CHAPTER 1
CURRENT TRENDS IN ECONOMIC DEVELOPMENT

POLAND'S SOCIETY 4.0: HOW DIGITAL TOOLS ARE CHANGING EVERYDAY LIFE

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Abstract. *The dynamic integration of digital tools into all facets of Polish society has redefined how citizens interact with public services, education, healthcare, commerce, and each other. As Poland enters a new phase of digital development, the importance of understanding both the depth and the disparities of this transformation becomes increasingly urgent. This study sets out to explore the practical realities of Poland's digital evolution within the conceptual framework of Society 4.0, emphasizing the interconnectedness of technological advancement, institutional adaptation, and social inclusion. The research identifies key components of this transformation, including the adoption of digital technologies by enterprises, the state of digital skills among the population, the accessibility and quality of internet infrastructure, the effectiveness of e-government services, and the broader economic implications of digitalization. The methodology employed combines qualitative analysis with comparative data review. The study covers developments between 2020 and 2024, reflecting the most recent data available at the time of writing, and offers a comparative perspective on Poland's position relative to other EU countries. The results reveal that while Poland has achieved significant progress in internet connectivity and the digitalization of public services, considerable challenges remain. The level of digital skill acquisition among citizens is still insufficient, particularly among older and less-educated demographics, posing a substantial barrier to inclusive participation. Businesses, especially small and medium-sized enterprises, show low adoption rates of advanced technologies such as artificial intelligence and cloud computing. E-government services, though increasingly available, are fragmented and inconsistently integrated, limiting their effectiveness and user satisfaction. In rural and economically disadvantaged areas, broadband infrastructure and digital engagement continue to lag behind urban centers, reinforcing existing socioeconomic divides. The economic benefits of digitalization, although growing, remain unevenly distributed, with digital entrepreneurship and foreign investment concentrated in major cities. The study contributes valuable insight into the real-world dynamics of digital change and provides a foundation for policy recommendations that promote equity, efficiency, and long-term national competitiveness in the digital age.*

Keywords: *digitalization, Poland, Society 4.0, digital skills, e-government, SMEs, internet connectivity, digital economy, public services.*

JEL Classification: M15, L16, H75

Formulas: 0; fig.: 3; table: 2; bibl.: 10

Introduction. Just a decade ago, paying utility bills online, booking a doctor's appointment via smartphone, or joining a video conference with local officials felt like a novelty in Poland. Fast forward to today, and these digital interactions have become routine for millions of people across the country. From smart city projects in Warsaw to remote learning in Podlaskie schools, digital tools are quietly but powerfully transforming Polish society.

This transformation is part of a broader global trend often referred to as Society 4.0 - a term used to describe a digitally connected, innovation-driven social model where everyday life is seamlessly integrated with technology. In Poland, this means more than just faster internet and sleek apps; it signals a cultural shift in how citizens interact with education, healthcare, public administration, commerce, and even one another.

Fueled by EU funding, national innovation strategies, and a digitally ambitious population, Poland has made rapid strides in digital infrastructure and literacy. According to Eurostat, over 93% of Polish households had internet access by 2023, and mobile broadband usage has surged, with smartphones now the dominant access point to digital services. Meanwhile, platforms like mObywatel (a mobile app offering digital ID and access to government services) and Internetowe Konto Pacjenta (IKP) have become essential tools for managing civic and health-related tasks.

Literature review. The digital transformation of societies and economies has become a central focus of policy development and academic discourse across the European Union. The European Commission (2022) introduced the Digital Decade Policy Programme to guide member states toward a common vision for digital progress by 2030, setting measurable targets in areas such as digital skills, business technology adoption, digital public services, and infrastructure. Poland, like many EU nations, is aligning its national strategies with these continental goals.

The Digital Economy and Society Index (DESI), maintained by the European Commission, provides a comparative framework for understanding Poland's digital standing in relation to other member states. According to the DESI 2022 report, Poland has demonstrated significant growth in internet accessibility and digital public service development, yet continues to lag behind EU averages in advanced technology integration among enterprises and in digital skills among the population (European Commission, 2022).

Polish governmental initiatives such as the Digital Strategy 2035 represent a comprehensive response to these gaps, outlining long-term objectives to digitize public administration, improve digital inclusion, and foster innovation (Polish Ministry of Digital Affairs, 2024). These strategies are supported by national and EU funding, notably through the Recovery and Resilience Facility, which dedicates over €12 billion to digital development efforts in Poland (European Commission, 2021).

