

The Use of Information Technology in SMEs: Advantages and Main Challenges

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Abstract. *From the beginning of the 20th century, a lot of research has been conducted on how SMEs contribute to the development of innovative activities and vice versa, on how new technologies and innovation have the potential to influence small and medium-sized enterprises (SMEs). Nowadays, given the highly competitive and dynamic business environment, SMEs are constantly and actively trying to find ways to keep up with the latest developments, which is not always an easy task. Digital technologies and innovation in business administration and other related fields are key attributes that can be seen as essential elements in the field of entrepreneurship. Thus, digitization has become a crucial factor in the business world, and its impact on SMEs cannot be neglected. Nonetheless, company size, capital and resources seem to limit SMEs' ability to adopt digital technologies. However, countless studies argue that a smaller firm size allows SMEs to be more flexible to change. Therefore, both digital progress and innovation have become highly relevant tools for businesses to improve their performance, reduce their costs and increase their efficiency, and are seen as key factors for competitiveness, development and economic growth. With this paper we understand how Romania, with its expanding economy and support for entrepreneurs, has the potential to be a relevant player in the digital economy, although its current ranking on the level of digitization and innovation is considerably lower than the EU average.*

Keywords: SMEs, technology, digital technology, Romania, challenges.

Introduction

Today, the fourth industrial revolution or Industry 4.0 is associated with the digitization of all company management processes, playing a significant role in eliminating traditional business and management processes, considering that the use of technology can provide a competitive advantage to those who have mastered technological tools (Radicic & Petkovic, 2023). Consequently, if the internal processes of companies used to be strongly dependent on paper documents, today digital technologies allow remote interaction, receiving digital data and information, facilitating decision-making, and optimizing allocated time. As per Radicic and Petkovic (2023), digital technologies that enable the collection, storage, and processing of data, such as artificial intelligence, the Internet of Things (IoT), and blockchain, represent new opportunities for SMEs. These opportunities include, among others, entering foreign markets, engaging in international trade, and participating in global value chains.

In Europe, according to Accountancy Europe, "many SMEs are innovative in technologies or have taken significant steps towards digitization. However, many less digitized SMEs still face challenges when it comes to digitization" (Accountancy Europe, 2021).

Regarding SMEs and decision-making in their case, the use of digital data processing systems can lead to more efficient business planning, as well as more effective reactions to "evolving circumstances and improved predictions regarding their business prospects" (Accountancy Europe, 2021). For example, consolidated digital database platforms facilitate the quick identification of factors contributing to business growth and profitability. As a result, managers can make estimates regarding the company's evolution, an action that in the past was not easy to achieve without digital resources, as the enterprise leadership team had the task of manually collecting various sources and analyzing them efficiently. Enterprises face the challenge of processing significant amounts of data. In the context of the latest advances in artificial intelligence and statistical models, this data can provide valuable information that can be processed more quickly to anticipate the future evolution of the business and eliminate errors.

Through this article, we aim to explore how the digital revolution and technological advancement have transformed the way SMEs manage their businesses, from decision-making processes to human resources and financial planning. To achieve our objectives for this paper, we are employing a methodology structured in three steps. First of all, our goal is to quantify the adoption of digital tools by identifying the total number of SMEs in Romania and determining the percentage of these enterprises utilizing digital technologies. Then our analysis is focused on the Digital with Purpose report from 2019, realized by Deloitte and the Global Enabling Sustainability Initiative, to identify the most impactful digital tools for SMEs in Romania. Lastly, we are conducting a SWOT analysis specific to Romanian SMEs, evaluating the Strengths, Weaknesses, Opportunities, and Threats that may influence the acquisition of digital technologies for the Romanian business field. We are looking at how SMEs are adapting to technological advances to remain competitive in the global market, given that today's competition is international, and firms with a high level of digitization, although young, may end up competing with successful traditional business models. In agreement with Hausberg et al. (2019), from the decision-making process to human resource management or financial decision-making, digitization has significantly influenced the management of SMEs.

