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Strengthening Economic Resilience via Integrated Business Analytics and Digital Transformation

Abstract

In the modern era, the phase of implementing traditional technologies in the public and private sectors are about to end. The continued use of outdated systems and technologies across all fields may lead to inefficiencies. Therefore, the adoption of new approaches is now considered essential across various sectors. Taking these factors into account, this research systematically analyzes the impact of digital transformation on the economy, public administration, society, infrastructure, trade, logistics, and financial systems. Digitalization is viewed not only as a technological innovation but also as a key instrument for socio-economic development at both global and regional levels. The article emphasizes that the growing digital divide may deepen the gap between developed and developing countries, thus posing significant risks. In this context, the establishment of an international coalition is proposed as a means to address these challenges. The study also highlights the importance of establishing a global digital tax system and regulatory framework for the governance of the digital economy. Moreover, the article underscores how digitalization enhances the competitiveness of enterprises and nations in international markets. It also explores the role of contemporary innovations-such as 5G technology, the Starlink project, artificial intelligence, and digital currencies-in shaping economic and social systems. Furthermore, the article notes the necessity of implementing a series of projects to ensure that digital transformation is sustainable and inclusive.

Keywords: *Digital transformation, Business analytics, Economic inequality, Digital economy, Digital taxation, Digital divide, Economic development, Digital innovation*

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İnteqrasiya edilmiş biznes analitikası vasitəsilə iqtisadi dayanıqlığın gücləndirilməsi və rəqəmsal transformasiya

Xülasə

Müasir dövrdə, dövlət və müəssisələrdə ənənəvi texnologiyaların tətbiqi mərhələsi artıq başa çatmaq üzrədir. Yəni, köhnəlmiş sistem və texnologiyaların istifadə edilməsi bütün sahələrdə qeyri-səmərəli nəticələr verə bilər. Bu səbəbdən artıq yeni yanaşmaların tətbiq edilməsi bütün sahələr üzrə əhəmiyyətli hesab edilə bilər. Bunları nəzərə alaraq, tədqiqat işində rəqəmsal transformasiyanın iqtisadiyyat, dövlət idarəçiliyi, cəmiyyət, infrastruktur, ticarət, logistika və maliyyə sistemlərinə təsiri sistemli şəkildə təhlil olunur. Rəqəmsallaşma təkcə texnoloji yenilik kimi deyil, eyni zamanda qlobal və regional səviyyədə sosial-iqtisadi inkişafın əsas aləti kimi qiymətləndirilir. Məqalədə rəqəmsal bərabərsizliyin artmasının, inkişaf etmiş və inkişaf etməkdə olan ölkələr arasında uçurumun dərinləşməsi ilə səciyyələnən risklərə səbəb olacağı qeyd edilir və bu istiqamətdə beynəlxalq koalisiya yaradılması təklif olunur. Tədqiqat işində rəqəmsal iqtisadiyyatın tənzimlənməsi üçün qlobal rəqəmsal vergi sisteminin və normativ çərçivənin formalaşdırılmasının əhəmiyyətindən bəhs edilir. Eyni zamanda, rəqəmsallaşmanın müəssisələrin və hər bir ölkənin beynəlxalq bazarlarda rəqabət aparması üçün nə dərəcədə əhəmiyyətli olduğu ön plana çəkilir. Burada 5G texnologiyası, Starlink layihəsi, süni intellekt və rəqəmsal valyuta kimi müasir layihələrin iqtisadi və sosial sistemlərdə roluna da toxunulur. Məqalədə qeyd edilən bəzi nüanslarda rəqəmsal transformasiyanın dayanıqlı və bərabər şəkildə olması məqsədilə bir sıra layihələrin həyata keçirilməsinin vacibliyi qeyd edilir.

