

*Economics*

# Digital Transformation in the Global Economy: Technological Innovation, Social Impacts, and the Role of Government Policy

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**Abstract.** This paper discusses the role and importance of digital transformation in the contemporary global economy. Particular attention is given to the impact of technological innovations, artificial intelligence, and the platform economy on the production processes, management practices and business development. The study analyzes how digital integration contributes to the growth of labor market productivity and economic sustainability. It is shown that in parallel with technological progress, challenges such as digital inequality and structural transformation of the labor market are emerging. The paper points to the crucial role of government policy in infrastructure investments, adaptation of the education system and strengthening cybersecurity. The findings suggest that a coordinated and strategic approach can transform technological challenges into a driving force for innovative, sustainable economic growth. © 2026 Bull. Natl. Acad. Sci. Georg.

**Keywords:** digital transformation, global economy, social effects, technological innovations

## Introduction

The global economy is at the epicenter of fundamental transformations driven by the pervasive expansion of digital technologies into all spheres of public life. The beginning of the 21st century was marked by the so-called “Second Machine Age”, in which the mechanization of physical labor and industrial standardization are being replaced by the automation of cognitive processes, artificial intelligence, and algorithmic management based on data processing (Brynjolfsson & McAfee, 2014). This transformation is no longer limited to high-tech

sectors. It reaches all levels of economic activity, radically changing global value chains, the dynamics of international trade, and socio-institutional arrangements.

According to endogenous economic growth theories, technological progress is not viewed as an exogenous, random phenomenon, but as an internal, integral component of the economic system, directly related to the purposeful accumulation of knowledge, intellectual capital, and research and development processes (Romer, 1990). In the digital era, this theoretical framework has acquired new, critical importance, as information and “big

data” are transformed into a major factor of production. Modern models of economic growth clearly emphasize the fact that the long-term competitiveness and prosperity of states depend less on the abundance of natural resources, and more on their ability to rapidly disseminate innovations, modernize digital infrastructure, and adapt human capital to new technological realities (Agion and Howitt, 2009).

The aim of this study is to comprehensively examine the multifaceted economic and social aspects of digital transformation. The research analyzes in detail the impact of technological innovations on labor productivity, the mechanisms of disruption of traditional markets by the platform economy, and the structural reorganization of the labor market. Particular attention is paid to the strategic role of state policy in overcoming the “Digital Divide” and creating a regulatory framework that ensures an inclusive and fair distribution of technological benefits in conditions of global uncertainty. The paper argues that only a coordinated strategic approach makes it possible to transform technological challenges into a solid foundation for long-term economic sustainability.

### **Technological Innovations and Economic Efficiency**

The fundamental basis of digital transformation lies in the continuous generation of data chains (Big Data) and their high-tech analytical processing. In modern economic discourse, data is often considered a “new oil” strategic resource that allows business entities to micro-optimize operational processes, radically reduce information asymmetries and predict customer behavioral patterns with maximum accuracy (Manyika et al., 2017). Data analytics transforms traditional management into so-called “data-driven management”, where the decision-making process will shift from intuition to empirical evidence.

The integration of artificial intelligence (AI) and machine learning into the production cycle

creates new standards of efficiency. This is especially noticeable in complex sectors such as logistics, financial technologies and high-tech industries. For example, smart algorithms provide autonomous optimization of supply chains, which minimizes losses and increases the utilization rate of resources. In addition, in the context of technological sovereignty, the ownership of data and the ability to process them becomes a key element of the national economic strategy, which directly affects the competitiveness of the country.

**Platform change and market structural transformation.** Digital platforms (such as Uber, Airbnb, Amazon, Alibaba, etc.) have fundamentally changed the architecture of market relations. By exploiting network effects, these platforms create large-scale ecosystems where transaction costs of sourcing, negotiating, and executing are minimized (Parker et al., 2016). The platform economy “democratizes” the market, giving small and medium-sized enterprises a unique opportunity to transcend local borders and gain direct access to global consumers, which was previously the privilege of only transnational corporations.

However, the expansion of the platform model also poses serious economic challenges. In particular, new forms of monopolization are emerging, where “the winner takes almost all.” The control of data by platforms gives them unprecedented market power, which often hinders free competition and requires new regulatory approaches from the side of state policy. The platform revolution is not only a tool for economic growth, but also a catalyst for socio-economic transformation, which requires a balance between encouraging innovation and antitrust control (Stiglitz, 2019).