Literature review

According to Accountancy Europe (2021), in Europe, we are dealing with a very diverse palette of small and medium-sized enterprises. It can include companies that individually develop certain technologies or companies that need to adopt methods and examples already tested by others. Thus, according to Ilieva and Logeais (2021), the use of digitization creates the foundation for rapid analysis of the current situation of enterprises and decreases the possibility of errors, which generally improves the quality of decisions. However, according to the authors, while the use of intelligent systems helps reduce processing time, human expertise is still needed to verify the collected results. On the other hand, currently, there is a lot of research confirming that the strategic adoption of digital technologies can lead to increased productivity and performance (Papadopoulos et al., 2020). "In Europe, the key challenge is to ensure that such opportunities are fully captured by industry and service companies, harnessing digitization to create economic growth and new jobs" (European Commission, 2018).

As per Kane (2015), the main technological trends related to digital transformation are described in the literature as social, mobile, analytics and cloud computing. Regarding cloud computing, according to Assante et al. (2016), it seems that market trends show that European SMEs are not making the most of the convenient solutions that cloud computing offers. Cost

management is one of the most serious difficulties for small and medium-sized enterprises, it is not beneficial for them to make large investments in IT services, especially given the uncertainty of the results obtained.

At the level of Romania, according to an Intel study that targeted Romanian SMEs and their reporting on cloud computing, it seems that "54% of the SMEs that already use Cloud Computing services have applications related to salaries and analysis of data in the Cloud and 46% of them have procurement-related data" (Intel, 2014, quoted by Bursa), and the most used applications in the Cloud are software for human resources, CRM, project management, finance, salaries, procurement or accounting. The SMEs participating in the Intel study that already used cloud computing services, state that the choice was motivated by the reduction of IT costs (46%), the ease with which they can be used (30%), the fact that information is secured, it cannot be stolen or lost (30%), as well as by the increased employee mobility (23%) (Intel, 2014).

In the case of the analyzed Romanian SMEs using cloud services, "the benefits observed in the first six months after the adoption of Cloud services are the increase in the mobility of employees and the company, in general, the reduction of IT costs, the increase of competitiveness, fast access to data and their real-time analysis" (Intel, 2014). Unfortunately, however, the level of digitization of Romanian enterprises is below the European average (69%), and according to the European Commission's Country Report for Romania, only 53% of local SMEs have a basic level of digitization, and the percentage seems to be decreasing when we refer to advanced technical knowledge such as cloud computing, artificial intelligence, or big databases.

Regarding Big Data, in the case of SMEs, Big Data can be useful for them to anticipate customer preferences and needs, but also for predictions about the target audience. This perspective is also reinforced by Chan (2020), adding that most small and medium-sized enterprises store data in several places, for example, CRM systems, inventory management software, marketing data or POS sales systems. Thus, SMEs need to find the right data tool for their specific needs, ensuring that the data collected is reliable, complete, and consistent. For example, without Big Data, it is certainly possible for a business to build a profile of its customers, but it is more difficult to understand the reasoning behind purchase decisions. With the right data management tools, SMEs avoid the need to analyze, correct or combine datasets, as Big Data tools help improve data quality, for example by gaining a deeper understanding of customer preferences by recording information about experience, regardless of device, which allows for more useful marketing campaigns or better product development. At the same time, another key advantage of Big Data is that it allows SMEs to easily determine if their rates are in line with the competition and, therefore competitive. Thus, this information can be used for business-wide improvements as well as maximizing efficiency.

Currently, we can identify a multitude of tools and software useful for Big Data, but since SMEs do not always easily manage and control large volumes of data, a solution to reduce costs and complexity could be Amazon Web Services. Another example could be SAS. For example, SAS offers business analytics and software services, turning data into development opportunities, thus helping SMEs in their decision-making process. Also, another useful tool for SMEs is considered the free Google Analytics platform, which offers SMEs the possibility "to extract long-term data to reveal trends and other valuable information (...) For example, tracking and analyzing visitor behavior – such as where traffic comes from, how audiences interact, and how long visitors stay on the site" (Oldham, 2023).