Despite the evident commitment to digital transformation, significant challenges persist. The Polish Central Statistical Office (GUS, 2024) reports that although internet access has reached over 95% of households, disparities in service quality between urban and rural areas remain a concern. Eurostat (2023) further highlights the country's digital skills gap, with only 45% of adults possessing basic competencies—well below the EU average.

E-government services in Poland, such as the mObywatel app, have seen widespread uptake, with over 8 million users by 2022 (mObywatel, 2023). However, these services are often fragmented across platforms and suffer from inconsistent integration, reducing their overall effectiveness. Previous research (Kolisnichenko, 2024) also notes that while digital infrastructure is advancing, institutional coordination and user experience design still present barriers to full public engagement.

On the economic front, digitalization has had a measurable impact on productivity, entrepreneurship, and investment. The Digital Poland Operational Programme (2024) supports initiatives that promote broadband expansion and digital entrepreneurship, particularly in underserved regions. Nevertheless, the slow adoption of AI and cloud technologies among Polish SMEs underscores a structural lag in innovation uptake (European Commission, 2022).

In summary, the literature reveals a complex picture: while Poland has made strong policy commitments and improved key infrastructure, gaps remain in skills, SME digitalization, and service integration. The reviewed materials provide a foundational understanding for analyzing these dynamics and developing targeted policy recommendations.

Aims. The goal of this study is to analyze how digitalization is transforming everyday life in Poland within the broader context of Society 4.0, and to assess the country's progress, challenges, and strategic direction in achieving a fully digital society.

To achieve this goal, the study sets out to:

- examine the integration of digital technologies in Polish enterprises, with a focus on small and medium-sized enterprises (SMEs) as key drivers of the national economy;
- assess the state of digital skills and human capital, including the population's preparedness to participate in and benefit from a digitally-driven society;
- evaluate the availability, quality, and equity of internet connectivity and digital service usage across various regions and demographic groups in Poland;
- analyze the development and adoption of e-government services, paying particular attention to accessibility, user experience, and the integration of national and local platforms;
- investigate the economic impact of digitalization in Poland, including its effects on productivity, employment structures, regional development, and overall competitiveness;
- compare Poland's digital development with relevant EU benchmarks, identifying areas of strength and gaps requiring targeted policy intervention.

Methodology. This study adopts a mixed-methods research approach, combining qualitative analysis with a review of secondary data to comprehensively examine the state of digitalization in Poland. The research draws primarily on desk research using official national and EU-level sources, including the Digital Economy and Society Index (DESI), Eurostat databases, and national statistical reports. These sources provide quantitative insights into key indicators such as digital technology adoption among SMEs, levels of internet access, digital skill proficiency, and citizen engagement with e-government services.

In addition to data analysis, the study incorporates a comparative dimension, evaluating Poland's digital performance in relation to other European Union member states. This comparative perspective helps contextualize Poland's progress and highlights best practices and areas where improvement is needed.

Furthermore, the study reviews key strategic documents, including Poland's Digital Strategy 2035 and the EU's Digital Decade policy framework. These documents serve to align the empirical analysis with the broader policy goals set at national and European levels.

Finally, a policy synthesis approach is used to interpret the findings in light of existing digital development strategies. This allows for the identification of performance gaps and the formulation of actionable recommendations aimed at closing those gaps.

The analysis primarily covers developments from 2020 to 2024 and incorporates the most recent data available as of early 2025, ensuring the findings reflect current trends and challenges in Poland's digital transformation journey.

Results. In 2021, only 55% of small and medium-sized enterprises (SMEs) in EU reached at least a basic level in the adoption of digital technologies. Sweden and Finland have the most digitalised SMEs (86% and 82% having a basic level of digital intensity respectively), while Romania and Bulgaria have the lowest rates of SME digitalisation. To reach the Digital Decade target, at least 90% of SMEs in the EU should have a basic level of digital intensity by 2030.

The EU has put on the table significant resources to support the digital transformation. EUR 127 billion are dedicated to digital related reforms and investments in the national Recovery and Resilience Plans. This an unprecedented opportunity to accelerate digitalisation, increase the EU's resilience and reduce external dependencies with both reforms and investments. Member States dedicated on average 26% of their Recovery and Resilience Facility (RRF) allocation to the digital transformation, above the compulsory 20% threshold. Member States that chose to invest more than 30% of their RRF allocation to digital are Austria, Germany, Luxembourg, Ireland and Lithuania.

