

DIGITAL TRANSFORMATION OF SMALL AND MEDIUM-SIZED ENTERPRISES IN THE EU STATES

MARINA COBAN

PhD, Associate professor

Academy of Economic Studies of Moldova

Chisinau, Republic of Moldova

e-mail: marinac@ase.md

ORCID:0009-0005-1984-9682

Abstract: The aim of the paper is to look at how small and medium-sized businesses in the EU are using digital technology. The European Commission's Digital Compass plan sets out goals for a successful digital transformation in Europe by 2030. The Digital Compass has a target for 2030. It wants at least 90% of small and medium-sized enterprises in the EU to have a basic level of digital intensity. It also wants all key public services for citizens and businesses to be fully online by 2030.

The use of digital technology by EU small and medium-sized businesses helps them to work better, with better productivity, management and new ideas. After looking at specialist books and statistics, we were able to talk about how digital technology is being used by small and medium-sized companies in the EU.

We compared existing data from the Eurostat database. This paper looks at a number of things, like how much technology is used, the use of cloud computing, artificial intelligence, and the number of SMEs that sell online in different EU countries. The good and bad points of e-commerce, and the problems SMEs have when selling online, were explained. The study gives a summary of how EU small and medium-sized companies currently use digital technologies and how this use is changing in different EU countries.

Keywords: digital transformation, digital technology, digital intensity Cloud computing, Artificial intelligence, e-commerce

JEL Classification: O3, O52, P52

1 Introduction

Digitalization is a profound business transformation that involves the use of digital technologies to optimize business processes, increase company productivity, and improve customer interactions. One of the key steps in digitalization is creating a more convenient and efficient interaction between the client and the company. However, based on the question of what business digitalization is, it can be said that this process can also have the following goals:

- Improving the product (or service): its quality, attractiveness, ease of use, and delivery;
- Automating production and other internal company processes;
- Simplifying internal and external communications.

Today, more and more company executives and entrepreneurs recognize the need for change in their businesses. Fighting the concept of total digitalization is futile – it must be embraced. Companies must understand how to integrate it.

This is one of the most important areas that will help achieve a new technological breakthrough in the global economy. Significantly reducing costs and optimizing production processes will help preserve the environment, save human, financial, and time resources, and improve overall living standards.

Companies that do not begin digitally transforming their businesses today will be ineffective and will simply disappear under the pressure of new market realities.

Annual International Scientific Conference
“Competitiveness and Innovation in the Knowledge Economy”
September 26-27, 2025
Chisinau, Republic of Moldova

The transformation of businesses will depend on their ability to adopt new digital technologies rapidly and across the board. Digital technologies must be rapidly deployed to enable a more intensive and efficient resource use.

Digital business is all about using the internet to share information, using social networks, and using the latest technologies like cloud services and artificial intelligence (AI).

SMEs represent the bulk of the EU companies, but also because they are a critical source of innovation. With the support of over 200 Digital Innovation Hubs and industrial clusters, by 2030, SMEs should have the opportunity to access digital technologies.

By 2030, the following goals must be achieved:

- 75% of European enterprises have taken up cloud computing services, big data and Artificial Intelligence;
- Most European SMEs are using digital tools. In fact, 90% of them have a basic level of digital intensity;
- Europe will grow the pipeline of its innovative scale ups and improve their access to finance.

This paper looks at how SMEs in EU countries are using digital technology to change the way they work. We look at a few different things to see how well a country is doing, like how much it uses technology, if it uses cloud computing, artificial intelligence, and how many businesses sell things online.

2 Findings

The Digital Economy and Society Index (DESI) shows how companies in the EU use digital technology. Thanks to digital technology, companies can become more competitive, improve their services and products and sell their products in more markets.

One of the main things that shows how much Europe wants to be digital is the Digital Intensity Index (DII). It's a composite indicator that's based on a study of ICT and e-commerce use in enterprises. The Digital Compass is aiming for more than 90% of EU SMEs to reach at least a basic level of digital intensity by 2030.