Regarding the disadvantages, Iqbal et al. (2018) identify the following aspects as the main disadvantages: SMEs face a lack of case studies and representative success stories in the use of Big Data, which makes it difficult to propagate innovative activities at the enterprise level. Also adding

to this challenge, the authors argue, are customer data protection and privacy laws, especially when it comes to large volumes. Thus, SMEs with little or insufficient legal expertise in-house are often forced to turn to a third-party legal party, which means an additional cost that they cannot always afford. For example, the European Data Protection Law handbook is more than 200 pages long, and understanding all the legislative nuances in it could prove challenging for SMEs trying to understand the implications for their business. Another additional cost could be generated by additional staff training if new cybersecurity policies and procedures are required. At the same time, SMEs do not have the possibility, most of the time, to obtain huge financing, therefore there is a tendency to invest cautiously in new technologies. Therefore, they may not have an allocated budget for IT or Big Data investments.

Also, according to Willetts et al. (2020), to adopt these technological solutions, ethical concerns also intervene, namely the fears related to the collection and use of Big Data, often criticized for violating privacy. The authors explain that when using large data sets to make predictions about consumer behaviour, SMEs must be aware of certain ethical concerns. Thus, there must be an ethical balance between the protection of privacy and the use of personal data.

Table 1. SME barriers to adopting Big Data. Classification in 5 pillars

Business	Work environment	Workforce	Organisational area	Technological area	Business	Work environment	Workforce	Organisational area
Financial barriers	Ethical reasons in the use of data	Lack of in-house expertise in data analysis	Reluctance to change	Data complexity	Financial barriers	Ethical reasons for the use of data	Lack of in-house expertise in data analysis	Reluctance to change
Lack of successful cases	Failure to identify and address digital risks	Lack of consulting services	Cultural barriers	Data scalability	Lack of successful cases	Failure to identify and address digital risks	Lack of consulting services	Cultural barriers
	Aspects related to Big Data regulation		Lack of technology management skills	The level of readiness of the infrastructure		Aspects related to Big Data regulation		Lack of technology management skills

Source: Adapted from Willetts et al., 2020.

However, Big Data remains an effective method for organizations of any nature to process a large volume of data, including SMEs, even though the first uses of collecting large volumes of data belonged predominantly to large corporations to increase analytical skills at the level of the organization, being often used to detect fraud (Rising et al., 2014). As digital technologies have advanced, more and more small businesses can overcome financial constraints more and more effectively, given that they can access cheaper, and more easily accessible servers and data centres delivered through cloud providers. In Romania, according to the report published in the White Paper of Romanian SMEs (2021:351), in terms of software used by SMEs, the most common are business operating software (63.62%), electronic signature (52.33%), communication software (17.74%) and security software (19.00%). The ERP software for managing, planning, and optimizing the company's processes, is used in percentage of 10.57%, and CRM software simplifies and makes sales processes more efficient – in percentage of 8.96%. Thus, small, and medium enterprises in Romania are below the European average. According to Eurostat, in 2021 only 17% of Romanian companies used ERP systems, in contrast to the European average of 38%. According to Molina-Castillo et al. (2022), “ERP implementation processes can be difficult for companies, for example when a specific ERP software does not fit the existing operating model, it needs to be

aligned with business processes or integrated with other applications, for example management information or systems of knowledge management".

In conclusion, according to OECD (2000), SMEs have the advantage of being able to make decisions quickly, unlike most large firms, where the level of bureaucracy may be higher and therefore, they can exploit opportunities more effectively and bring an impact on the level of innovation (Eurostat, 2014). In addition, the EC mentions in the publication *Shaping Europe's Digital Future* (2020), that many European businesses, and in particular SMEs, have not been very quick to adopt digital solutions, which has led the Commission to develop some new strategies to facilitate the transition to a more digital EU industry and also recognizing that SMEs need clear, reasonable and consistently applied regulations across the EU to give them a strong internal market from which to succeed to penetrate the global market. For Romania, prioritizing innovation and investments in digitization could help support the overall growth of the Romanian economy, and this could include government incentives or funding programs for innovation, as well as training to help SMEs develop their knowledge and innovative skills.

