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THE DEVELOPMENT OF THE EUROPEAN UNION COUNTRIES UNDER THE INFLUENCE OF THE DIGITAL TRANSFORMATION

MARINA COBAN
Associate professor PhD
Department Economic Theories and Polices
Academy of Economic Studies of Moldova, Republic of Moldova
mcoban.mcoban@gmail.com
ORCID ID: 0009-0005-1984-9682

Abstract: The main purpose of the study is to determine the main trends of the socio-economic development of the EU countries under the influence of the digital transformation. The modern world has already taken some steps towards a new technological, economic and social reality.
The European Commission's Digital Compass plan sets out goals for a successful digital transformation in Europe by 2030. The 2030 target of the Digital Compass is that at least 80% of citizens have at least basic digital skills, at least 90% of small and medium-sized enterprises in the EU should have a basic level of digital intensity, all key public services for citizens and businesses should be fully online by 2030.
Based on the analysis from specialized literature and statistical data, it was possible to present the situation in the field of digital transformation of the EU states.
The key aspects of socio-economic development indicators in the field of human capital, connectivity, integration of digital technology, digital public services are analyzed in this paper.
Several indicators are analyzed such as: digitally skilled population and highly skilled digital professionals, secure and sustainable digital infrastructures, the degree of digital intensity of business processes, the use of Cloud computing, Big data, Artificial intelligence by enterprises, the share of businesses that sell online and the digitalisation of public services.
Our study provides an overview of the current state of adoption of digital transformation by EU society and trends in their further development.
Developments in the digital economy and society cannot be achieved through isolated improvements in particular areas but through concerted improvement in all areas.

Keywords: digital transformation, digital skills, connectivity, digital technology, digital public services

JEL: O3, O52, P52

1 Introduction

The digital transformation of the European Union countries is important for recovery, prosperity, security, competitiveness and the well-being of societies. This transformation is also necessary to achieve the transition to a climate-neutral, circular and resilient economy. "The EU's objective is to be digitally sovereign and to implement digital policies that enable citizens and businesses to benefit from a sustainable and more prosperous digital future." (Policy Programme, 2021)
The digital transformation of European Union is essential for: economic growth, competitiveness, security, social well-being.

Economic Growth

Digitalization fosters innovation by enabling new business models, startups, and technologies, thus contributing to economic growth and job creation.

Competitiveness

A digitally advanced Europe can better compete globally, especially with large economies such as US and China, by enhancing its technological capabilities and innovation potential.

Security

With the rise of digitalization, cybersecurity is becoming a prerequisite for protection against cyber threats. The EU's focus on building robust cybersecurity frameworks is critical for safeguarding digital infrastructure.

Social Well-being

Ensuring all citizens have access to digital technologies and skills is important for social equity and reducing the digital divide. This includes access to high-speed internet, digital literacy programs, and affordable digital devices.

Member States' progress in digitization is reflected in the annual Digital Economy and Society Index (DESI) reports. According to the annual report for 2022, "most Member States are making progress in digital transformation, but the adoption of key digital technologies such as artificial intelligence (AI) and big data (Big Data) by businesses is still low" (Digital Economy, 2022). More and more services are being moved online, so low levels of digital skills are hindering future development. Among the EU countries, the leaders in digital transformations continue to be Denmark, Finland, the Netherlands and Sweden. But digital challenges remain for most leaders as well. Overall, the EU member states continue to improve their level of digitization. Some Member States that started from lower levels are implementing digitization at a faster pace. Thus Italy, Greece and Poland have substantially improved their DESI scores thanks to funding and investment.

The European Parliament and the Council of the EU have reached an agreement on the *2030 Policy Agenda: Path to the Digital Decade.* This program aims for the European Union to achieve its goals in the digital transformation of the societies and economies of the member states in accordance with EU values, promoting digital policies centered on the human factor, which will empower citizens and businesses.

"To achieve the objectives set in the 2030 Policy Program in all Member States, EUR 127 billion is allocated for digital reforms" (2030 Policy Programme, 2021).

The path to the digital decade sets out common objectives and digital principles for member states. The proposed objectives are structured in four cardinal directions: *a digitally qualified population and highly qualified digital professionals, secure and sustainable digital infrastructures, the digital transformation of enterprises and the digitization of public services.*

Achieving these objectives will increase the competitiveness of the member states globally. "The current geopolitical context makes the implementation of innovative technologies, digital infrastructures and the strengthening of cyber security even more relevant" (2030 Policy Programme, 2021).

The Path to the Digital Decade sets out concrete digital objectives that the European Union should achieve by the end of the decade. The path to the digital decade emphasizes EU values and security. "Only a digitally sovereign EU can shape its digital transformation in line with European values" (2030 Policy Programme, 2021).