Açar sözlər: *Rəqəmsal transformasiya, Biznes analitikası, İqtisadi bərabərsizlik, Rəqəmsal iqtisadiyyat, Rəqəmsal vergi sistemi, Rəqəmsal uçurum, İqtisadi inkişaf, Rəqəmsal innovasiya*

Introduction

Modern economy and society are currently undergoing a phase of digital transformation. This process compels not only individual elements of the economy but also societies and governments as a whole to pay particular attention to the factors of digitalization. With the advent of technological discoveries and the onset of globalization, digital and traditional economies have entered a path of parallel development. The transition to digital technology plays a crucial role and holds significant importance in the economic and political development of any given country. Therefore, the present era is considered the most suitable time to fully implement this transition. Moreover, it is essential to closely monitor global trends in economic and social transition.

Digital transformation serves as the main driving and transformative force behind the renewal of systems that are currently being shaped on a global scale and within national societies (Zakizade, 2024). In today's context, there is virtually no functional sphere of activity into which digital technologies have not penetrated or cannot penetrate.

The digital transition refers to the virtualization of the classical physical world and the provision of public services to everyone through technological communication tools. Digitalization encompasses not only government services but also the entire society. The current stage of development coincides precisely with the transition period from the classical world to the digital world (Məmmədov, 2021, s. 27-32)

Digitalization, while initially understood as the process of converting information from analog to digital format in the operations of organizations and society, has evolved into a broader and more transformative framework in the modern era. This process, with a technology-centered approach, leads to a fundamental restructuring of business structures, management models, and service offerings. Digitalization not only automates operations but also fosters innovation, ensures the real-time collection and analysis of data, and promotes more transparent and efficient decision-making. This is a transformative process that encompasses everyone, from individual users to large organizations (Chaffey, 2000, pp. 8-14).

The concepts of digital market and digital economy are widely spread in this regard. The digital market is a modern mechanism that ensures the rapid transition from limited national markets to a unified global market (Aleksenko, 2018, p. 25). The digital economy, on the other hand, is a collection of economic activities arising from billions of daily online connections between people, companies, devices, data, and processes (Qasımlı, 2023, s. 20-21)

Currently, there exists a digital "gap" between the future of national economies worldwide. A significant portion of developing countries, as well as many economically underdeveloped nations, remain excluded from digital transformation. According to UNCTAD's assessment, in the aforementioned group of countries, one in every five people (on average) has access to the internet. In developed countries, this figure rises to four out of every five. The gap is even deeper in terms of the use of digital information and advanced technologies. There is an oligopolistic dictation in terms of leading new quality technologies in every sense. According to UNCTAD's data, countries in Latin America and Africa together account for only 5% of the global digital data analysis centers (Bayramov, 2021, s. 78-100). This fact indicates that, in relation to the aforementioned group of countries, there is not only an unequal distribution of digital revenues, but these countries are generally outside the creation and distribution of those revenues.

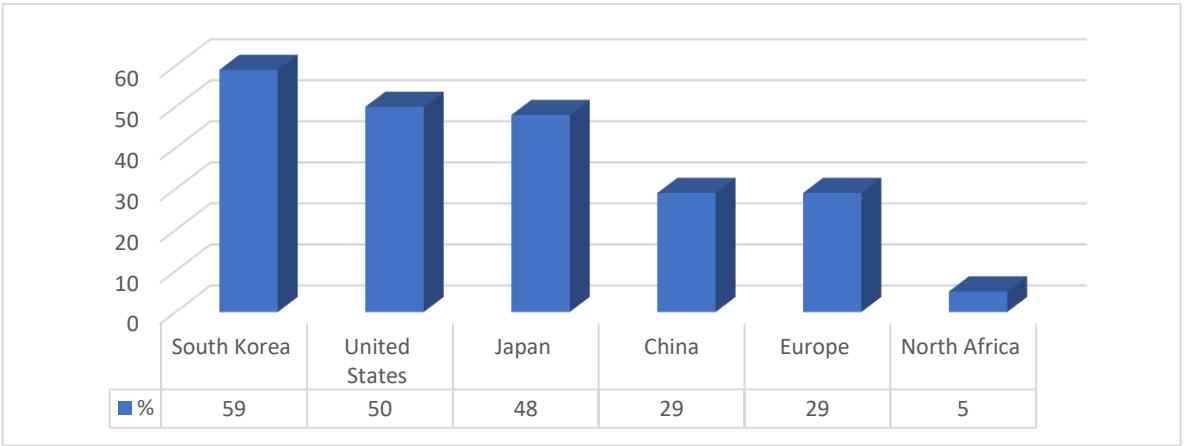
There is a multi-dimensional digital divide between countries, businesses, and individuals, which exacerbates the development gap over time. Hospitals, schools, government institutions, and businesses cannot operate efficiently without digital tools. The digital divide hinders growth and continues to limit opportunities for billions of people who remain unconnected, as well as for those who are connected but do not fully utilize the potential of these technologies.

