

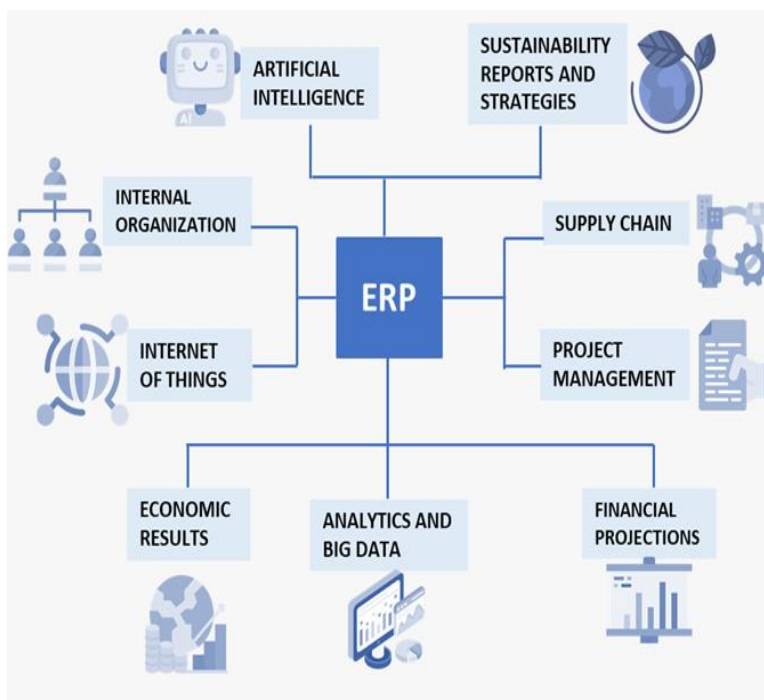
## **2. Literature review**

As per Melville's et al. definition (2004), IT business value is defined 'as the organisational performance impacts of information technology at both the intermediate process level and the organisation-wide level, and comprising both efficiency impacts and competitive impacts' (2004: 287). Some of the advantages that IT can bring to a business, as identified by the authors are considered 'productivity enhancement, profitability improvement, cost reduction, competitive advantage' (2004: 287). Safiullin et al. (2019:4-5) indicate also that at the moment many cities and regions have been actively working on implementing digital policies to expand productivity in the public sector and sustainability.

Today the implementation of ERPs is very present in business schedules and of rising importance, including the small and medium enterprises, regardless of their more limited resources concerning larger firms and corporations. According to Brenner (2018), although ERP systems can create shared values for the company and its stakeholders, they can support society and the company's overall success. They can also add more complexity to the business. Following Deep et al. (2008), ERP systems used to be driven only towards large corporations and companies, yet today the SMEs field has started to obtain more popularity, as it is still an unexploited enough market. SMEs in particular face many challenges in this era of the current fast-paced business environment, including competitive

pressure and ongoing IT advancements used by most businesses to obtain competitive advantages. The difficulties, however, impact how enterprises are run, thus on their management. Implementing Enterprise Resource Planning systems has different effects on various organisations. This is why one of the goals of our article is to outline the most significant digital technologies used in the Romanian retail sector, while also observing what effects these can have on business sustainability results.

It is pertinent to assume that a business can protect itself from various economic uncertainties if it adopts digital tools and invests in new technologies, for instance, incorporating digital technologies into business models brings high competitiveness and advantages (OECD, 2021: 9-14). Adopting new emerging technology means developing a strategy and if an organisation develops sustainable tools and invests in modern technologies, it could have a significant impact and protect the business from various economic challenges. This is why nowadays many companies employ enterprise resource planning (ERP) software, which has grown in popularity in recent decades, to boost corporate performance. Implementing Enterprise Resource Planning systems has different effects on various organisations, which is why one of the goals of our article is to outline the most significant elements involved in the adoption of enterprise resource planning systems. Figure 1 summarises some of the most important elements of the ERP model based on the Author's research.



