

# ASSESSING THE IMPACT OF DIGITALIZATION ON ECONOMIC GROWTH

**Lesya Kolinets**

Vilnius Gediminas Technical University  
lesya.kolinets@vilniustech.lt

**Oleksandr Dluhopolskyi**

West Ukrainian National University, Ukraine  
WSEI University, Poland  
dlugopolsky77@gmail.com

## Introduction

**Relevance.** Digitalization is widely recognized as a major technological megatrend, shaping various sectors and driving transformative changes. The impact of digitalization on the economic landscape and financial market mechanisms is a critical issue in modern academic discourse. As digital technologies become embedded in the core of global economic operations, it is essential for scholars, practitioners, and policymakers to understand the diverse implications of this transformation. The acceleration of digitalization across various sectors has catalyzed significant changes in economic structures, heralding the emergence of new business models, the disruption of traditional industries, and the creation of new value chains. These transformations necessitate a reassessment of existing economic theories and models to account for the dynamics of the digital economy.

**Research problem.** As the global economy becomes increasingly digital, European countries exhibit significant disparities in both economic performance and digital integration. While some nations have advanced digital infrastructure and stable economic growth, others face challenges in establishing robust digital economies and maintaining consistent growth. Understanding these variations and identifying patterns among European countries can provide valuable insights into the relationship between digitalisation and economic growth.

**Aim.** This study aims to assess the digitalisation process among EU member states and its relationship with economic growth.

**Tasks.** After analyzing European countries based on GDP per capita growth and Digital Economy and Society Index (DESI) scores over a six-year period, submit a categorization of these countries into distinct clusters with similar economic and digital characteristics and assess the digitalisation process among EU member states examining its relationship with economic growth, research and development.

**Research methodology.** This study employed a quantitative research methodology, utilizing cluster analysis to group European countries based on two key indicators: GDP per capita growth and the Digital Economy and Society Index (DESI) scores, collected over a six-year period (2017-2022). We used the Pearson correlation method to investigate the relationship between digitalization (measured by the DESI score) and economic growth (measured by GDP per capita growth) within each cluster. This approach allowed us to assess whether higher levels of digitalization are significantly associated with stronger economic performance across different groups of European countries.

**Theoretical assumptions.** The European Union (EU) has positioned itself at the forefront of digital transformation, acknowledging its critical role in driving economic growth, enhancing global competitiveness, and improving societal welfare. The EU's digital strategy, which aims to make the Digital Single Market a tangible reality, reflects a multifaceted approach that integrates policy, investment, and regulatory measures. Supported by cornerstone frameworks such as the Digital Europe Programme and the Europe 2020 strategy, the EU's digital agenda underscores the importance of removing cross-border digital barriers and fostering an innovation-friendly ecosystem. Key political figures, including Andrus Ansip, former Vice President for the Digital Single Market, have been instrumental in these efforts, advocating for unified digital policies and advancing initiatives to encourage cross-EU digital integration (European Commission, 2020a). The Digital Services Act and Digital Markets Act stand as recent regulatory milestones, aiming to ensure transparency, fairness, and competition within the EU's digital landscape (European Commission, 2020b). The EU has anchored its digital agenda in substantial investments, with digital infrastructure and innovation forming its core. Programs like the Connecting Europe Facility and Horizon Europe exemplify the EU's dedication to strengthening digital capabilities by promoting high-speed internet access, advancing research in digital technologies, and supporting the digitalization of public services (European Commission, 2021). These efforts aim to solidify the EU's stance as a competitive force in the global digital economy, ensuring that its digital infrastructure aligns with the evolving demands of the Digital Single Market. Despite marked progress, the EU's digital transformation journey is met with challenges. There are notable disparities in digital readiness across member states, raising issues of digital inclusivity and uniformity.

## Research results

In our research, we used K-Means Clustering to group EU countries based on similar patterns in GDP per capita growth and DESI scores. This analysis utilized statistical data from the World Bank (2023) and the European Commission (2023). We calculated the average GDP growth and DESI score for each country over a six-year period, and then performed clustering based on these averages. The analysis yielded the following four clusters, each with distinctive characteristics.

**Table 1. Summary of European Clusters Based on Digitalization (DESI) and Economic Growth (GDP per capita growth)**

Cluster	Description	Countries
0	These countries have high DESI scores, indicating strong digital economies and advanced digital infrastructure. The GDP per capita growth rates in these countries are generally moderate, suggesting stable but not extremely high economic growth. These nations are typically recognized as developed economies with high standards of living and robust digital ecosystems.	Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, Netherlands, Spain, Sweden
1	Countries in this cluster show moderate DESI scores, pointing to developing digital sectors, though they may not be as digitally advanced as Cluster 0. GDP growth rates are moderate to low, reflecting relatively steady economic performance with some variance. Many of these are Eastern and Southern European countries, likely making advancements in digital integration while maintaining steady growth.	Czech Republic, Estonia, Italy, Latvia, Lithuania, Malta, Portugal, Slovakia, Slovenia
2	This cluster has countries with lower DESI scores and relatively varied GDP growth. The lower DESI scores suggest these nations may face challenges in digital transformation or have room for improvement in digital infrastructure and accessibility. Economically, these countries often show variable growth, potentially driven by recovery, structural reforms, or economic policy adjustments.	Bulgaria, Croatia, Cyprus, Greece, Hungary, Poland, Romania
3	Ireland stands alone in this cluster, likely due to unique characteristics in both high GDP growth and a strong DESI score. The high GDP growth rate is often attributed to Ireland's favourable corporate tax policies, which attract multinational companies, especially in the tech sector. Its strong DESI score and rapid economic expansion place it distinctively apart from other countries, warranting its own cluster.	Ireland

We received such correlations' results: cluster 0 - moderate positive correlation, cluster 1 - low or insignificant correlation, cluster 2 - weak or negative correlation, cluster 3 – strong correlation.

## CONCLUSIONS AND RECOMMENDATIONS

The weak correlation between DESI (Digital Economy and Society Index) scores and GDP per capita growth among EU countries could stem from several nuanced economic and social factors. Highly developed digital economies (often seen in wealthier EU nations) may experience diminishing returns on GDP growth from further increases in DESI scores. When countries reach a certain level of digital maturity, additional digitalization may enhance quality of life, productivity, or innovation without necessarily leading to rapid GDP growth. Digital advancements have a more immediate economic impact in industries reliant on high-tech, data-intensive processes. However, GDP growth in sectors like agriculture or tourism may be less sensitive to digitalization, particularly in countries where these sectors contribute significantly to the economy.

Many EU economies are heavily service-oriented, which might benefit from digitalization in terms of efficiency and productivity but not always in direct GDP growth.

Countries with more diversified economies may show less correlation between DESI and GDP growth, as digitalization benefits some sectors more than others. In a diversified economy, growth rates might be influenced more by international trade, manufacturing, or agriculture rather than solely by advancements in digital sectors.

Some countries may have high DESI scores due to strong infrastructure but may lack the widespread skills or business adoption necessary to convert this digital infrastructure into substantial economic growth.