Research

The development of the digital economy in recent years is closely linked to the increasing importance of the internet. To this end, developed countries around the world, particularly the United States, China, South Korea, and European nations, have made significant investments in expanding fiber-optic cable networks and implementing 5G technology. Since fiber-optic technologies offer higher speeds and data transmission capabilities compared to traditional cables, they enhance the reliability of digital services and create favorable conditions for the development of fields such as artificial intelligence, cloud technologies, and e-commerce.

Countries around the world are therefore looking to 5G to help spearhead future economic growth; getting national 5G policy right is a priority for most major economies worldwide. The GSMA (the trade body for mobile network operators) has conducted analyses on the future of 5G implementation and has forecasted that by the end of 2025, the adoption of 5G will be as shown in Diagram 1.

Diagram 1. *5G connections as a share of total connections by 2025, in percentage terms.*



Source: *The diagram is based on data from KPMG. (KPMG, 2019)*

5G technology represents the next generation of mobile telecommunications and marks a significant advancement in the evolution of both technology and communication systems. In contrast to previous generations, 5G offers a broad spectrum of innovative applications and capabilities. Beyond providing faster mobile internet speeds, it has the potential to drive the development of smart cities, enhance agricultural practices, revolutionize transportation, and enable the automation of digital industrial ecosystems. As a result, nations across the globe are turning to 5G technology as a catalyst for future economic expansion. Consequently, formulating an effective national 5G policy has become a central focus for major economies worldwide.

In this regard, providing fast and reliable internet connectivity to a wider range of population groups through innovative technologies is of significant importance, parallel to the development of 5G. It is precisely at this point that the Starlink project plays a crucial role with its global coverage and satellite-based infrastructure. Starlink is a global satellite internet project initiated by SpaceX, led by Elon Musk. The primary aim of the project is to provide high-speed and reliable internet access, particularly in remote and underserved areas with limited access to the internet. To achieve this, Starlink is deploying thousands of small satellites in Low Earth Orbit to create a global broadband internet network. The internet services offered by Starlink are a significant alternative for regions that lack traditional cable and fiber-optic infrastructure. The speed and latency of the service allow users to effectively utilize digital services such as video conferences, online education, and other digital services. For example, the speed offered to standard users ranges from 100 to 250 Mbps, which is sufficient for many digital activities. (9)

The global implementation of Starlink contributes to the wider distribution of internet services and helps reduce the digital divide. This initiative also creates new opportunities in the fields of education, healthcare, and economic development.

In addition to such global initiatives, significant programs are being implemented at the regional level to strengthen digital transformation. The European Union, in particular, has been taking advanced steps in this area. In recent years, the European Union has taken significant steps to accelerate digital transformation by allocating substantial financial resources through the "Digital Europe" programmes. These initiatives aim to strengthen the EU’s digital sovereignty, ensure access to strategic technologies, and expand digital capabilities for both citizens and businesses. Within this framework, several key programmes have been launched, including:

- Digital Europe Amended Work Programme 2023-2024: This programme focuses on the development of digital skills, the deployment of advanced digital technologies, and support for startups and SMEs to foster innovation and competitiveness.
- Digital Europe - Amended Cybersecurity Work Programme 2023-2024: Aimed at enhancing cybersecurity infrastructure across the EU, this initiative supports the establishment of advanced threat detection systems and promotes cross-border cooperation in combating cyber threats.
- Digital Europe - Chips: Multiannual Work Programme for the Years 2023-2027: This long-term programme is designed to reinforce Europe's resilience in semiconductor technologies and to strengthen domestic production capabilities in microchip manufacturing.