**Figure 1:** Elements of the ERP's model  
Source: Author's own creation

To gain a comprehensive picture of the progress of ERP systems, authors Costa et al. (2016: 1-4) reviewed existing studies on ERP systems from recent decades. They revealed that although research on ERP systems has risen lately, the majority of the studies concentrate only on the deployment phase. According to Kallunki et al., 'ERPs are organisation-wide and integrated information systems that can be used to manage and

coordinate all the resources, information, and functions of a business from shared data stores' (Kallunki et al., 2011:21). As planning systems, an ERP can make a substantial contribution to an organisation's effectiveness in the current fast-moving corporate climate. However, its implementation is considered a highly lengthy task that has several limitations due to its intricate structural design, which can generate certain established implementation challenges (Sumner, 2000). 'Information systems potentially change an organisation's structure, culture, politics, and work; that is the reason why there is often considerable resistance to them when they are introduced' (Veljanoska & Axhiu, 2013: 8).

For example for SMEs with little expertise in IT, or with limited access to innovation capabilities, and scarce financial and human resources, these threats become indisputable. These lead to businesses having used various tactics and changing initiatives to cope with these obstacles, aiming to improve the efficiency of their internal processes. As per Scott and Wagner, as cited by Molina-Castillo et al. (2022), 'ERP implementation processes can be hard for companies, for instance when specific ERP software does not match the existing operational model, needs to be aligned with business processes or integrated with other applications, e.g. management information or knowledge-management systems' (2022:2).

Following Brenner, 'Digitization has become widespread, affecting each aspect of the global economy. Consequently, organisations are busy exploring how large-volume data—or "big data"—can be usefully deployed to create and capture value for individuals, businesses, and organisations' (Brenner, 2018:1-2). Therefore businesses (Beheshti, 2006:190) seek to obtain certain advantages by reinterpreting their business model through experimentation and development (Weking et al., 2020). Nonetheless, given the fact that today getting information from various systems and combining it to make information circulate effortlessly throughout the firm is one of the biggest issues that businesses deal with, the ERP system can certainly bring some significant advantages. For example, combining information not only inside the company but also coordinating it with suppliers and other partners or stakeholders. Veljanoska and Axhiu (2013) explain that an ERP system can be of service to various business functions through a unique database that stocks information useful for CRM, Finance, HR or Manufacturing among others, containing information that is always current and available to every part involved in the process.

Today's firms are finding that they can become more flexible and productive by coordinating their business processes more closely and, in some cases, integrating these processes so they can focus on efficient management of resources and customer service. (...) Intended to ease the administration and optimization of internal business processes across a corporation, ERP packages have become the competitive tool for most large trade organisations (Veljanoska & Axhiu, 2013: 6).

Independent of the size of the business, whether it's an SME or a larger company, they will all experience concrete and immaterial advantages, involving benefits such as 'business processes enhancement, best practices implementation, and enterprise assimilation and combination' (AIMuhayfith & Shaiti, 2020:3). This is leading to companies being ready to start investing in this kind of new technology because of the incredibly significant gains. For instance, according to research conducted by Market Research Future (2022), the global ERP market software is valued at \$50.84 million in 2021 and is expected to reach \$117.68 by 2030. Therefore, it has become a useful tool for competitive businesses all around the world, being employed in numerous areas including governments, NGOs and other institutions as well.

Further, our article focuses on the methodological side, including the materials and methods used to conduct this research highlighting how digital technologies influence companies, more specifically practises from the retail industry to become more sustainable, competitive and productive at the same time.

### **3. Methodology**

The crisis of the COVID-19 pandemic has gradually changed the existing living conditions, with a transition from the traditional market economy to the digital market (Nosova & Norkina, 2020: 651). Digital technologies are offering new opportunities to companies forcing them to create innovative business models and migrate from conventional-centric approaches to digitally-based service-oriented ones (Paiola & Gebauer, 2020:244).