Member States must invest in their own digital transformation and help increase innovative potential and reduce the EU's external dependencies.

"Until 2022, 25 digital development plans have been approved by the Council of the European Union. By 2022, the amount allocated in these plans was EUR 490 billion of which EUR 325 billion in grants and EUR 165 billion in loans" (Digital Economy, 2022).

Each Member State must dedicate at least 20% of the total allocation of its Recovery Plan to measures contributing to the digital transition. Estimated spending on digital transformation per Member State is presented in figure 1.

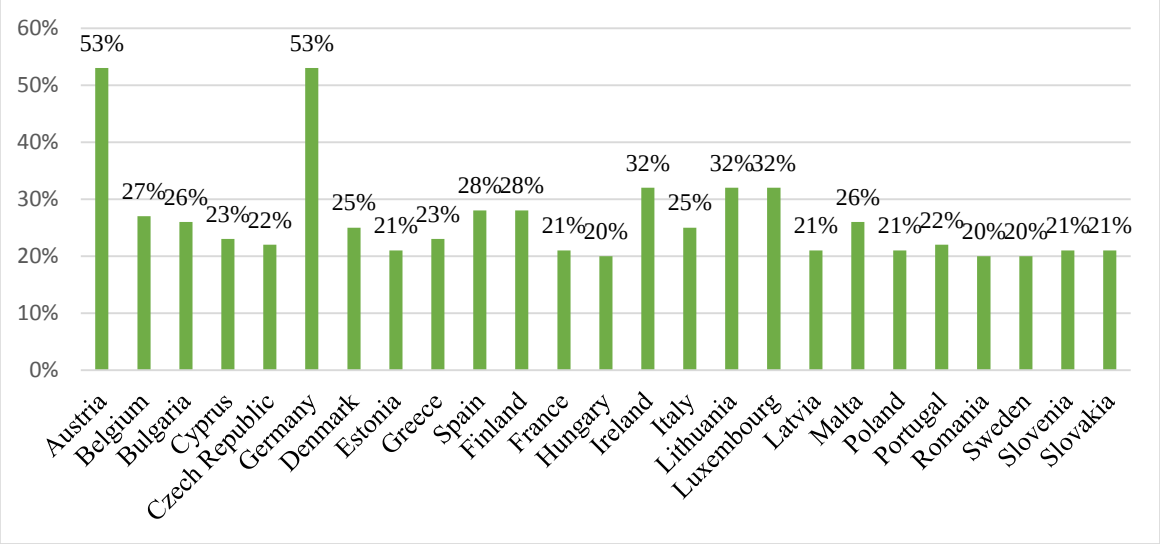

Figure 1 Contribution to digital objectives

Source: European Commission Digital Economy and Society Index (DESI) 2022

"Of the EUR 127 billion earmarked for digital reforms, 13% aims to promote the launch of very high capacity networks (VHCN), 37% digitization of public services and government processes, 19% digitization of enterprises, especially SMEs, 17% the development of basic and advanced digital skills and 14% R&D related to digitization and the implementation of advanced technologies" (Digital Economy, 2022). Investments and reforms will make an important contribution to the set goals of digital development.

2 Priority directions

2.1 A digitally skilled population and highly skilled digital professionals

This priority direction aims to foster a society where everyone, from everyday citizens to specialized experts, possesses the necessary digital skills to thrive in a technology-driven world. It involves two main components: *digitally skilled population, highly skilled digital professionals.*

Digitally Skilled Population

– Ensuring that all members of society, regardless of age, education, or occupation, have basic digital skills. This includes understanding how to use digital devices, navigate the internet safely, and access digital services.

– Providing resources and opportunities for marginalized groups, such as the elderly or those in remote areas, to develop digital skills.

– Promoting continuous learning and upskilling to keep up with rapidly changing technology, emphasizing the importance of adaptability in a digital world.

Highly Skilled Digital Professionals

Developing specialized programs in higher education and vocational training institutions to produce professionals with advanced digital skills, such as software development, data science, cybersecurity, and AI.

"While 87% of people (aged 16-74) used the internet regularly in 2023, only 54% possessed at least basic digital skills. The Netherlands and Finland are leaders in the EU, where 79% of the population possess basic digital skills. Romania and Bulgaria lag behind, this indicator constituting around 30%" (Digital Economy, 2022). "A large part of the EU population still lacks basic digital skills, even though most jobs require such skills. The proposed objective for 2030 is for at least 80% of citizens to have basic digital skills" (Digital Education, 2020).