These strategic initiatives stimulate the widespread application of digital transformation not only in the public and technological sectors but also in various aspects of economic activity, particularly in sectors such as trade and logistics. The integration of digital technologies with the real sector has led to significant innovations in these areas. In recent years, the rapid development of global trade and e-commerce has made digitization in logistics and payment systems essential. As a result of this transformation, international logistics giants like DHL and FedEx have equipped their delivery processes with automated technologies, achieving route optimization through artificial intelligence and data analytics. Thanks to these technologies, both delivery times have been shortened and the quality and traceability of services have been enhanced.

On the other hand, payment systems have also undergone similar innovations. Digital payment platforms such as PayPal, Stripe, and Apple Pay offer users secure, fast, and convenient shopping experiences. These technologies, alongside bank cards, have contributed to the widespread adoption of alternative methods, including cryptocurrency and mobile payment systems. At the same time,

these platforms provide integration opportunities for small and medium-sized businesses, facilitating their access to the global market.

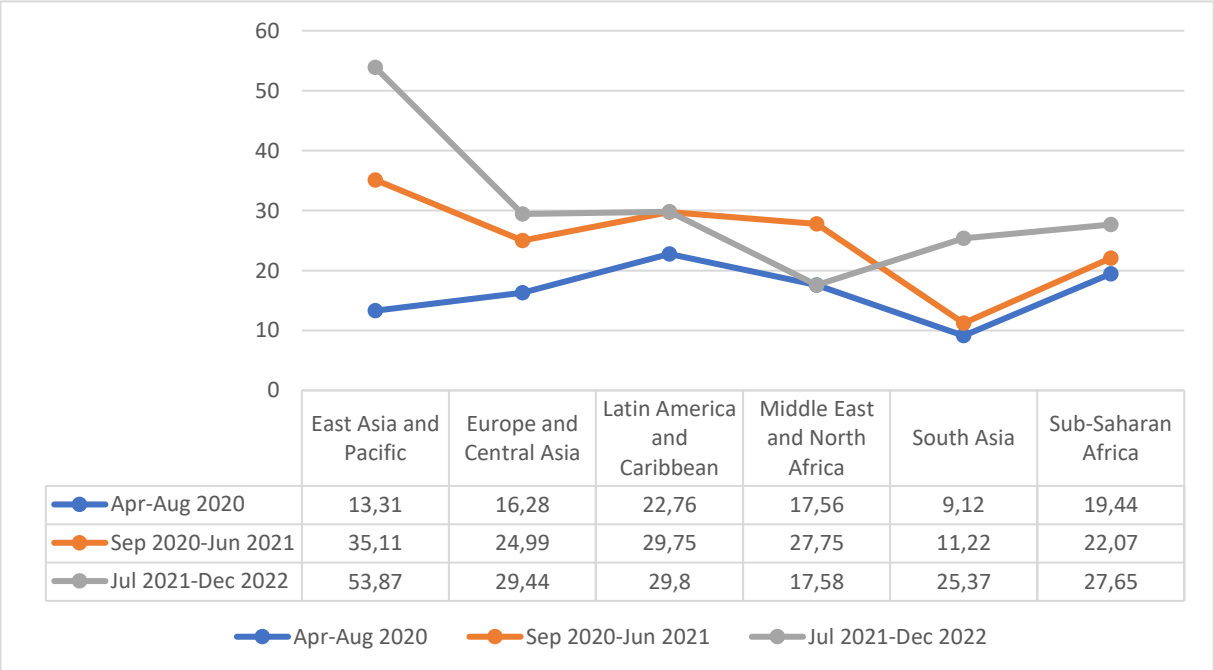
As a result, the digitization of logistics and payment systems has become one of the fundamental pillars of the modern economy. Innovations in this field not only accelerate trade but also fundamentally transform the customer experience.