The indicator is also used in the construction of the Digital Economy and Society Index (DESI), that monitors the progress of EU Member States on digital performance.

The indicator is a useful way to describe how digital EU companies are. It measures the use of different technologies by enterprises.

The indicator is calculated based on 12 variables. In 2024 the Digital Intensity Index (DII) had the following composition:

1. This is for companies where more than half of the people who work there can use the internet for work.
2. The fastest fixed internet connection is at least 30 Mb/s.
3. Businesses that make at least 1% of their money from online sales.
4. This is for companies that make more than 1% of their total sales online. It is also for companies that make more than 10% of their sales to people online.
5. Enterprises have document(s) on measures, practices or procedures on ICT security.
6. Businesses make sure their staff know what they've got to do when it comes to keeping the ICT security ball rolling.
7. Use at least 3 ICT security measures.
8. The company offered training to its staff to help them improve their computer skills.
9. Employ ICT specialists.
10. Use any AI technology.
11. Provide employees remote access to the company's email system, documents and applications.
12. Enterprises, which conducted remote meetings via the internet.

Each of the variables has a score of 1 point. The DII separates enterprises into four levels of digital intensity:

- Enterprise has very low DII: count of enterprises with points between 0 and 3;
- Enterprise has low DII: count of enterprises with points between 4 and 6;
- Enterprise has high DII: count of enterprises with points between 7 and 9;
- Enterprise has very high DII: count of enterprises with points between 10 and 12.

The Digital Decade has a goal, and to monitor this, the four levels of the DII are used to calculate an “at least basic level” of digital intensity. To be at the basic level of digital intensity, we need to use at least four of the twelve selected variables. This means that it includes enterprises with a low, high or very high level of the DII, but not the very low level.

Figure 1 shows the data about SMEs (small to medium-sized enterprises) that use digital technology to a basic level in different European countries.