Poland has embarked on an ambitious journey toward digital transformation, guided by comprehensive strategies and substantial investments. Despite notable progress, the nation faces challenges, particularly in integrating advanced technologies within enterprises and enhancing digital skills among its population.

In 2024, Poland unveiled the Digital Strategy 2035, aiming for a holistic digital transformation across society, the economy, and public administration by 2035. This strategy represents a paradigm shift, moving beyond simple e-government services to encompass a complete digital transformation.

Complementing this, Poland's commitment to the Digital Decade objectives is evident, with plans to allocate approximately €12.4 billion (1.6% of its GDP) toward achieving these goals by 2030.

Poland's performance in the DESI highlights areas of both progress and concern.

Integration of Digital Technology. Poland ranks among the lower EU countries in integrating digital technologies within enterprises. Notably, only 5.9% of Polish

enterprises have adopted Artificial Intelligence (AI) technologies, compared to higher adoption rates in countries like Denmark (27.6%) and Sweden (25.1%).

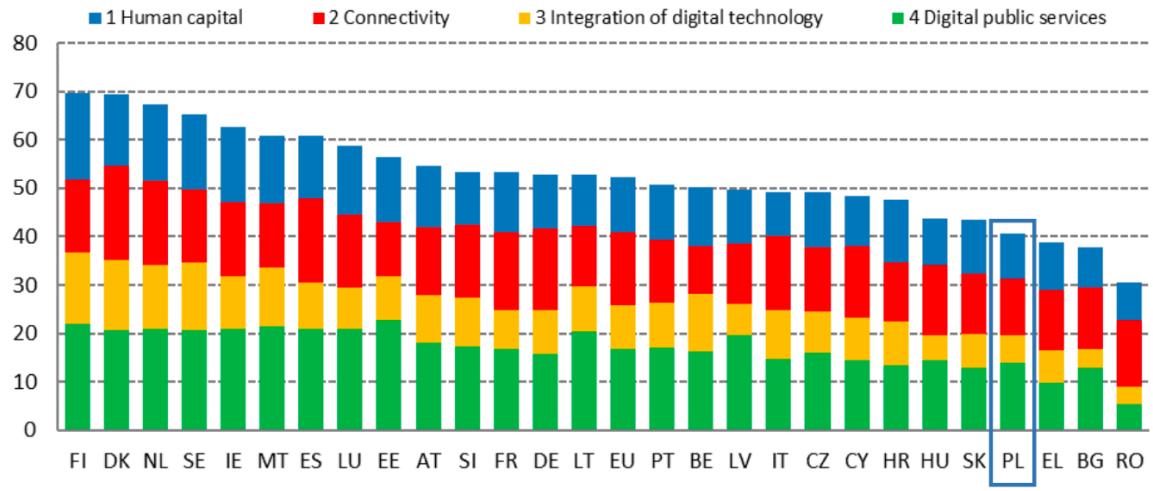

Figure 1. Digital Economy and Society Index (DESI) 2022 ranking

Source: DESI 2022, European Commission

Digital Skills. In 2023, 56% of EU citizens aged 16-74 had at least basic overall digital skills, 24 percentage points below the 2030 target set in the Digital Decade.

Digital literacy is crucial for people to benefit from the ongoing digital transformation and the vast variety of services available online, thus preventing them from being digitally excluded. Having digital skills is also critical to protect oneself from cyber threats stemming from the increasingly digitalised world.

In 2023, 56% of people aged 16-74 years in the EU had at least basic overall digital skills, 24 percentage points (pp) below the 2030 target set in the Digital Decade. The highest proportions of people aged 16-74 years who had at least basic overall digital skills were found in the Netherlands (83%) and Finland (82%), followed by Ireland (73%), Denmark (70%) and Czechia (69%). On the other hand, the lowest were recorded in Poland (45%), Romania (28%) and Bulgaria (36%). In most Member States, the shares of people with at least basic digital skills were higher among men than among women, with Austria, France and Greece recording the highest difference of 8 pp, 7 pp and 6 pp respectively. In 8 Member States, the situation was reversed, with higher shares of women with at least basic digital skills, with the largest difference in Lithuania (5 pp) (Figure 2).