In this context, digitalization extends beyond logistics and payment systems, also penetrating the core elements of financial infrastructure, thereby paving the way for larger-scale transformations. The rapid advancement of digital technologies and the increasing popularity of cryptocurrencies have prompted many countries to consider the necessity of developing their own sovereign digital currencies. This has brought the concept of Central Bank Digital Currencies to the forefront. China has been one of the pioneers in this field, having entered the testing phase of its digital yuan, known as "e-CNY." Meanwhile, the European Central Bank has joined this process with the "Digital Euro" project. The primary objective of CBDCs is to accelerate the transition to a cashless society, create secure and traceable payment systems, and enhance financial inclusivity. These technologies also enable access to digital financial services for populations that are excluded from traditional banking systems. Furthermore, CBDCs provide governments with a more effective means of controlling monetary policy and reducing the size of the shadow economy. (Nocoń, 2023, p. 82-83)

Currently, the United Kingdom, Japan, Canada, and other developed countries are conducting various research and pilot projects on Central Bank Digital Currencies (CBDC). This trend suggests that, in the near future, the global financial system may transition entirely to a digital format.

Based on the ideas presented above, it becomes evident that the pace and scale of digital transformation develop differently across countries and regions. In order to highlight these differences more clearly and substantiate existing inequalities in digitalization with concrete facts, statistical indicators for various regions are provided below. Through the analysis of these statistical indicators, the dynamics of the digital transition, changes over periods, and possible factors influencing this process will be explained in greater depth.

Diagram 2. *Firms investing in digital solutions, by region (in percentage terms).*



	East Asia and Pacific	Europe and Central Asia	Latin America and Caribbean	Middle East and North Africa	South Asia	Sub-Saharan Africa
Apr-Aug 2020	13,31	16,28	22,76	17,56	9,12	19,44
Sep 2020-Jun 2021	35,11	24,99	29,75	27,75	11,22	22,07
Jul 2021-Dec 2022	53,87	29,44	29,8	17,58	25,37	27,65

Source: *The diagram is based on data from the World Bank. (10)*

Between 2020 and 2022, the percentage of firms investing in digital solutions increased at different rates across regions. The most significant growth was observed in the East Asia and Pacific region, where the digital investment indicator rose from 13.31% to 53.87%. This increase can be attributed to rapid technological development in the region, government digitalization policies, and the shift to online systems during the pandemic. A similar growth is observed in the South Asia and Sub-Saharan Africa regions, where access to technology has expanded, and digital literacy has been promoted.

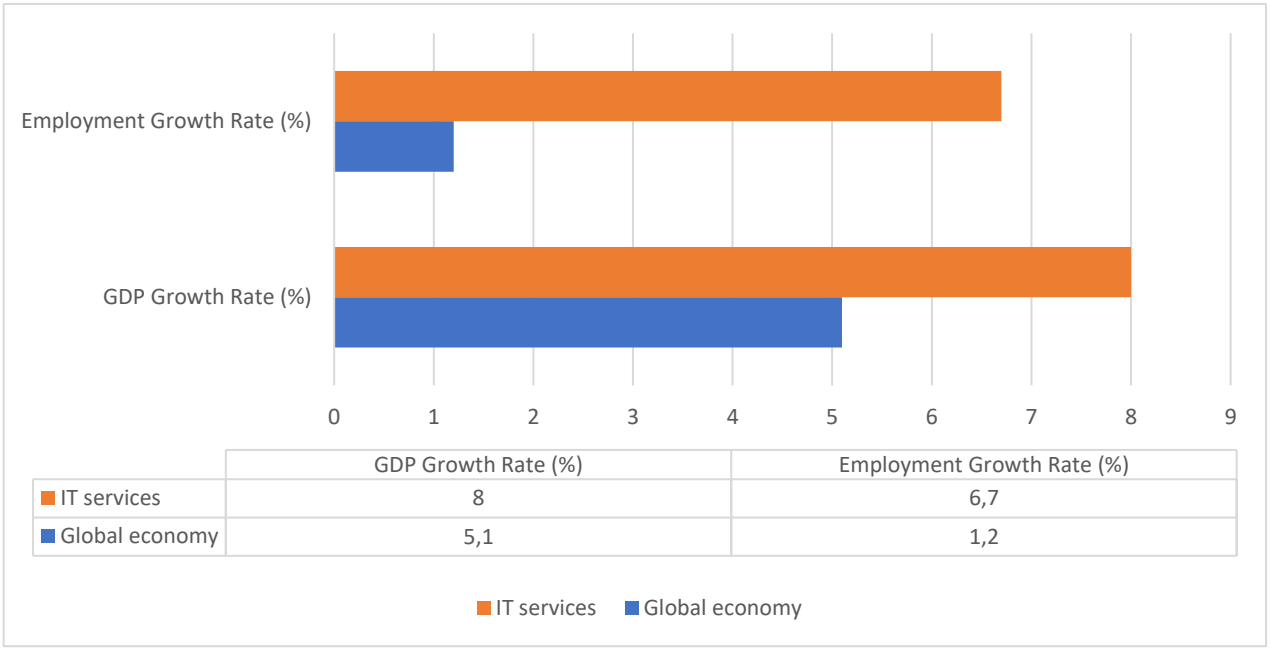
Conversely, although growth in the Middle East and North Africa region was observed up until 2021 (27.75%), by the end of 2022, this figure had decreased to 17.58%. This decline is likely attributable to political instability, economic difficulties, and the uneven development of technological infrastructure in the region. Additionally, the limited opportunities for small and medium-sized enterprises to transition to digital transformation could explain the downturn in this area. In other regions, while the growth has been more moderate, the global spread of technology and the increasing prioritization of digital transformation are evident.