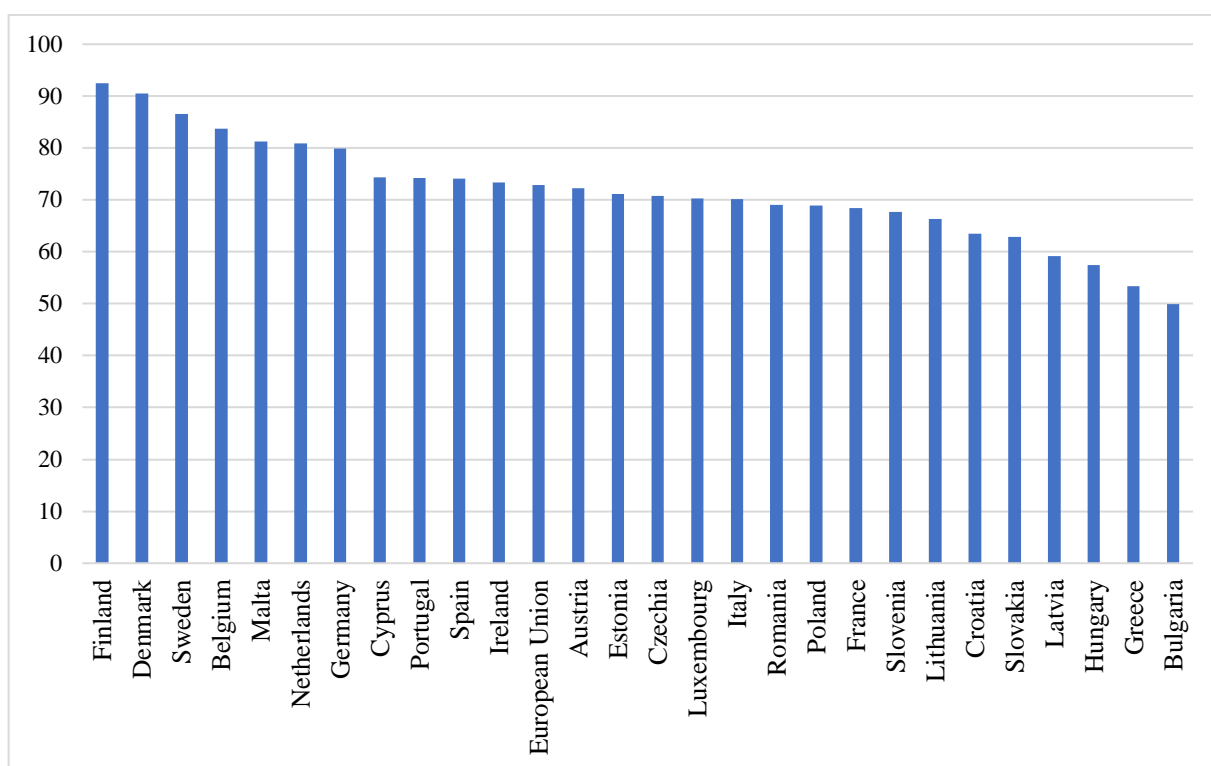


Figure 1. The Data on the percentage of SMEs that demonstrate a basic level of digital intensity, 2024.

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

As we can see in Figure 1, the largest number of small and medium-sized enterprises that use digital technology to some extents are in Finland (92,51%), Denmark (90,47%), Sweden (86,56%), Belgium (83,7%). In countries such as Latvia (59,18%), Hungary (57,44%), Greece (53,42%), and Bulgaria (49,93%), the share of these enterprises is lower than the average in the European Union (72,91%).

Another way to tell if a business is using ERP software is if they share electronic information between different parts of the business, like accounting, planning, production and marketing. ERP software is software that helps businesses manage their resources.

Figure 2 shows the data regarding European SMEs which have electronic information sharing.

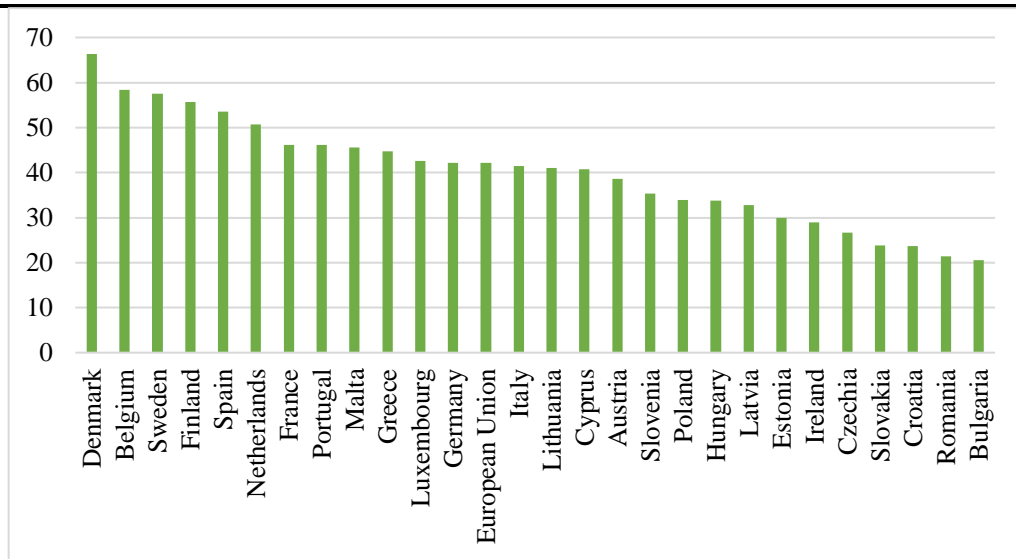


Figure 2. Electronic information sharing (% of enterprises), 2023

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

Figure 2 shows that the most of enterprises that use the electronic information are in Denmark 66,36%, Belgium-58,36%, Sweden-57,47%, Finland-55,67%, Spain-53,55%. There is a small share of enterprises that use the electronic information in Slovakia 23,88%, Croatia 23,72%, Romania 21,4% and Bulgaria 20,51%.