Internet connectivity and usage in Poland. As of 2024, 95.9% of Polish households had internet access at home, placing Poland slightly above the EU average of 94%. This marks a dramatic rise from 80% in 2014 and reflects a successful expansion of connectivity infrastructure nationwide. The improvement mirrors a broader EU-wide trend where countries like Bulgaria and Romania have also leapt forward—thanks in part to targeted national and EU-funded digital inclusion policies.

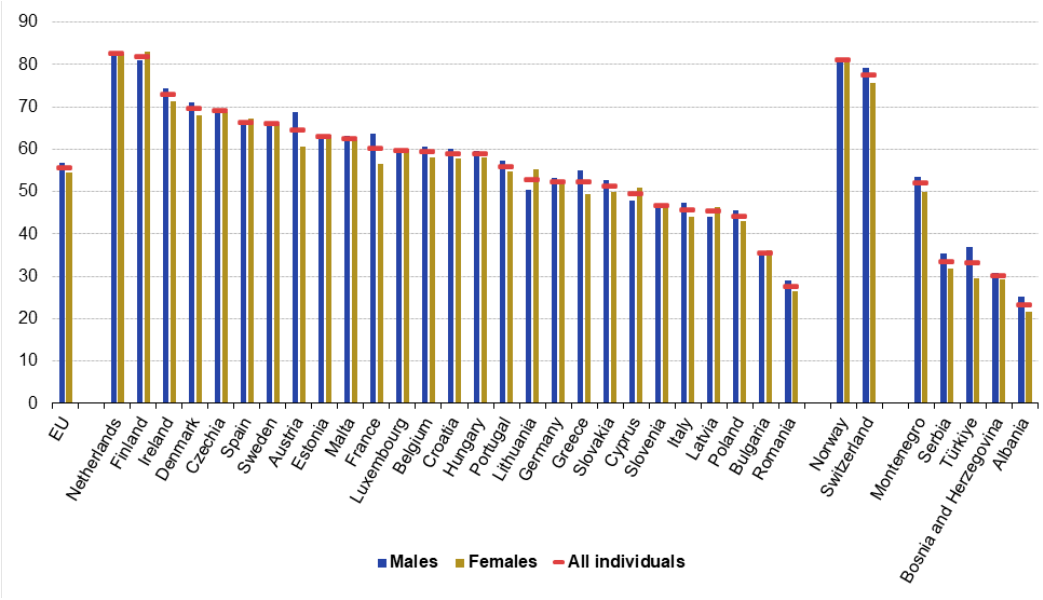

Figure 2. Individuals wiyh at least basic overall digital skill, by sex, 2023
(% of individuals ages 16-74)

Source: Eurostat (isoc_sk_dskl_i21)

However, the type and quality of internet access remains uneven:

- 72.1% of households use fixed broadband (e.g., fiber, cable, DSL).
- 75.9% of households rely on mobile broadband, which is often more prevalent in rural or lower-income areasdue to lower installation costs.

This reliance on mobile broadband raises concerns about connection stability and speed, especially for data-heavy activities like remote learning or streaming. Poland still faces a divide between high-speed urban infrastructure and underserved rural areas.

Although connectivity rates are climbing across the country, Eurostat data shows a persistent urban-rural digital gap in many EU member states, including Poland. In leading countries like the Netherlands, Denmark, and Germany, rural areas enjoy nearly equal internet access as urban centers. In contrast, countries like Greece and Bulgaria report gaps of up to 15 percentage points.