This landscape also highlights the deep divide that exists between high-income countries and low- and middle-income countries in the field of digital transformation. While companies in high-income countries continue to integrate digital solutions to streamline processes and improve efficiency, many companies in low- and middle-income countries were without a computer or internet connection in 2022, particularly small and medium enterprises.

The digital sector is an engine for economic growth and job creation, but the benefits are concentrated in a few leading economies. IT services sector growing much faster than the global economy. (*Diagram 3*)

As the indicators show, the IT services sector has grown at a significantly faster pace than the global economy. Specifically, the GDP growth rate in this sector is 8%, substantially surpassing the 5.1% growth rate of the global economy. This indicates that technological development has become a primary driver of economic value creation. (*Diagram 3*)

Diagram 3. *Compound annual growth rate of value added and employment, 2000-2022.*



Source: *The chart is based on data from the Digital Progress and Trends Report. (4)*

Similarly, comparable differences are observed in the employment sector. While the global economy has seen an employment growth rate of only 1.2%, the IT sector's growth rate in this area has reached 6.7%. This highlights that technology has not only contributed to economic value creation but has also had a significant impact on the labor market by generating more job opportunities. Therefore, the diagram clearly demonstrates the contribution of digital transformation to both labor and economic sectors.

In the context of these trends, another noteworthy point is that the rapid employment growth and economic value observed in the IT sector cannot solely be explained by technological advancements; this development has also been geographically unevenly distributed. The information technology services sector, including software development and tech consulting, grew at twice the rate of the global economy, creating jobs at six times the rate of the global economy. However, this remarkable growth was highly concentrated, with the top six economies - the United States, China, India, Japan, Germany, and the United Kingdom - accounting for 70 percent of the global value added in IT services.

Table 1. *Domestic app among top 100 most download app, in percentage terms.*

	2015	2019	2022
China	91,62	94,68	97,99
Korea	68,32	64,13	66,08
United States	67,45	60,48	62,7
Japan	61,79	50,38	52,29
India	29,44	29,12	36,6
Russian Federation	22,63	29,64	33,75
Türkiye	12,19	24,98	31,98
Brazil	10,3	13,03	25.22
South Africa	7,43	13,01	16,93
Egypt, Arab Rep.	2,4	2,69	3,31

Source: *The diagram is based on data from the World Bank. (11)*

Between 2015 and 2022, significant changes have been observed in the share of domestic applications among the most downloaded apps in the "Top 100" list. These changes have developed in different directions across various countries. China stands out as the country with the highest growth in this regard. The share of domestic apps, which was 91.62% in 2015, increased to 97.99% by 2022. This growth is attributed to restrictions placed on foreign apps and the strong development of domestic technologies. Applications such as WeChat, TikTok (Douyin), and QQ are the main drivers of this increase.