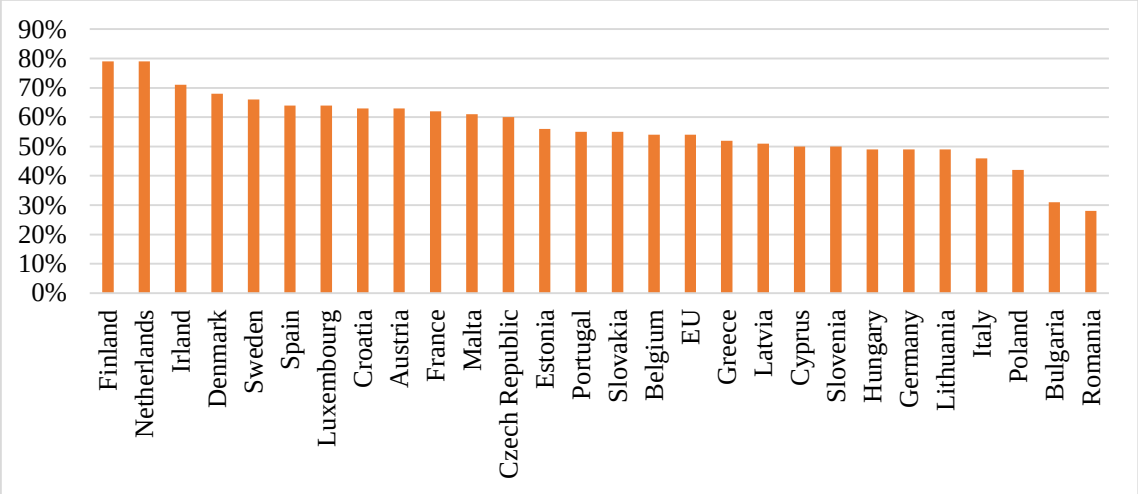

Figure 2. Basic digital skills (% of people), 2023

Source: Eurostat, ICT usage in households and by individuals in Households and by Individuals,2024

There is a general shortage of ICT specialists in the EU labor market. New jobs are emerging that require such specialists, and the number of vacancies continues to grow. "During 2020, 55% of businesses that recruited or attempted to recruit ICT specialists reported difficulties in filling such vacancies".

The Path to the Digital Decade program aims to increase the number of ICT professionals employed in the EU to at least "20 million by 2030, up from 8.9 million in 2021 (corresponding to 4.5% of the workforce)". Although there has been steady growth since 2013, acceleration is needed to achieve the set targets. As of 2021, Sweden - with 8% and Finland - with 7.4% have the highest proportion of ICT specialists in the workforce **(**Digital Economy, 2022).

2.2 Priority direction: secure and sustainable digital infrastructures

The focus on secure and sustainable digital infrastructures for EU Member States highlights several priorities and strategic directions for ensuring a technologically advanced digital ecosystem. Key priorities are: strengthening cybersecurity, green and sustainable digital transformation, resilient and interconnected digital infrastructures.

Strengthening cybersecurity requires implementing common standards cybersecurity in Member States to ensure protection against cyber threats.

The green and sustainable digital transformation requires promoting the use of energy-efficient technologies and renewable energy sources in data centres, following the objectives of the EU's "European Green Deal".

Interconnected digital infrastructures require accelerating the deployment of secure 5G networks and investing in 6G research to ensure high-speed communication across the EU.
A sustainable digital infrastructure for connectivity and capacity is needed to ensure Europe's digital leadership. to process large volumes of data.
"Excellent connectivity for everyone in the EU, including in rural and remote areas, will enable all citizens and businesses in Europe to benefit from the opportunities offered by the digital decade" (Digital Economy, 2022). Society's needs for bandwidth available for downloading and uploads are constantly increasing. "By 2030, networks with speeds expressed in gigabits should be available on affordable terms for everyone who needs such capacity" (Digital Economy, 2022).
While the EU has full broadband coverage, only 70% of households can benefit from fixed Very High Capacity Network (VHCN) connectivity with the potential to deliver gigabit speeds. High-capacity fixed network connectivity includes FTTP (fibre-to-the-premises) and DOCSIS 3.1 cable (data over cable service interface specification) technologies. "FTTP coverage increased from 43% in 2020 to 50% in 2021, while DOCSIS 3.1 coverage increased from 28% in 2020 to 32% in 2021. Coverage of fixed connectivity to the rural very high capacity network improved, also from 29% in 2020 to 37% in 2021" (Broadband coverage, 2021). Malta, Luxembourg, Denmark, Spain, Latvia, the Netherlands and Portugal are the most advanced Member States in terms of total fixed VHCN coverage, all with more than 90% of households covered. Conversely, in Greece, only 1 in 5 households have access to fixed VHCN. *The Path to the Digital Decade* program sets the goal that gigabit networks will be available to all households by 2030.