Methodology

As digital technologies continue to integrate into every facet of society, there is an urgent need for a deeper understanding of how technology will impact progress toward sustainable development (Bril et al., 2023) for Romanian companies, and especially SMEs. Consequently, our paper's methodology is based on three main points:

- Quantification of digital adoption: we begin by identifying the total number of companies in Romania (focusing on SMEs), determining the percentage of them that utilize digital technologies and the current existing support structures for the Digitalization of SMEs. This step is crucial for comprehending the current landscape of digital integration in the business sector.
- Considering the Digital with Purpose (DwP) report, jointly published by the Global Enabling Sustainability Initiative (GeSI) and Deloitte in 2019, we identified which are the most impactful digital tools to SMEs of Romania. Recognizing the significance of these key technologies in today's world is essential for organizations and professionals to successfully address Environmental, Social, and Governance (ESG) issues in the future (Bril et al., 2023).
- Lastly, we conduct a SWOT analysis, evaluating the Strengths, Weaknesses, Opportunities, and Threats specific to Romanian SMEs. This strategic assessment provides a comprehensive understanding of the internal and external factors that may influence the integration of digital technologies for sustainable development in the Romanian business context.

Results and discussions

The number of businesses in Romania continues to grow, as shown in Figure 1.

- The number of businesses has an expected growth of about 3% between 2021 and 2027.
- Micro-enterprises are the highest in numbers for Romania, around 90% of the total considering our data.
- Small enterprises account for 7.5% of the total enterprises, and their growth is moderate.
- Medium-sized enterprises make up approximately 1.2% of the total enterprises, and their numbers remain stagnant.

- Large enterprises represent about 0.3% of the total, and their numbers remain stagnant.

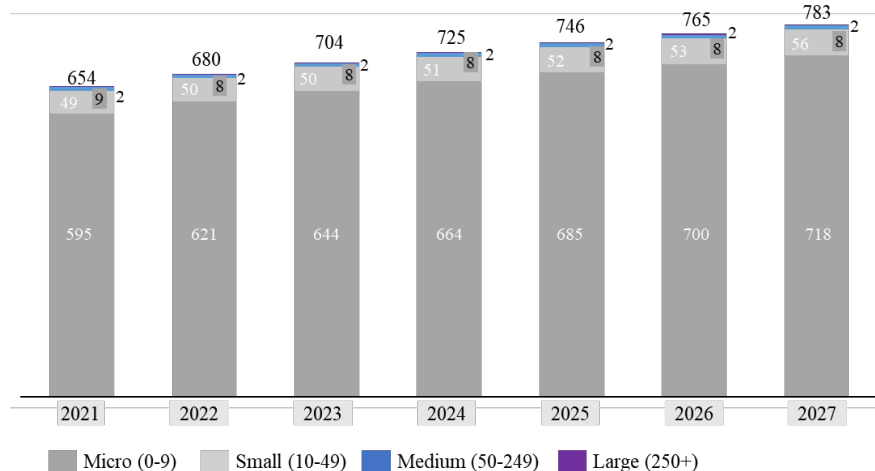


Figure 1. Total number of enterprises in Romania (K enterprises)

Source: Source: own creation, (National Institute of Statistics of Romania, 2023).