The Path to the Digital Decade says that more than 75% of EU companies must use cloud computing by 2030. The Cloud Computing indicator provides a comprehensive overview of the share of enterprises utilising cloud computing services, encompassing financial and accounting software applications, enterprise resource planning (ERP) applications, customer relationship management (CRM) applications, and security applications. According to Eurostat, in 2023, 69,72% of large enterprises and 38,04% of SMEs in the EU purchased complex or intermediate at least one of cloud computing services for financial/accounting management, customer relationship management (CRM), and process and resource planning (ERP). As illustrated in Figure 3, the data indicates the proportion of enterprises utilising cloud computing services across various countries.

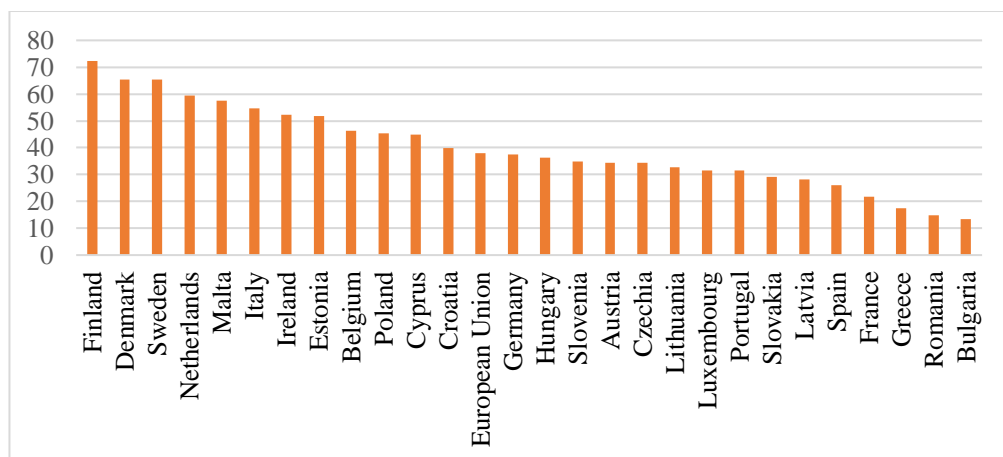


Figure 3. The data on the use of cloud computing services by small and medium-sized enterprises, broken down by country and percentage of enterprises, 2024

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

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It can be observed that there are significant differences across countries. In Finland (72,27%), Denmark (65,45%), Sweden (65,32%) more than 60% of enterprises used cloud computing. On the other hand, in France (21,79%), Greece (17,57%), Romania (14,8%) and Bulgaria (13,47%) less than 25% of enterprises did so.

The investigation into the utilisation of cloud computing services by industry revealed that 67% of enterprises in the ICT sector employ these services at either a sophisticated or intermediate level. This is followed by publishing activities, motion picture, video and television program production, sound recording and music publishing, programming and broadcasting (62%), travel agency/tour operator reservation service and related activities (49%), real estate activities (42%), accommodation (37%), electricity, gas, steam, air conditioning and water supply (36%), wholesale and retail trade; repair of motor vehicles and motorcycles (34%), and manufacturing (33%), as well as transportation and storage (30% of enterprises). The construction sector has been found to be the one with the least cloud usage (27% of enterprises).

The Path to the Digital Decade stipulates that more than 75% of EU companies must adopt big data by 2030. Big data is defined as larger, more complex data sets. The sheer volume of data necessitates the utilisation of specialized software capable of effectively managing such extensive information. Big data is characterised by three attributes: volume, variety, and velocity. It enables the processing of large volumes of unstructured data. Traditional data types were structured. The advent of big data has precipitated the emergence of novel unstructured data types, including text, audio, and video formats. These require additional preprocessing to facilitate the extraction of meaning and the support of metadata.