Table 1. Fixed Very High Capacity Network (VHCN) coverage, % of EU households, 2017-2023

2017	2018	2019	2020	2021	2022	2023
25.16%	29.16%	33.29%	50.06%	59.78%	70.20%	73.40%

Source: IHS Market, Broadband coverage in Europe studies, 2024

5G coverage has increased to 66% of populated areas in the EU. "There is a need for new services with a high economic and societal value, such as connected and automated mobility, advanced manufacturing, smart energy systems or e-health" (Digital Economy, 2022). Connected cars, telephones, the Internet, high-performance computers require microprocessors. Europe's production of state-of-the-art and durable microprocessors should represent at least 20% of global production by 2030.

2.3 Priority direction: digital transformation of enterprises

Digital transformation is a key priority for the European Union. Digital transformation for enterprises encompasses a wide range of strategies, initiatives and policies aimed at stimulating innovation, improving productivity and supporting the digital ecosystem. The main directions are: *digitization of SMEs, start-ups and innovation ecosystems.*
Digitization of SMEs includes providing support to small and medium-sized enterprises (SMEs) to adopt digital technologies, creating the SME Digitization Fund and providing technical assistance in the formation of Digital Innovation Hubs (DIH).
It is important to financially support start-ups and their access to digital innovation hubs.
All new technologies will be at the heart of new products, new manufacturing processes and new business models. "The transformation of businesses will depend on their ability to adopt new digital

technologies. By 2030, at least 75% of European businesses should have used cloud computing services, big data and artificial intelligence. By 2030, over 90% of European SMEs should have achieved at least a basic level of digital intensity" (Digital Economy, 2022).

In 2022, only 55% of small and medium-sized enterprises (SMEs) have reached a basic level of digital adoption. Sweden and Finland have the most digitalized SMEs, with 86% and 82%, respectively, with a basic level of digital intensity, while Romania and Bulgaria have the lowest rates of digitalisation of SMEs. "To achieve the objectives of the Roadmap to the Digital Decade, at least 90% of SMEs in the EU must have a basic level of digital intensity by 2030" (Digital Economy, 2022).

"Although businesses are increasingly digitized, the use of advanced digital technologies remains low. Although already 38,9% of enterprises relied on Cloud Computing services, only 8% used artificial intelligence - AI (artificial intelligence) and 33,2% used large volumes of data (Big Data) in 2023" (Shaping Europe's Digital Future, 2024). According to the program The path to the digital decade, at least 75% of companies must adopt AI, Cloud Computing and Big Data technologies by 2030.

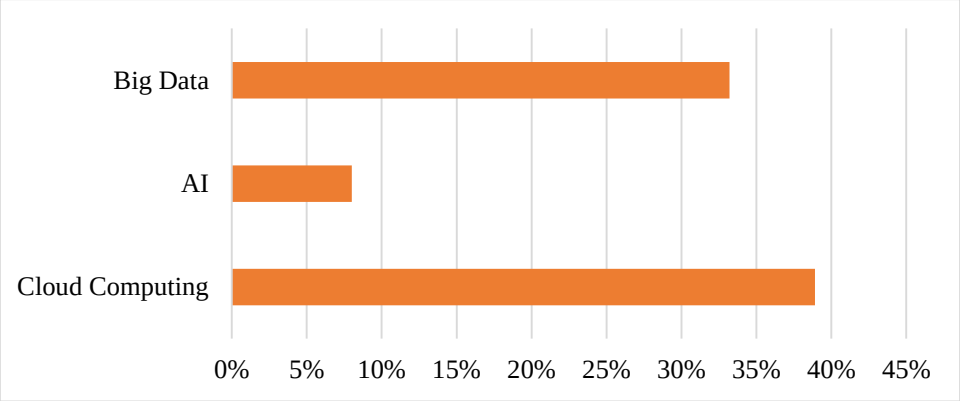

Figure 3. Adoption of advanced technologies (% of enterprises) in the EU, 2023

Source: Shaping Europe's Digital Future, 2024

There is a substantial gap between large companies and SMEs, not only in the use of advanced technologies, but also in basic digital solutions, such as having an Enterprise Resource Planning (ERP) software package and involvement in electronic commerce. Finland, Denmark and Sweden rank highest in digital business transformation.