This paper is based on a qualitative research method and it aims to describe how digital technologies influence sustainable practices in the retail industry. But at the same time, it is following a quantitative analysis by comparing different data of Romanian-based realities, collecting and transforming them to qualitative results. Digital technologies such as the Internet of Things, Cloud platforms, Big Data and Data Analysis are offering companies the possibility to leverage technology to innovate their strategies, align with regulations and implement new business models to comply with standards and grow their productivity. The main focus of the research regards the following three aspects:

- selecting a cluster of big companies from a based-Romanian sector and analysing the most relevant digital technologies used and their sustainability results;
- understanding how digital technologies influence sustainability practices in the retail industry;
- representing a situational analysis with a SWOT matrix by understanding how digitalization can be related to sustainable practices.

We decided to use the comparison, the case study, and the official document analysis as research methods/instruments for our article, as we considered these efficient ways of getting valuable insights into where Romania is situated in terms of ERP implementation in the EU context, by studying data in Eurostat corresponding to the year 2021, the most recent set of available data. For example, comparing this type of data which includes most of the European countries helped us better understand and provided us with a clearer picture of whether Romania is progressing towards new and modern digitalization technologies or is unfortunately staying behind, under the European average.

Additionally, we decided to analyse a cluster of Romanian-based hypermarkets by looking at their annual sales, comparing data available in Statista, and their sustainability results according to the official documents found on their websites. By consulting companies' reports from the last five years to gather information about the digital technologies used, where they're currently standing, and later comparing them to the Digital and Sustainability Survey of 2021 by Bain & Company and the World Economic Forum, we were able to summarise a large quantity of information concerning the technologies used by the top five retailers in Romania and the results produced.

Finally, we realised a SWOT analysis composed of strengths, weaknesses, opportunities and threats, as a way to understand how digitalization is related to sustainable practices in the retail industry in Romania.

We would also like to add the fact that this approach cannot be inferred for other environments without first realising an in-depth analysis as well, but in the current situation it allowed us to have an improved and thorough understanding of the topic discussed.

### **4. Results and discussion**

#### **4.1. Relevant digital technologies used in Romania and the results obtained.**

It is generally accepted that businesses have different sizes and operate in various industries. The company's sizes are identified as the following: a) a micro-entity has from 1 to 9 employees; b) a small business has from 10 to 49 employees; b) a medium-sized from 50 to 249 employees; and d) a large company has +250. A company's size is defined by the

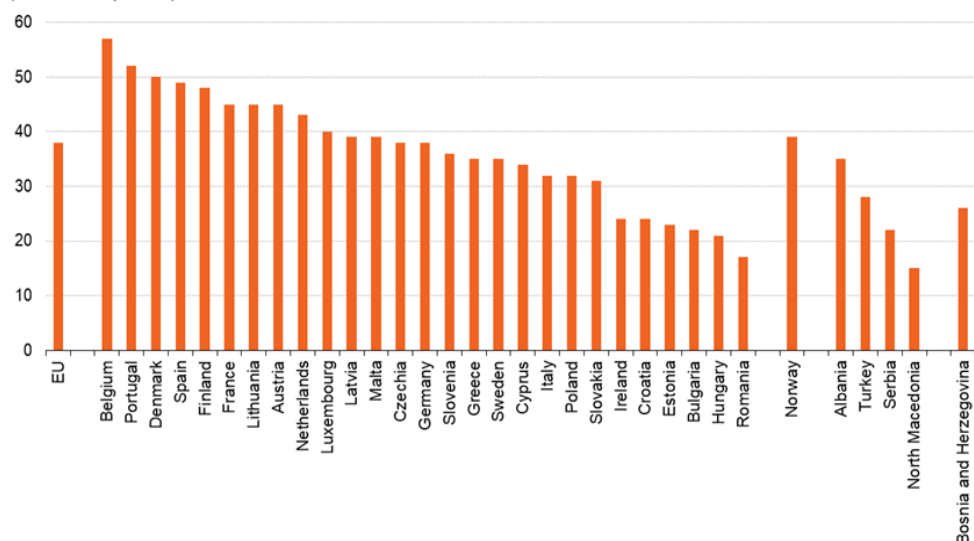
number of employees, its final balance sheet, and any other qualitative factor that plays an essential role in identifying the type of business.

