

ECONOMIC IMPACT OF DIGITALIZATION ON HOUSEHOLD FINANCES IN UZBEKISTAN

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Abstract. This research explores the relationship between digitalization and its economic impact on household finances in Uzbekistan. The study's objective is to determine how technological advancements, particularly in ICT (Information and Communication Technology), influence financial behavior and market dynamics within Uzbekistan households. The research employs a quantitative approach, using a Tobit regression model to analyze data collected from various national databases, including Uzstat and the Global Innovation Index. The study focuses on variables such as the ICT index, government readiness for ICT integration, and the rate of automation, represented by the number of robots per 10,000 workers. Data was collected over a span of ten years, from 2011 to 2021, and analyzed to identify significant correlations between these variables and household savings rates. The findings suggest a positive correlation between the ICT index and labor market indices, indicating that as digitalization advances, the labor market and household incomes experience growth.

Keywords: digitalization, household finances, ICT index, Uzbekistan.

O'ZBEKISTONDA RAQAMLASHTIRISHNING UY XO'JALIKLARI MOLIYASIGA IQTISODIY TA'SIRI

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Annotatsiya. Ushbu tadqiqot raqamlashtirish va uning O'zbekistondagi uy xo'jaliklari moliyasiga iqtisodiy ta'siri o'rtasidagi bog'liqlikni o'rganadi. Tadqiqotning maqsadi texnologik taraqqiyot, xususan, AKT (axborot-kommunikatsiya texnologiyalari) sohasidagi yutuqlar O'zbekiston uy xo'jaliklaridagi moliyaviy xatti-harakatlar va bozor dinamikasiga qanday ta'sir ko'rsatayotganini aniqlashdan iborat. Tadqiqotda miqdoriy yondashuv qo'llanilgan bo'lib, Tobit regressiya modelidan foydalanib, turli milliy ma'lumotlar bazalaridan, jumladan, Uzstat va Global innovatsion indeksdan to'plangan ma'lumotlar tahlil qilingan. Tadqiqot AKT indeksi, hukumatning AKT integratsiyasiga tayyorligi va har 10 000 ishchiga to'g'ri keladigan robotlar soni bilan ifodalanadigan avtomatlashtirish darajasi kabi o'zgaruvchilarga qaratilgan. Ma'lumotlar 2011-yildan 2021-yilgacha bo'lgan o'n yil davomida to'plangan va ushbu o'zgaruvchilar va uy xo'jaliklarining jamg'arma stavkalari o'rtasidagi sezilarli bog'liqliklarni aniqlash uchun tahlil qilingan.

Kalit so'zlar: raqamlashtirish, uy xo'jaliklari moliyasi, AKT indeksi, O'zbekiston.

ЭКОНОМИЧЕСКОЕ ВЛИЯНИЕ ЦИФРОВИЗАЦИИ В УЗБЕКИСТАНЕ НА ФИНАНСЫ ДОМАШНИХ ХОЗЯЙСТВ

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Аннотация. В данном исследовании рассматривается взаимосвязь между цифровизацией и ее экономическим влиянием на финансы домохозяйств в Узбекистане. Целью исследования является определение того, как технологические достижения, особенно в области ИКТ (информационно-коммуникационных технологий), влияют на финансовое поведение и динамику рынка в домохозяйствах Узбекистана. В исследовании используется количественный подход, используя регрессионную модель Тобита для анализа данных, собранных из различных национальных баз данных, включая Uzstat и Глобальный индекс инноваций. Исследование фокусируется на таких переменных, как индекс ИКТ, готовность правительства к интеграции ИКТ и скорость автоматизации, представленная количеством роботов на 10 000 работников. Данные были собраны в течение десяти лет, с 2011 по 2021 год, и проанализированы для выявления значимых корреляций между этими переменными и показателями сбережений домохозяйств.

Ключевые слова: цифровизация, финансы домохозяйств, индекс ИКТ, Узбекистан.

Introduction.