At the same time, the popularity of local applications has also risen in countries such as Turkey, India, Russia, Brazil, and South Africa. For instance, in Turkey, the percentage of domestic apps, which was only 12.19% in 2015, reached 31.98% in 2022. The development of local tech startups and the shift of users towards national platforms have supported this increase. In India, Paytm, and in Russia, VKontakte and Yandex are among the key examples that have reinforced this trend.

On the other hand, in technologically advanced countries like the United States, Japan, and South Korea, the representation of local applications in the "Top 100" list has shown a decline or stagnation. In the United States, this indicator was 67.45% in 2015, but it dropped to 62.7% by 2022. At the same time, Japan saw a more significant decline-from 61.79% to 52.29%. Among the main reasons for this trend are the increasing usage of global applications (such as TikTok, Instagram, WhatsApp, etc.) in these countries' markets, making it difficult for local applications to compete with them.

Overall, the table indicates that in developing countries, there is an increasing interest in local applications as a result of policies promoting technological independence and digitalization. In contrast, in developed countries, the market has become saturated, with global applications dominating. These trends are directly related to the technological policies, legislative approaches, and user behaviors of the respective countries.

The growing interest in domestic digital applications in developing countries aligns with the rise of digital startups and the influx of financial support in these regions. Specifically, between 2020 and 2022, venture capital investments directed towards these regions led to the ascent of local tech companies. While the app market is becoming more localized, the domestic success of these companies in developing economies may not be transferable to foreign markets.

Suggestions

Based on the findings and research conducted, a series of recommendations are presented to address the identified issues and foster further development. These recommendations aim to mitigate the challenges observed and enhance effectiveness in the relevant fields. The following proposals hold significant importance both from a theoretical and practical perspective and can contribute to progress in the respective area.

1. The creation of an "International Coalition" for reducing digital inequality. In this regard, the implementation of the "Digital Solidarity Fund," which would be based on mandatory contributions from technology giants (such as Meta, Microsoft, Google, etc.), could be an effective initial step in reducing digital inequality. The primary goal of this fund could be to establish digital infrastructure in developing countries and enhance internet access in remote areas. In particular, the provision of technical equipment for teachers and students, training programs on digital skills, and the development of online education platforms could be supported through this fund.

The preparation of an international digital literacy index would enable the systematic evaluation of countries' levels of digital knowledge and skills. Through this index, countries' education systems, access to technology, the spread of digital skills, and technological ecosystems can be compared. Based on the results obtained, targeted support programs can be developed for countries in need, and global strategic actions can be taken to eliminate digital inequalities.

2. Formation of a global digital tax system and regulatory mechanism. It should be noted that as a result of digitalization, companies may attempt to avoid taxes through offshore operations. In this regard, the implementation of tax control systems supported by artificial intelligence is considered an important issue. In this context, the establishment of a global digital tax system may begin with the creation of a "unified and centralized tax platform for international digital companies." This project could facilitate the possibility of simplified and centralized tax registration for digital companies, allowing technology giants operating in various countries to fulfill their tax obligations from a single platform.

Additionally, it is crucial to incorporate digital addenda into traditional bilateral tax treaties. Through these addenda, it may be possible to ensure the fair distribution of revenue generated from digital sales between the source country and the country where the profit is registered. To prevent tax evasion, the use of artificial intelligence-based tax monitoring tools is also deemed appropriate.

Conclusions

Digital transformation has become a crucial factor in the development of the global economy and society. These changes are having a profound impact on areas such as public administration, trade, logistics, finance, and social sectors. The analyses presented in this article seek to address the key challenges faced by digitalization, such as digital inequality, the technological divide, and the creation of appropriate regulatory frameworks. International cooperation and the establishment of a global digital tax system are proposed, which would enable the more equitable management of the digital economy. At the same time, the role of digital transformation in combating climate change is highlighted, with the potential to contribute to the development of a green economy. For the successful implementation of this process, interstate collaboration and innovative approaches are essential. Overall, digital transformation not only accelerates global development but also has the potential to contribute to the reduction of social and economic inequalities.

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