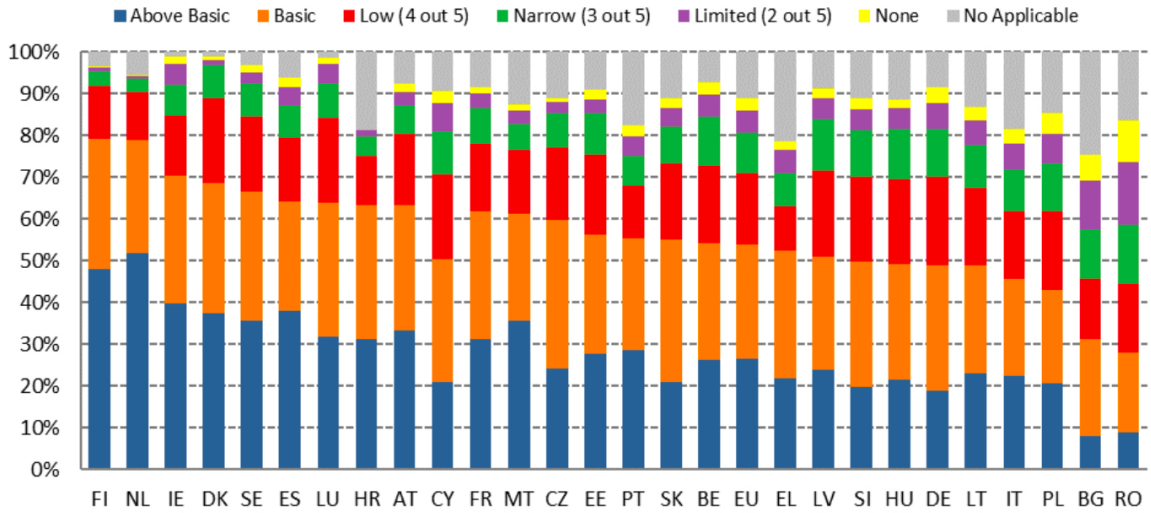

Figure 3. Digital Skills (% internet users), 2021

Source: Eurostat, Community survey on ICT usage in Households and by Individuals

In Poland, this gap is narrower (estimated at around 5–7 percentage points) but still notable, particularly in remote regions of Podkarpackie, Świętokrzyskie, and Lubelskie, where terrain and economic factors slow broadband rollout. This spatial inequality risks reinforcing existing social and economic divides if not addressed by focused investment.

E-Government in Poland. Over the past decade, Poland has made significant strides in the digitization of public services, with the mObywatel appemerging as a central pillar of this transformation. Launched in 2015, the app has grown into a key component of the national digital identity framework, allowing citizens to access digital versions of their ID cards, vehicle registration documents, health records, and more. By the end of 2022, mObywatel had over 8 million active users, reflecting a growing level of trust in digital public infrastructure.

The app's success stems from its user-friendly design, broad acceptance in both governmental and commercial contexts, and continuous expansion. Recent updates in 2023 and 2024 have added new functionalities such as digital driving licenses and court notifications, further integrating the platform into everyday civic life. However, despite its rapid adoption, challenges remain. Not all citizens—particularly the elderly or low-income groups—have access to smartphones or feel confident using digital credentials. In addition, concerns over data privacy and cybersecurity, heightened by incidents in other EU countries, continue to inhibit broader uptake.

According to Eurostat, 63% of Polish internet users interacted with e-government services in 2022. While this places Poland ahead of countries like Romania or Bulgaria, it remains below the EU average of 74% and significantly lags behind digital frontrunners such as Estonia and Denmark, where engagement rates exceed 90%. This underutilization is not due to a lack of digital infrastructure, but rather systemic and social factors.

One major issue is the fragmentation of digital services across multiple platforms - such as mObywatel, ePUAP (Unified Electronic Platform of Public Administration Services), and the Internetowe Konto Pacjenta (IKP) for health records. These systems are not fully integrated, which creates inconsistencies in user experience and limits the efficiency of digital interactions. Citizens are often required to navigate between different authentication methods - such as the Trusted Profile (Profil Zaufany) or bank-based logins - depending on the platform or service. Moreover, many municipal services are not digitized to the same extent as national platforms, leading to further disjointedness.

Recognizing these challenges, the Polish government has laid out a comprehensive vision through its Digital Strategy 2035 and alignment with the EU Digital Decade objectives. The roadmap includes the full digitization of public services by 2030, the integration of AI into administrative processes, and the implementation of the "once-only" principle, which would ensure that citizens only need to submit their data once—after which it is automatically shared across relevant departments.

To support this vision, Poland is leveraging funding from the National Recovery Plan (KPO) and EU investment instruments to digitize local governments and court systems, improve accessibility features (including multilingual and screen reader support), and enhance cybersecurity. Workforce development is also a priority, with a

focus on re-skilling public employees to adapt to an increasingly digital administrative environment.

In summary, Poland's e-government infrastructure is robust and expanding, but its full potential remains untapped due to structural fragmentation and user engagement barriers. Bridging these gaps will require not only technological upgrades but also a citizen-centric approach focused on accessibility, trust, and coherence across platforms. If successfully implemented, Poland's digital public services could become a model of efficient, inclusive, and secure governance within the EU.

The economic effect of digitalization in Poland. Digitalization is not only transforming the way people live and work in Poland—it is also reshaping the very foundations of the national economy. From small enterprises adopting cloud-based solutions to entire industries streamlining processes with artificial intelligence and automation, the economic impact of Poland's digital shift is becoming increasingly visible across multiple sectors.