However, the overall productivity of SMEs in Romania appears to be lower than the EU average and that of comparable EU countries. The value added per person employed at the SME level is around € 16.500 for SMEs in general. This is significantly lower than the EU average of around €40.000 for SMEs. The situation is similar when looking at comparable countries such as Hungary, Croatia, and Poland. The approximate value added per employee is €19.800 in Hungary (about 20% higher than in Romania), €20.500 in Croatia (about 25% higher than in Romania) and €20.700 in Poland (EIB, 2023). In 2022, according to Eurostat, only 56% of businesses in the European Union had reached a basic level of digital intensity (Eurostat, 2022), and in Romania, considering the 2022 DESI index the share of SMEs with at least a basic level of digital intensity (22%) and the percentage of enterprises sharing information electronically (17%) are the lowest in the EU. The low level of digitalization and the relatively slow progress are hindering the Romanian economy from fully capitalizing on the opportunities offered by digital technologies. This challenge is further exacerbated by the very low level of digital public services for both citizens and businesses (European Commission, 2022). Additionally, a basic level may include businesses with low, high, and very high levels of the Digital Intensity Index (DII), excluding a very low level. Among SMEs, according to DII, (as cited in the Eurostat report, 2022), 55% had achieved a basic level of digital intensity, compared to 88% for large enterprises. Regarding the Europe Ecommerce Report (2022: 15), the following 12 technologies are considered to determine the level of digitization for a business, including SMEs:

1. Businesses where more than 50% of employees have used computers with internet access for commercial purposes;
2. Have an ERP software package;
3. The contracted maximum download speed of the fastest fixed-line internet connection is at least 30 Mb/s;
4. Businesses where web sales represented more than 1% of total turnover, and B2C web sales more than 10% of web sales;
5. Use any IoT software;
6. Use any Social Media platform;

7. Have a CRM;
8. Purchase sophisticated or intermediary CC services (2021);
9. Use any AI technology;
10. Purchase CC services used on the internet;
11. Businesses with e-commerce sales of at least 1% of turnover;
12. Use two or more social networks.

Thus, according to the Digital Intensity Index (2021), only 3% of SMEs in the EU have achieved a very high level of digital intensity, while 18% have reached a high level. Most SMEs (Eurostat), however, have recorded low (34%) or very low (45%) levels of digital intensity. Looking towards the EU's objectives for digital transformation, by the year 2030, over 90% of SMEs should attain at least a basic level of digital intensity. About the existing Support Structures for the Digitalization of SMEs, SMEs in Romania have access to a growing innovation ecosystem that supports their digitization efforts. This includes:

- Business Associations as reference points for SMEs and direct access to centralized knowledge/know-how.
- Digital Innovation Hubs (DIH), where Romania has a thriving network of both locally developed and EU-funded digital innovation hubs.
- Other Stakeholder groups participating in the digitization ecosystem in various ways, such as industrial clusters, large corporations, and universities (EIB, 2023).

Additionally, the Romanian government has introduced several initiatives aimed at enhancing digitization across the country, including within SMEs. These initiatives encompass the Operational Competitiveness and Human Capital Programs, the Start-Up Nation program (launched for the third time in July 2022), and the establishment of the Romanian Digitalization Authority (ADR) in 2020, which has the main task of coordinating digitization at the governance and governmental services level.

Additionally, there are three other financial instruments within Romania's National Recovery and Resilience Plan aiming to provide funding through lending (EUR 500 million in the InvestEU compartment for Romania) and equity financing (EUR 400 million) for SMEs, including support for digitalization (EIB, 2023). The role of technology in SMEs development strategy has become increasingly well-defined at the management level, encompassing issues related to managing the overall impact of the company's activities and methods of creating long-term value for stakeholders and interested parties (EY, 2020). For a company to be technologically advanced, it should define the list of digitalization topics that matter to the organization. Based on materiality assessment, a company can then develop a shortlist of priority topics to address internally. This will assist companies in making better decisions regarding resource allocation and organizing around issues that matter to their operations (De Smet A., et al., 2021).