Big data can help with:

- Enterprises use data and analytics from focus groups, social media and market tests to plan, produce and launch new products.
- Predictive maintenance is when organisations look at how their equipment works and try to spot any potential problems before they happen. This helps them to keep their equipment running smoothly and for longer.
- Big data can be used to improve the customer experience. It can gather data from social media, web visits, call logs and other sources. This helps to improve the interaction experience and make the most of the value delivered.
- Big data helps to spot fraud and make sure rules are being followed. It looks at lots of information quickly to identify patterns that indicate fraud.
- Machine learning is possible because we have lots of data available.
- Big data helps you to work better. It lets you look at and judge how your production and customer feedback is working and predict what will be needed in the future.
- Big data can help to create new ideas in a number of ways.
- Big data can help us understand how humans and institutions are connected. It can also help us see how processes work. Then, it can help us find new ways to use these insights.

Big data helps us find more complete answers because there is more information, and it means we can solve problems in a completely different way.

Eurostat data shows that in 2020, 34.3% of big companies used big data. This compares to just 13.64% of small-and-medium sized businesses.

The objective of the Path to the Digital Decade initiative is to ensure that over 75% of companies in the European Union have adopted AI technologies by the year 2030. The integration of artificial intelligence within business processes has the potential to transform the way enterprises operate. The implementation of AI technologies into the business operations has the aim to save money, rise efficiency, to generate insights and create new markets.

There are lots of ways that AI can help businesses. It can help with customer service, making the most money, keeping the internet safe, making supply chains better, letting workers do other things, improving products and making new products.

There are a multitude of AI use cases. It is important that business leaders must understand where AI technologies can be used by businesses and where they cannot. It is important that business leaders understand where they can use AI and where they cannot. It is important to know:

- all the good and bad points;
- presented here are the current and potential uses of AI;
- how to create a successful AI strategy.

The share of enterprises using artificial intelligence (AI) technology is illustrated in figure 4.

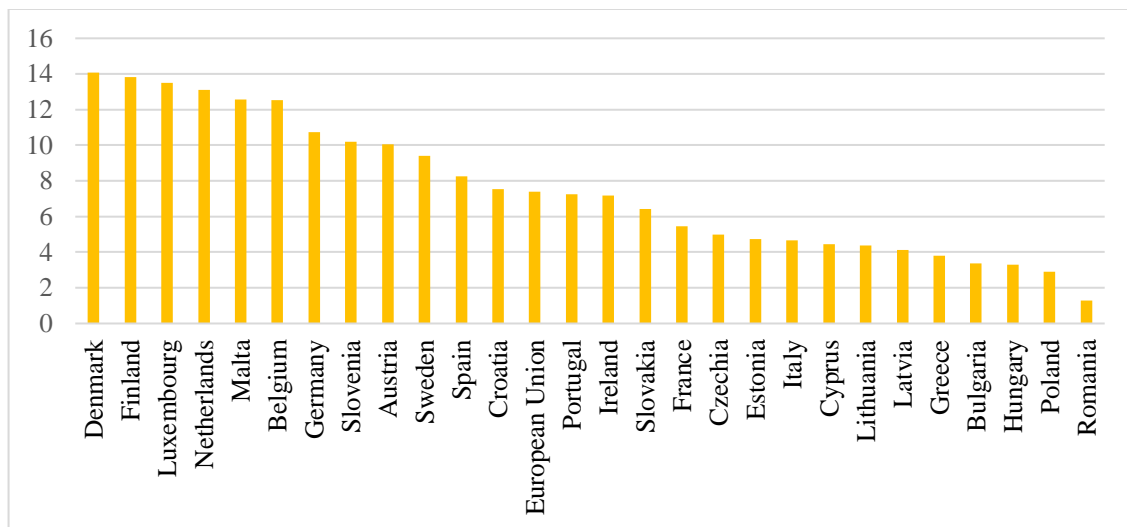


Figure 4. The percentage of small and medium-sized businesses that use artificial intelligence (AI) technology, 2024

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

The data in Figure 4 shows that not many small and medium-sized businesses in European Union countries are using AI technologies. Only 7,38% of them are. But there are some differences between Member States. Some countries have more than 10% of their population using AI technologies. Denmark is in the top (14,08%), Finland (13,83%), Luxembourg (13,51%), the Netherlands (13,11%), Malta (12,56%), Belgium (12,53%), Germany (10,75%), Slovenia (10,19%), Austria (10,06%).