One of the most direct economic benefits of digitalization is increased productivity. By integrating digital tools into their operations, Polish businesses—especially small and medium-sized enterprises (SMEs)—can automate repetitive tasks, improve customer relationship management, and optimize logistics and supply chains. This is particularly important in a country where SMEs represent over 99% of all enterprises and account for almost 70% of employment.

Table 1. Integration of digital technology in Poland

	Poland			EU
	DESI 2020	DESI 2021	DESI 2022	DESI 2022
SMEs with at least a basic level of digital intensity	NA	NA	40%	55%
% SMEs	-	-	2021	2021
Electronic information sharing	29%	29%	32%	38%
% enterprises	2019	2019	2021	2022
Social media	14%	14%	18%	29%
% enterprises	2019	2019	2021	2021
Big data	8%	8%	8%	14%
% enterprises	2018	2020	2020	2020
Cloud	NA	NA	19%	34%
% enterprises	-	-	2020	2020
AI	NA	NA	3%	8%
% enterprises	-	-	2021	2021
ICT for environmental sustainability	NA	60%	60%	66%
% enterprises	-	2021	2021	2021
e-Invoices	16%	13%	13%	32%
% enterprises	2018	2020	2020	2020
SMEs selling online	13%	13%	14%	18%
% SMEs	2019	2019	2021	2021
e-Commerce turnover	NA	NA	NA	12%
% SMEs turnover	2019	2020	2021	2021
Selling online cross-border	5%	5%	5%	9%
% SMEs	2019	2019	2021	2021

Source: DESI 2022, European Commission

However, as recent DESI and Eurostat data show, the pace of digital technology adoption remains uneven. Only 5.9% of Polish enterprises reported using artificial intelligence tools in 2023—well below the EU leaders like Denmark (27.6%) or

Sweden (25.1%). This lag represents not only a challenge but a missed economic opportunity, as AI and big data analytics are key drivers of innovation, competitiveness, and scalable growth.

Digitalization has significantly reshaped the labor market in Poland. While some traditional roles have been automated or made redundant, new opportunities have emerged in the fields of IT, cybersecurity, data science, and digital marketing. Between 2017 and 2023, the number of ICT specialists in Poland increased by over 30%, with major urban centers like Warsaw, Kraków, and Wrocław becoming hubs for tech talent.

Remote work—turbocharged by the COVID-19 pandemic—has now become a permanent feature of the Polish labor landscape. Digital platforms have enabled broader participation in the workforce, including among women, freelancers, and rural populations. Moreover, the rise of digital gig platforms (e.g., Useme, Freelancer.pl) has expanded income-generating options beyond traditional employment models.

Still, Poland faces a skills mismatch: demand for digital skills continues to outpace supply. According to the European Commission, fewer than 60% of Polish adults have basic or above-basic digital skills—below the EU average. This gap threatens to slow economic growth unless addressed through large-scale upskilling and lifelong learning initiatives.

Digitalization has also accelerated the rise of Poland's platform economy, which includes e-commerce, fintech, mobility services, and digital marketplaces. The success of local platforms like Allegro—Poland's leading e-commerce site and one of the most valuable tech companies in Central Europe—is a testament to the growing economic role of digital services. In 2022 alone, e-commerce in Poland accounted for over 14% of total retail sales, and the sector is expected to continue expanding, especially with improved logistics and mobile payment adoption.

Meanwhile, digital financial services, including online banking and mobile payment platforms like BLIK, have transformed how Polish consumers interact with money. These innovations not only enhance convenience but also expand financial inclusion—a key factor in broader economic participation.

Poland's growing digital economy is also a magnet for foreign direct investment (FDI). Global tech companies like Google, Microsoft, and Amazon have established data centers, R&D hubs, and service centers in Poland, citing its strategic location, skilled workforce, and improving digital infrastructure. These investments stimulate local economies, create high-value jobs, and integrate Poland more deeply into global value chains.

In addition, the emergence of startup ecosystems in cities like Warsaw, Gdańsk, and Poznań is helping to cultivate homegrown innovation. Sectors such as edtech, medtech, greentech, and cybersecurity are particularly dynamic, often supported by EU funding and public-private incubators.