**Labor market transformation and social challenges.** Historically, every technological leap has caused intense fear in society about the so-called “technological unemployment”. However, modern empirical research shows that the process of

automation and robotization is more complex than the simple replacement of human labor by machines. Automation replaces specific, routine tasks rather than entire professions (Autor, 2015). This means that the content of work is changing: machines take on algorithmic functions, allowing people to focus on “super-automated” skills.

As a result, the demand for human labor remains critically high in sectors that require creativity, empathy, social intelligence, and complex problem-solving thinking. The “second machine age” does not mean the end of labor, but rather its reconfiguration, where the symbiosis of humans and artificial intelligence becomes the main prerequisite for productivity growth (Brynjolfsson & McAfee, 2014). However, adapting to this process requires a large-scale retraining of labor capital, the resources of which are not equally available to all social groups.

**Skills polarization and social inequality.** Despite technological optimism, digital transformation poses serious social risks, the most important of which is the polarization of the labor market. In the context of digital integration, the demand for highly skilled, technologically literate personnel is increasing, which leads to an increase in their salaries. At the same time, workers with medium-level qualifications, who perform routine tasks that are easily automated (for example, administrative or production line operations), face the risk of displacement and reduced incomes (ILO, 2023).

This structural deviation directly affects income inequality. If the distribution of the surplus benefits resulting from technological progress is left solely to the “invisible hand” and market mechanisms, this will lead to a catastrophic increase in social imbalances and the erosion of the middle class. Therefore, it is necessary to introduce a model of “progressive capitalism”, which includes active fiscal policy, new social protection mechanisms and increased public investment in education (Stiglitz, 2019). The digital economy cannot be sustainable if it is not inclusive and if technological

dividends are not accessible to broad segments of society, which ultimately guarantees social peace and long-term economic growth.

**Digital inequality and global inclusion.** Digital transformation is, by its very nature, an uneven and asymmetric process that often exacerbates economic imbalances. The so-called “digital divide” between developed and developing countries is no longer seen as a technological barrier. It is a structural barrier that hinders global financial inclusion and equal opportunities. According to the International Telecommunication Union (ITU), in 2022, a third of the world was still in a state of poverty and lacked access to basic internet connectivity, which is holding back the global digital economy (ITU, 2022).

This inequality manifests itself at several levels. The first level concerns the physical infrastructure, such as access to high-speed internet and reliable energy supplies. The second, and perhaps more critical, level is digital literacy and skills, without which technological access cannot be transformed into economic benefits. Digital inclusion must therefore become a top global policy priority to avoid the emergence of digital isolation (OECD, 2021). An inclusive approach involves creating an environment where technological dividends are accessible to all segments of society, regardless of their geographical or social status.

In addition, the issue of international economic order is of paramount importance. According to the United Nations Conference on Trade and Development (UNCTAD), the digital economy is based on cross-border data flows, which are currently controlled by a small number of global technology giants. This creates the risk that developing countries will remain only suppliers of “raw” data, while added value and innovative profits will be concentrated in high-tech centers (UNCTAD, 2021).

Therefore, fair global regulation is essential to enable developing countries to protect their digital sovereignty and reap the real benefits of the data economy. This requires international cooperation in

the areas of tax policy, intellectual property and cybersecurity, so that technological progress becomes a tool for global convergence rather than division (UN, 2021). Digital inclusion is no longer a goodwill gesture, it is a necessary prerequisite for economic sustainability and a just world order.

**The strategic role of state policy.** In the digital era, the functional purpose of the state is evolving from a traditional regulator to an active strategic partner. State policy is no longer limited to market monitoring. It becomes the architect of an innovative ecosystem. The European Commission's vision of "Shaping Europe's Digital Future" clearly indicates that maintaining global competitiveness requires direct and targeted state intervention in critical areas such as the development of 5G and 6G networks, high-performance cloud computing, and quantum technologies (European Commission, 2022).