2.4 Priority direction: digitization of public services

Digitization of public services is a key priority for the European Union as it seeks to modernize its governance, improve efficiency, and provide better services to its citizens. The main objectives are:

- create a unified digital market in the EU where goods, services, and capital can move freely;
- strengthen the EU's digital sovereignty and ensure a safe, inclusive, and open digital environment;
- facilitate seamless digital interactions across EU public administrations;
- leverage data and AI for better governance and public service delivery;
- enhance the security and trustworthiness of digital public services.

The digitization of public services is central to the EU's vision of a modern, efficient, and citizen-centered governance model.

"By 2030, democratic life and public services online will need to be fully accessible to everyone, and everyone will need to benefit from a best-in-class digital environment that will provide easy-to-use, efficient and personalized services and tools, with high security standards" **(**Policy Programme,

2022). DESI monitors online public services by scoring Member States. Quality scores reached 75 out of 100 for digital public services for citizens and 82 out of 100 for businesses in 2021. Estonia, Finland, Malta and the Netherlands have the highest scores for Digital Public Services in DESI, while Romania and Greece have the smallest ones. The Path to the Digital Decade program sets the goal that all key public services for citizens and businesses will be fully online by 2030.

In the top of the over performing countries is Italy, with an increase of 2.2% between 2017 and 2022. It is followed by Germany, Ireland, France and Poland. In the group with slower development are Latvia, Luxembourg, Romania, Belgium, Slovakia and Estonia (2030 Policy Programme, 2021).

Figure 4 shows the DESI 2022 ranking of the Member States. Finland, Denmark, the Netherlands and Sweden have the most advanced digital economies in the EU, followed by Ireland, Malta and Spain. Romania, Bulgaria and Greece have the lowest DESI scores.

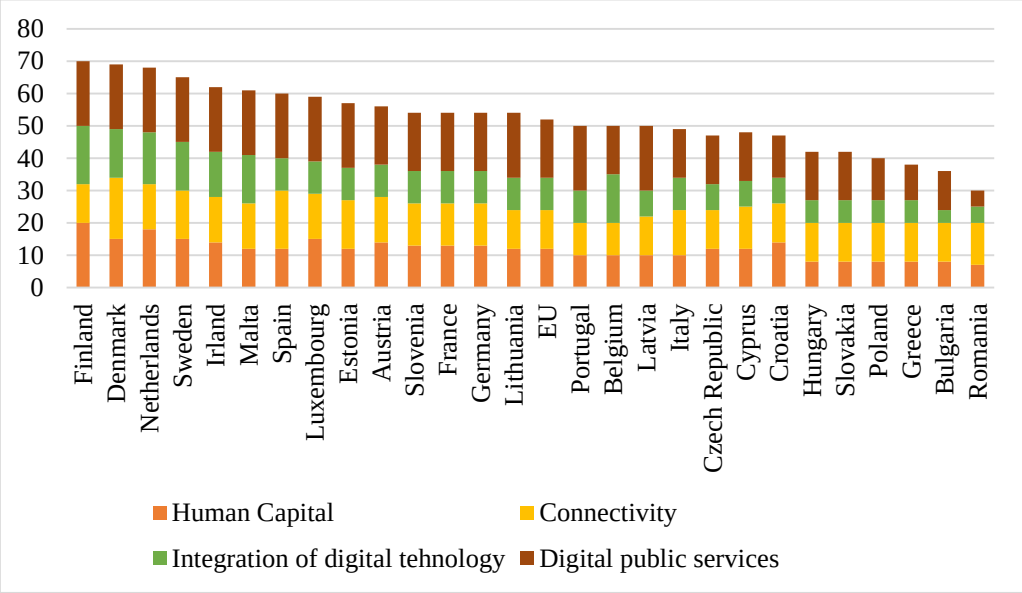

Figure 4. Fixed Very High Capacity Network (VHCN) coverage, % of households in the EU, 2014-2021

Source: European Commission Digital Economy and Society Index (DESI) 2022

3 Conclusion

Digital transformation is important for the development of EU member states, as it drives economic growth, enhances competitiveness, and improves public services. Strengthening the EU's digital sovereignty is essential for maintaining technological leadership and ensuring that the region can protect its digital assets, data, and infrastructure.

The digital transformation is necessary to strengthen the EU's digital sovereignty by capitalizing on its strengths and reducing its weaknesses, maintaining open markets and global cooperation.

All available instruments from industrial, trade and competition, skills and education, research and innovation policies and long-term funding instruments must be used to facilitate the digital transformation. Achieving these objectives requires a joint effort from all member states and at the level of the European Union, accompanied by joint investments. Investments in multinational projects are of major importance. They will enable industry to be at the forefront of innovation and compete globally, and the European Union to strengthen its digital sovereignty.

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