This article focuses on the retail industry, more exactly on big realities such as hypermarkets, that combine grocery supermarkets and department stores and offer a high variety of products.

When looking at ERP implementation based on the size of a business, it appears that ERP software applications were adopted in 2021 by 38% of EU enterprises (ERP) according to Eurostat's most recent data (2021), going from 33% for small enterprises to 81% for large enterprises. Unfortunately, as per the statistics available, Romania presents the lowest percentage of companies that use ERP with only 17%, followed by Hungary at 18% and Bulgaria at 22%. Out of all the realities considered in the research, only North Macedonia has a lower score with 15% of the enterprises using ERP. On the opposite end, we have Belgium (57%), Portugal (52%) and Denmark (50%). Considering this, it is fundamental to acknowledge and improve the level of ERP implementation in our country.

### Enterprises having ERP software package, 2021

(% of enterprises)



(\*) Montenegro: data unreliable

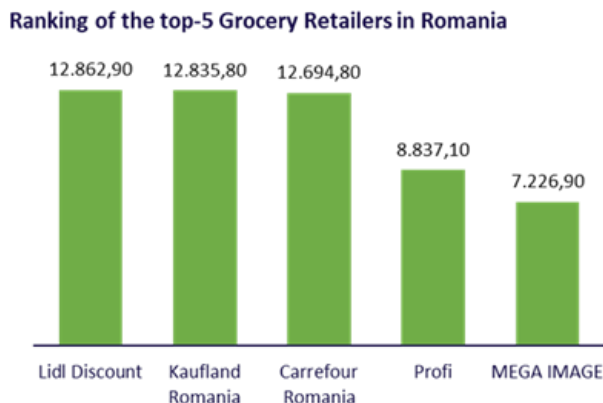
Source: Eurostat (isoc\_eb\_iip)

eurostat

**Figure 2:** Percentage of enterprises using ERP in 2021

Source: Eurostat (2021)

To reply to the first point of the methodology, we select a cluster of Romanian-based Hypermarkets and analyse the most relevant digital technologies used for them and their sustainability results. Before starting with the proper analysis, we considered numbers from Statista data published in February 2022 about an online ranking of retail chains in the food category. The top position of grocery retail in Romania and the most powerful five groups of the list are Lidl Discount and Kaufland from the Schwarz Group, Carrefour, Profi and Mega Image (Ahold-Delhaize) with RON 54.46 billion annual sales of the modern retail as shown in Figure 3:



**Figure 3:** Top 5 Grocery Retailers in Romania  
 Source: Author's own creation

As shown in Figure 3, the top 5 grocery retailers that have the highest results in the Romanian food market are also the more known Hypermarkets in the country. Therefore, to understand the most relevant digital technologies used in the retail sector and their sustainability results, we proceeded as follows: 1. we consulted companies' reports during the past five years (where available on their online websites), 2. compared them with the 2021 survey of Bain & Company and 3. finally, summarised their overall results represented below. Therefore, Figure 4 indicates the main digital technologies that have been used in the past years and the effects they generally produce.



**Figure 4:** Technologies used by Hypermarkets and their results  
 Source: Author's own creation.

Digital technology requires a highly balanced sustainability strategy that understands its social and economic impacts. Although new and digital technologies such as Artificial Intelligence, IoT etc. present transformative opportunities to address environmental challenges, if left unguided, they can affect the environment, diminish people's interaction and bring losses to SMEs or local companies. If businesses want to develop safe digital technology, they must ensure that it aligns with societal requirements and values in all ways. Today, digital technologies are often being used to optimise the use of resources, produce economic advantages and bring a green and circular economy through various sectors of industry (Wynn & John, 2022).