There are seven countries with an adoption rate between 5 and 10%, such as Sweden (9,42%), Spain (8,26%), Croatia (7,55%), Portugal (7,24%), Ireland (7,17%), Slovakia (7,42%), France (5,44%).

Another 11 countries have a very low adoption rate of up to 5%, for example Czech Republic (4,99%), Estonia (4,74%), Italy (4,78%), Cyprus (4,44%), Lithuania (4,39%), Latvia (4,14%), Greece (3,81%), Bulgaria (3,36%), Hungary (3,31%), Poland (2,91%). Romania has the lowest rate of AI absorption in the EU at 1,28%. This is because many companies in Romania still don't use digital technology very much. Basic technologies are not used by many businesses and advanced technologies are not common.

Digital services in the EU are regulated by two laws: the Digital Services Act (DSA) and the Digital Markets Act (DMA). These rules make the internet safer and more open, and they make sure that everyone has the same chances of success.

In 2024, 20,13% of EU small and medium-sized enterprises (SMEs) conducted online sales. Between 2017 and 2024, the number of SMEs conducting online sales increased by 3,28%, and their turnover increased by 2,05%.

The survey on how companies in the European Union use information and communication technology (ICT) and e-commerce shows how online sales and cross-border e-commerce are increasing. Figure 5 shows how SMEs are selling both online and cross-border.