The success of digital transformation is directly linked to the digitization of the public sector (GovTech). This does not only mean replacing paper documents with electronic ones, but also completely reconfiguring government services based on data analytics (World Bank, 2022). In addition, cybersecurity is becoming an integral part of national security, where the state is obliged to create a resilient digital shield to protect critical infrastructure and citizens' personal data (OECD, 2022).

**Adaptation of the education system and lifelong learning.** In the face of technological disruption, the education system faces an existential challenge. Traditional, academic models often fail to keep up with the dynamic demands of the market. Accordingly, the workforce of the future requires not only narrow technical competencies, but also "digital flexibility", critical thinking and the ability to quickly adapt to new realities (World Bank, 2023).

The institutionalization of lifelong learning models should become a top priority of state policy. This means creating an environment where employees have a constant opportunity to upgrade their

skills or completely retrain. Digital transformation in the public sector will only be effective if it is people-centered. This means that technologies should serve to reduce bureaucracy and increase citizen engagement, not alienate them (UNDP, 2023).

Ultimately, the strategic role of public policy is to create a fair "public contract" for data that protects individual freedoms while encouraging innovation for the public good (World Bank, 2021). Only coordinated policies that combine infrastructure investment and human capital development will enable countries to successfully navigate the complex mazes of the digital economy.

## Conclusions

The complex analysis conducted in this study demonstrates that digital transformation is no longer just a technological phenomenon; rather it represents an irreversible and comprehensive process of global economic development. Technological innovations, ranging from artificial intelligence to big data analytics, offer unprecedented tools for optimizing labor productivity, resource management, and sustainable development. However, this technological optimism is accompanied by serious existential and structural risks. The destabilization of the labor market, manifested in the erosion of middle-skilled jobs and the polarization of skills, poses a serious challenge to social stability. Digital inequality, both at the national and cross-border levels, raises the threat of a new type of isolation, where lack of access to technological benefits automatically means economic marginalization. Consequently, the full and positive realization of the potential of digital transformation is possible only under the conditions of a coordinated strategic approach. State policy should assume the role of a mediator and ensure the optimal balance between aggressively encouraging innovations and strengthening social protection mechanisms. A fundamental transformation of the educational systems is also imperative, focusing on lifelong learning to adapt human capital to the ever-changing digital

environment. Ultimately, the future of the digital economy depends not only on the power of technology alone, but on how effectively these technological challenges are transformed into a solid foundation for inclusive, equitable, and long-

term economic growth. Technology must remain a tool for enhancing human well-being, where innovation serves every member of society and contributes to a more sustainable global order.

## *ეკონომიკა*

# ციფრული ტრანსფორმაცია გლობალურ ეკონომიკაში: ტექნოლოგიური ინოვაციები, სოციალური გავლენა და სახელმწიფო პოლიტიკის როლი

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(წარმოდგენილია აკადემიის წევრის ა. აბრალავას მიერ)

ნაშრომში განხილულია ციფრული ტრანსფორმაციის როლი და მნიშვნელობა თანამედროვე გლობალურ ეკონომიკურ სივრცეში. ყურადღება ეთმობა ტექნოლოგიური ინოვაციების, ხელოვნური ინტელექტისა და პლატფორმული ეკონომიკის გავლენას წარმოების, მართვისა და ბიზნესის ფორმირების პროცესში. კვლევის ფარგლებში გაანალიზებულია, თუ როგორ უწყობს ხელს ციფრული ინტეგრაცია შრომის ბაზრის პროდუქტიულობის ზრდასა და ეკონომიკურ მდგრადობას. ნაშრომში აღნიშნულია, რომ ტექნოლოგიური პროგრესის პარალელურად იკვეთება ისეთი გამოწვევები, როგორცაა ციფრული უთანასწორობა და შრომის ბაზრის სტრუქტურული ტრანსფორმაცია. ნაშრომში მინიშნებულია სახელმწიფო პოლიტიკის გადამწყვეტ როლზე ინფრასტრუქტურული ინვესტიციების, განათლების სისტემის ადაპტაციისა და კიბერუსაფრთხოების უზრუნველყოფის მიმართულებით. დასკვნით ხაზგასმულია, რომ კოორდინირებული სტრატეგიული მიდგომა საშუალებას იძლევა ტექნოლოგიური გამოწვევები გარდაიქმნას ინოვაციური და მდგრადი ეკონომიკური ზრდის მამოძრავებელ ძალად.

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