Replying to the second point of methodology, we identify seven digital technologies as impactful tools used for SMEs to underscore the importance of understanding these technologies for effectively addressing Environmental, Social, and Governance (ESG) issues in the future (Bril et al., 2023). Considering the key digital technologies highlighted in the Digital with Purpose (DwP) report and doing a literature investigation on the field, we find that the most common technologies that the Romanian SMEs adopt are:

1. Digital Access that pertains specifically to the connectivity between individuals and the internet, encompassing telecommunications infrastructure, devices, and software.
2. Internet capabilities for SMEs that boast elevated levels of speed, capacity, and reliability, encompassing 4G and 5G. Notably, Romania excels in connectivity, outperforming in this

- dimension. The adoption of at least 100 Mbps fixed broadband (57%) and coverage of fixed very high-capacity networks (87%) surpass the EU average (European Commission, 2022).
3. Cloud services offer highly scalable IT capabilities as hosted services. This covers infrastructure, network, storage, computing power, applications, and data.
 4. The Internet of Things (IoT) which facilitates the connection of physical objects to the internet.
 5. Cognitive applications involve the advanced use of analytics, machine learning (ML), and artificial intelligence (AI) applied to datasets for the development of insights.
 6. Digital Reality encompasses virtual digital worlds or systems (Virtual Reality) and a combination of virtual and physical worlds (Augmented Reality)
 7. Blockchain technology utilizes digital ledgers for transactions, maintained across multiple computer systems controlled by different entities. This system is accessible to all participants without intermediaries, enhancing accuracy, verifiability, and security.

Considering all of this, we have identified that Romanian SMEs are expanding their technological capacities. However, the DESI 2022 report indicates very low scores in digitalization, actually ranking the lowest in Europe. Therefore, there is an urgent need for action to digitize all sectors and domains of the country and implement any possible measures. As a result of our study, we have formulated a SWOT analysis, focusing on the most pressing point in SMEs' digitization efforts. Consequently, Figure 2 illustrates this analysis.

Strengths 1. Availability of a skilled workforce that adapt to digital progress. 2. Supportive government initiatives and policies fostering digital transformation. 3. Emerging digital skills, particularly within the IT and technology sectors. 4. Improving infrastructure supporting digital connectivity.	Weaknesses 1. Slow adoption of digital technologies among SMEs. 2. Limited financial resources hindering investment in advanced technologies. 3. Shortage of specific digital skills for effective technology implementation. 4. Resistance to change within traditional business models and practices.
Opportunities 1. Digital integration to expand market reach and customer base. 2. Rapidly growing e-commerce opportunities for SMEs to tap into. 3. Opportunities for SMEs to collaborate with startups and innovation hubs. 4. Digital platforms to facilitate international business presence and partnerships.	Threats 1. Increasing threats related to cybersecurity and data breaches. 2. Intensified global competition as other regions embrace digitalization. 3. Challenges from evolving digital regulations and compliance. 4. Rapid advancements may render existing technologies obsolete.

Figure 2. SWOT Analysis on the Digitalization of SMEs in Romania

Source: Source: own creation.

Conclusion

In conclusion, digitalization and information technology are excellent resources for SMEs, as they facilitate operational efficiency, help to increase profits and adapt to the demands of an increasingly digitized market. Thus, SMEs that invest in appropriate technology solutions can have significant advantages as their operational processes become more competitive.

Our study focuses on the digital landscape of Romanian companies, more exactly on SMEs.

The results and discussions showcase the growth of the number of businesses in Romania. However, despite this growth, the overall productivity of SMEs in Romania appears to lag behind the EU average, indicating the need for enhanced digitization efforts.

The low level of digitalization, as highlighted by various indices, including the Digital Intensity Index and the Digital Economy and Society Index (DESI), poses a challenge to the Romanian economy. Most SMEs are recorded with low or very low levels of digital intensity, emphasizing the need for concerted efforts to achieve at least a basic level of digital intensity, in line with the EU's objectives for digital transformation by 2030.

The existence of support structures for the digitalization of SMEs in Romania, such as business associations, Digital Innovation Hubs, and government initiatives, provides a promising foundation. These entities contribute to creating an innovation ecosystem that supports SMEs in their digitization journey.

Our findings underscore the importance of technology in SMEs' development strategy, emphasizing the need for companies to define digitalization priorities based on periodic assessments and their possibility to increase profits by digitalizing operations and processes.

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