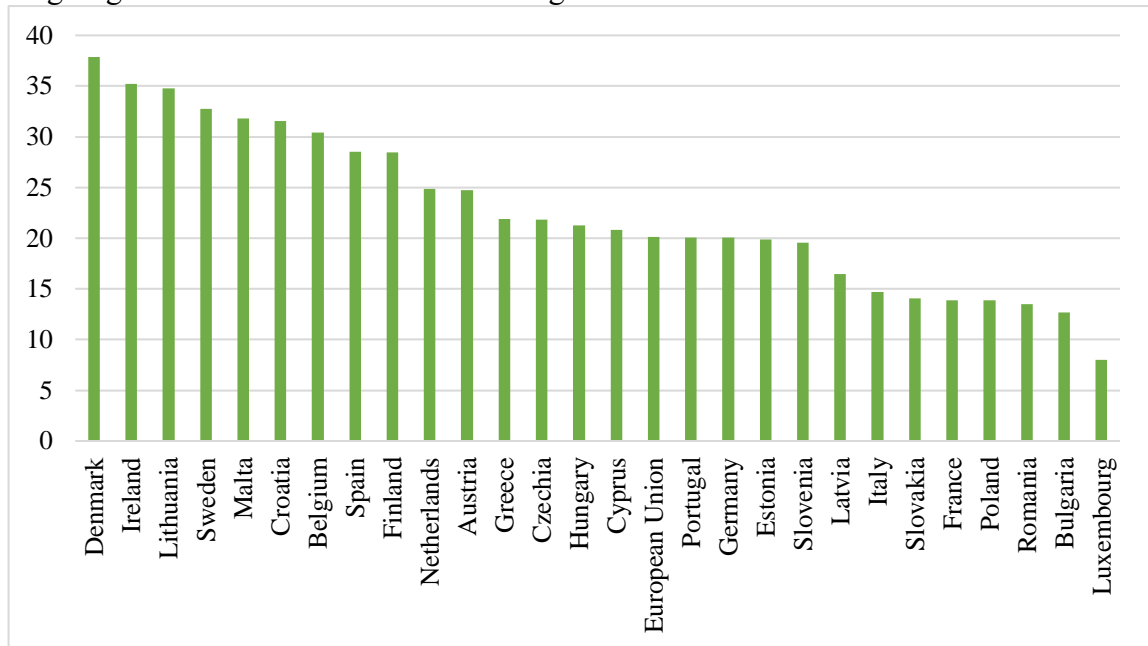


Figure 5. SMEs selling online (% of SMEs), 2024

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

According to Eurostat data in 2024, SMEs from Denmark (37,89%), Ireland (35,21%), Lithuania (34,77%), Sweden (32,77%), Malta (31,83%), Croatia (31,57%), Belgium (30,42%), Spain (28,54%), Finland (28,47%) had the most online sales.

In other countries, less than 15% of SMEs had online sales, such as Italy (14,68%), Slovakia (14,04%), France (13,89%), Poland (13,88%), Romania (13,49%), Bulgaria (12,7%) and Luxembourg (8,03%).

E-commerce has advantages:

Cost reduction. Online sales can be more cost-effective because they don't require physical locations, which means no rent, no additional staff, and no infrastructure costs.

24/7 availability. All types of modern e-commerce can provide 24/7 availability. This allows customers to make purchases and order services at any time, regardless of their geographic location. Furthermore, customers can shop from home or on the go—conveniently and save time.

Expanded marketing opportunities. E-commerce actively utilizes tools to effectively promote products and services and attract new customers.

Improved customer service. E-commerce allows for greater control over service quality and improves the customer experience by offering a variety of delivery and payment options.

Wide access. E-commerce offers entrepreneurs a chance to penetrate the international market, as it allows them to sell their products or services to customers anywhere in the world. Almost any type of e-commerce significantly expands your target audience, especially if you sell electronic goods rather than physical ones, or provide services remotely.

Of course, despite its many advantages, e-commerce also has some disadvantages:

Lack of physical contact. E-commerce suffers from a well-known drawback: the inability to touch and inspect the product before purchase.

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Delivery and returns. It's not always possible to promptly receive the product after purchase. There's also a difficult process for returning it if it doesn't meet expectations, which can lead to customer dissatisfaction.

Security and information security. Not all online retailers ensure adequate protection of customer data.

Dependence on technical stability. E-commerce is a business in which the entire sales cycle relies on digital technologies. If internet connections, servers, and software are affected by technical failures, they will bring all processes to a standstill.

Competition and pricing. E-commerce is characterized by a highly competitive environment, which can lead to aggressive pricing, making it difficult for small and medium-sized companies to compete with larger players.

Intellectual property. Books, films, software, and other intellectual property sold online are easily pirated and made publicly available.

The analysis of the e-Commerce turnover of the European SMEs is presented in figure 6.