#### 4.2. The link between digital technologies and the retail industry in Romania

To reply to the second point of methodology, regarding how digital technologies influence sustainability practices of the retail industry, in Figure 5 we summarise the ways these big realities are using digital technologies to improve their business. Retailers aim to digitalize

the entire activity of the business, rather than individual functions and areas, as the main challenges to the use of digital technologies in big companies lie in the technical, organisational and administrative plans. For designing the elements of Figure 5 we consider the Digital and Sustainability Survey of 2021 by Bain & Company and the World Economic Forum.



**Figure 5:** Top ten ways Hypermarkets are using digital technologies to improve their sustainability

Source: Author's own elaboration from Sustainability Survey of 2021 by Bain & Company & the World Economic Forum Figure.

Accenture research from 2017 finds that 'digital technologies and AI could increase profitability by 38% by 2035 and lead to \$14 trillion in economic growth across 16 industries in 12 countries by 2035, but this will only happen if organisations adopt the "people first" approach and take bold and responsible steps to apply AI technologies in their business (Accenture, 2017).

### 4.3. Swot Analysis: understanding the link between digitalization and sustainable practices.

Finally, to respond to the last point of the methodology, we represent a situational analysis with a SWOT matrix (composed of strengths and weaknesses, opportunities and threats) by understanding how digitalization can be related to sustainable practices.





**Figure 6:** SWOT Matrix  
Source: Author's own creation

The SWOT analysis is related to the relationship between the digital technologies of hypermarkets, their users and external/internal factors. The elements of the SWOT table were obtained considering an internal data analysis of the Romanian-based hypermarket's situation. The weaknesses represent negative points that can occur, namely situations that will arise during the Hypermarket's digitization process. The main strengths consist of the resources that Hypermarkets can use effectively to achieve their objectives or actions already implemented or under development in the different segments of the industry. The opportunities are possible results after implementing digital technologies or openings for something positive to happen. Finally, threats include anything that can negatively affect the industry from the outside, such as shifts in market requirements, supply-chain problems, national economic competitors with better prices etc.

## 5. In conclusion

This article aims to outline how digital technologies influence the growth of sustainable-oriented companies. Our research has numerous advantages in understanding the idea behind digitalization and new technologies, which is current and involves various segments of business and society in general. However, this analysis can have limitations as conducting the research from only one perspective or reducing its perimeter cannot be always exhaustive. It is still challenging for governments, academics or institutes to put together unique studies or official documents about digital technologies since it is a broad subject, continuously evolving. Our findings underline that digitalization influences the future of economies and sustainable-oriented companies.

Thus, digital technologies bring sustainable practices and competitiveness to the business environment. To revive economies, it is essential to expand them with investments in digital tools, new technologies, sustainable practices, green economy, renewable sources and green energy. Access to new digital technologies and sustainability practices brings

diversity to the economy and prepares governments to compete with other European realities.

Governments, regulators, businesses and individuals have the responsibility to embrace digital technologies to facilitate processes and therefore put a greater focus on digitalization as the right direction to engender sustained change. The EU market has numerous benefits for companies, for example, efficiency, where the allocation of resources is the most valuable. Many industries and firms have a considerable degree of market power, as investing in digital technologies can be a key to revenues. The practical solutions we propose are to offer companies a basis for understanding how digital technologies bring concrete benefits to businesses. Thus, the practical solutions that a company can adopt to streamline its processes consist in using electronic tools, systems, devices and resources which generate, store or process data. Investing in a digitally advanced product entails high initial costs but certainly higher future revenues if all market conditions are favourable.

Decision makers need to focus on key choices, as greater use is made of technology in all its forms to deliver a sustainable environment by 2030 and further.

It is up to interested researchers to collect the elements and information of this study and develop it further, as the ERP subject is iterative and gives concrete results to business realities. Finally, considering our study, we identified that there are few scientific articles focusing on the influence that digital technologies have on the growth of sustainable-oriented companies in Romania, and even fewer focusing on Romanian SMEs. We support the idea that there is a real need for further research regarding the object of our study, and we hope that this paper will be a point of future research.

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