Digitalization has already contributed positively to Poland's GDP growth, with the digital economy estimated to account for up to 8–9% of GDP, depending on the methodology. Projections suggest that, if Poland accelerates its digital transformation—particularly in SMEs, public services, and digital skills—it could gain an additional 2–3 percentage points of GDP growth annually over the next decade.

However, to fully unlock this potential, the digital divide must be addressed. This includes reducing disparities between urban and rural areas, improving digital literacy, and fostering trust in digital public infrastructure.

Challenges of digitalization in Poland. Despite significant progress and strong strategic commitments, Poland continues to face a number of challenges in fully realizing the benefits of digital transformation. These challenges span infrastructure, human capital, institutional design, and economic inclusivity.

Poland has made commendable progress in laying the groundwork for digital transformation. Through strategic investments, growing infrastructure, and increasingly digitized public services, the country is steadily aligning itself with the EU's Digital Decade objectives. However, to fully realize the vision of Society 4.0, deeper, more targeted efforts are necessary.

Table 2. Challenges of digitalization in Poland

Category	Challenge
Integration of Digital Technology	Only 5.9% of Polish enterprises use AI, far below EU leaders
	SMEs rely on legacy systems due to budget and technical constraints
	Tech adoption is regionally uneven, favoring urban centers
Digital Skills Gap	Less than 60% of adults have basic digital skills
	Digital literacy is particularly low among seniors and less-educated groups
	ICT sector is growing, but skilled worker supply is insufficient
Internet Connectivity and Usage	Only 72.1% of households have fixed broadband, rural areas underserved
	Mobile broadband is common but may not support high-demand activities
	Digital engagement gap persists despite near-universal internet access
E-Government	63% e-government use, below EU average (74%)
	Fragmented services across platforms create user confusion
	National and local services lack integration; digital inequality between municipalities
	Authentication systems are complex and not user-friendly for all
Economic Challenges of Digitalization	Digital divide risks widening economic inequality
	Job displacement in traditional sectors without sufficient reskilling
	Platform economy benefits are mostly urban-centric
	Dependence on foreign tech companies limits local scaling
	Low SME adoption of digital tools hampers productivity growth

Source: systematized by the author

First, the adoption of digital technologies must be accelerated across all sectors, particularly among small and medium-sized enterprises (SMEs), which form the backbone of the Polish economy. Many of these businesses still operate with outdated systems or lack the resources and expertise to modernize, which limits productivity and innovation.

Equally important is the need to expand digital education and lifelong learning programs. Without a digitally literate and adaptable workforce, the pace of transformation will slow. Digital skills must become a core element of education at all levels, supported by inclusive training opportunities for older populations and workers in transition.

Furthermore, while internet access in Poland is near-universal, disparities in connectivity quality and speed - especially between urban and rural areas -continue to undermine digital equity. Investing in high-speed broadband for underserved regions is essential for ensuring equal participation in the digital economy.

In the realm of public administration, Poland should work to streamline and integrate e-government services. Although tools like mObywatel and ePUAP have gained traction, fragmented platforms and inconsistent user experiences deter broader usage. A more unified and citizen-friendly approach would strengthen public trust and engagement with digital government services.

Finally, as digitalization reshapes the economy, it is crucial to ensure that its benefits are inclusive. Policymakers must take proactive steps to prevent economic divides from widening, ensuring that rural areas, vulnerable groups, and traditional industries are not left behind as Poland transitions to a more digital future.

By addressing these interconnected challenges - technology adoption, education, infrastructure, governance, and inclusivity - Poland can fully harness digitalization not only as a tool for modernization, but as a catalyst for sustainable, equitable economic development and an improved quality of life for all citizens.

Discussion. The findings of this study underscore both the remarkable progress and the complex challenges facing Poland in its digital transformation journey. Digitalization is reshaping Polish society and its economy in fundamental ways, yet the transition to Society 4.0 remains uneven across regions, social groups, and economic sectors.

Poland's digital progress is evident in several key indicators. With over 95% of households now connected to the internet, the country has built a strong infrastructure base. Popular services like the mObywatel app and the Internetowe Konto Pacjenta (IKP) illustrate how digital tools have become integrated into everyday life, enabling more efficient access to public services. Likewise, Poland's commitment to the Digital Decade targets and its strategic roadmap—culminating in the Digital Strategy 2035—signals a comprehensive policy vision to modernize the country's institutions and services.