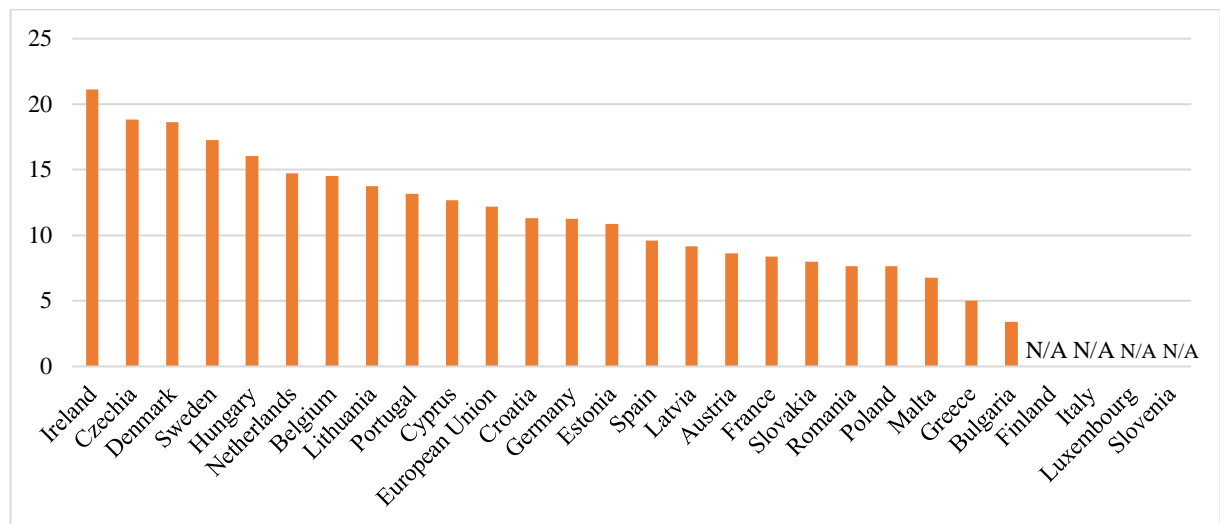


Figure 6. e-Commerce turnover of the European SMEs, (percentage of total turnover), 2024

Source: <https://digital-decade-desi.digital-strategy.ec.europa.eu>

As we can see from Figure 6, SMEs with the highest e-commerce turnover are in Ireland (21,13%), Czechia (18,82%), Denmark (18,65%), Sweden (17,27%), Hungary (16,04%) and the lowest e-commerce turnover are in Greece (5,02%), Bulgaria (3,38%). For countries such as Finland, Italy, Luxembourg, Slovenia data of e-commerce are not available.

Conclusions

The Digital Compass aims to help more than 90% of EU small and medium-sized businesses reach a basic level of digital intensity by 2030.

In 2024 European SMEs with at least a basic level of digital intensity amounted to 72,91%. The highest percentage of small and medium-sized enterprises demonstrating at least a basic level of digital intensity was observed in Finland (92,51%), while the lowest percentage was recorded in Bulgaria (49,93%).

European SMEs which have electronic information sharing amounted to 42,09%. The most of enterprises that use the electronic information were in Denmark 66,36% and the lowest were in Bulgaria 20,51%.

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It is evident that there are substantial variations across different countries. In the Finnish context, 72,27% of enterprises were utilising cloud computing, whereas in Bulgaria, the figure stood at – 13,47%.

Big data make it possible to gain more complete answers because there is more information and means a completely different approach to problem solving.

According to Eurostat data, in 2020 34,3% of large enterprises used Big data, and only 13,64% of SMEs used big data.

The integration of artificial intelligence within business enterprises has the capacity to effect a paradigm shift in the modus operandi of commercial activities. The implementation of AI technologies into the business operations has the aim to save money, rise efficiency, to generate insights and create new markets.

There are seven countries where between 5 and 10% of people are adopted, for example Sweden, Spain, Croatia, Portugal, Ireland, Slovakia and France.

Another 11 countries have a very low adoption rate of up to 5%, for example Czech Republic, Estonia, Italy, Cyprus, Lithuania, Latvia, Greece, Bulgaria, Hungary, Romania and Poland. Romania has one of the EU’s lowest rates of AI absorption, with only 1,28% of the population using it.

A key component of business digitalization is E-commerce. It encompasses the buying and selling of virtual and physical goods, brokering trade, exchanging information about products and services, attracting customers through marketing tools, and much more.

In 2024, 20,13% of EU small and medium-sized enterprises (SMEs) conducted online sales. Between 2017 and 2024, the number of SMEs conducting online sales increased by 3,28%%, and their turnover increased by 2,05%.

SMEs with the highest e-commerce turnover in 2024 were in Ireland (21,13%), Czechia (18,82%), Denmark (18,65%) and the lowest e-commerce turnover were in Greece (5,02%), Bulgaria (3,38%).

So, the use of digital technology will change all business processes. The use of the latest digital technologies by European SMEs allows them to carry out activities that were not possible in the past.

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