However, the discussion must critically consider the disparities and structural limitations that continue to undermine the full realization of digital society goals. Despite near-universal internet access, only 72.1% of Polish households use fixed broadband, and significant urban-rural divides persist. This geographical gap poses a risk of deepening existing social and economic inequalities, particularly in underdeveloped regions like Podkarpackie or Lubelskie.

Furthermore, Poland's digital skills gap presents a major barrier to inclusive transformation. With just 45% of individuals aged 16–74 having basic digital skills - far below the EU average - many citizens remain excluded from the benefits of digital services and labor market opportunities. This challenge is compounded by demographic trends, with digital exclusion most acute among the elderly and lower-educated populations. Addressing this gap is not only a matter of education policy but of social justice and economic competitiveness.

The integration of digital technology in enterprises also reveals a mixed picture. While some firms have embraced e-commerce and digital communication tools, the adoption of advanced technologies such as AI (5.9% of enterprises) and cloud computing (19%) remains relatively low. This slow pace of digital transformation among SMEs—who comprise 99% of all businesses in Poland—poses a significant

obstacle to productivity growth and innovation. Limited financial resources, lack of technical capacity, and regional inequality contribute to this challenge.

In the realm of e-government, Poland has achieved notable successes, especially through mObywatel. Nevertheless, fragmentation across digital platforms, inconsistent user experiences, and a lack of integration between local and national systems diminish the overall effectiveness of digital governance. Although 63% of internet users engaged with e-government services in 2022, this figure still lags behind the EU average and suggests untapped potential. Simplifying authentication processes, improving interoperability, and building public trust are essential steps to increase adoption.

Economically, digitalization is having a transformative effect—stimulating new forms of employment, attracting foreign investment, and expanding Poland's footprint in the platform economy. Yet the economic gains remain concentrated, largely benefiting urban tech hubs and digital service sectors. Traditional industries and rural regions risk falling behind unless targeted policies promote inclusive digital growth. Moreover, job displacement due to automation and platformization creates new vulnerabilities, especially for workers in sectors with low digital resilience.

Overall, while Poland is on a promising path, it stands at a critical juncture. The next phase of its digital evolution will require deep structural reforms, inclusive education strategies, and a human-centered approach to technology. Bridging digital divides - across age, income, geography, and business capability - will be essential for realizing the full potential of Society 4.0. If these challenges are met with coordinated policy, investment, and social engagement, Poland can emerge not only as a digitally advanced nation, but as a model of resilient, equitable digital transformation within the European Union.

Conclusions. Poland has made significant strides in its journey toward becoming a digitally empowered society. The widespread availability of internet access - reaching nearly all households - along with the growing popularity of digital platforms such as *mObywatel* and increased investment in infrastructure, reflects a nation undergoing rapid technological modernization. These developments indicate strong momentum toward the broader vision of Society 4.0, where digital tools are embedded in the fabric of daily life, governance, and economic activity.

Despite this progress, several critical challenges continue to hinder Poland's full digital transformation. The adoption of advanced technologies, particularly artificial intelligence, remains low. With only 5.9% of enterprises implementing AI tools - compared to over a quarter in the most advanced EU countries—Poland risks falling behind in innovation-driven productivity. Furthermore, the digital skills gap remains a major barrier: just 45% of the population possesses basic digital competencies, limiting the inclusive use of online services and participation in the digital economy.

While broadband coverage is extensive, disparities in service quality and internet speed persist, particularly in rural and less economically developed regions. This uneven access reinforces existing inequalities and threatens to leave parts of the population disconnected from essential services and opportunities. Similarly, the growth of e-government services, though promising, is constrained by fragmented platforms and inconsistent user experiences, which reduce trust and limit broader adoption.

Economically, the benefits of digitalization are not yet fully distributed. Urban centers have largely reaped the advantages of the platform economy and foreign investment, while many rural areas and traditional industries have yet to benefit equally from digital innovation. This concentration risks widening regional disparities unless specific efforts are made to extend digital growth across the country.

To unlock the full potential of digitalization, Poland must adopt a comprehensive and inclusive strategy. Priorities should include accelerating digital adoption among SMEs, expanding digital literacy programs for all age groups, investing in high-speed infrastructure in underserved regions, streamlining e-government platforms for user-friendly access, and fostering innovation ecosystems beyond major cities. By addressing these interconnected challenges, Poland can evolve from a digital follower into a digital leader—shaping a Society 4.0 that is not only technologically advanced but also equitable, resilient, and future-ready.

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