In the modern economic environment, information and communication technologies (ICT) play a crucial role in shaping household financial behavior and labor markets. Over the past decade, Uzbekistan has seen an increased focus on digital transformation, which has had widespread effects across various economic sectors. However, the specific impact of ICT on household savings and labor markets remains underexplored, particularly in terms of how technological advancements influence income distribution, job automation, and public interest in highly automated sectors.

This study aims to examine the relationship between ICT development and household savings in Uzbekistan, using a Tobit regression model. By analyzing data from Uzstat and the Global Innovation Index, the research seeks to understand the extent to which digitalization, represented by factors such as the ICT index, government readiness for ICT, and automation rates, impacts household income and labor market participation (Abalkin, 2014).

The primary objective of this research is to provide a comprehensive understanding of how ICT development contributes to financial stability and the challenges it poses to labor market adaptability. The findings will offer insights for policymakers on the socio-economic implications of digital transformation, guiding future policies in ICT integration and economic development.

Uzbekistan has undergone a significant digital transformation in recent years, driven by government-led initiatives such as the Digital Uzbekistan 2030 strategy, which aims to expand ICT infrastructure and promote digital financial services (World Bank, 2022). Despite these efforts, the impact of digitalization on household finances remains an underexplored area. While some studies suggest that digital financial services can enhance household savings and financial security (Jack & Suri, 2016), others indicate that automation may contribute to job displacement and income instability. The extent to which digitalization influences household savings and labor market dynamics in Uzbekistan is still unclear.

This study seeks to examine the economic impact of digitalization on household finances in Uzbekistan by analyzing key indicators such as the ICT Index, government readiness for ICT integration, and automation rates. Using a quantitative approach, the research employs a Tobit regression model to evaluate data from national databases, including Uzstat and the Global Innovation Index. The study aims to address the following research questions:

How does ICT development influence household savings behavior in Uzbekistan?

What is the relationship between digitalization and labor market outcomes?

How do regional disparities in digitalization affect financial inclusion and economic security?

By investigating these questions, this research will contribute to a deeper understanding of how digital transformation shapes household financial stability and labor market participation in Uzbekistan. The findings will provide valuable insights for policymakers, financial institutions, and researchers seeking to design strategies that maximize the benefits of digitalization while mitigating potential risks.

Literature review.

Digitalization has transformed economies worldwide, influencing financial behaviors, labor markets, and economic development. The impact of digitalization on household finances has been widely studied, with research highlighting the role of information and communication technologies (ICT), automation, and financial inclusion in shaping economic outcomes (Allen et al., 2016). This section reviews existing literature on the relationship between digitalization and household savings, financial inclusion, and labor market participation, focusing on both global experiences and Uzbekistan's context.

Economic theories suggest that digital transformation fosters financial stability by increasing efficiency, transparency, and accessibility in financial markets (Brynjolfsson & McAfee, 2014). ICT development enhances economic productivity, allowing individuals and businesses to participate in digital financial systems, thereby improving household savings (Stiglitz & Greenwald, 2014).

Access to digital financial services has been shown to boost savings and investment behavior, especially in emerging economies. Mobile banking and fintech platforms facilitate financial inclusion, reducing barriers to saving (Jack & Suri, 2016). Empirical studies from Sub-Saharan Africa and Southeast Asia show that mobile money adoption leads to a significant increase in household savings (Suri & Jack, 2016).

Research across developed and emerging economies indicates a strong positive correlation between ICT adoption and savings behavior. A study by Ayyagari, Beck, and Hoseini (2013) found that digital banking services led to a 15% increase in household savings across 20 developing nations. Similarly, a World Bank report (2019) highlights that ICT development contributes to improved financial decision-making and higher savings rates.

Uzbekistan has experienced rapid digital transformation in recent years. Government initiatives, such as the "Digital Uzbekistan 2030" strategy, have expanded internet access and digital financial services (Asian Development Bank, 2021). However, disparities between urban and rural regions persist. According to a UNDP report (2022), only 40% of rural households in Uzbekistan have access to digital banking, compared to 85% in urban centers.

The Uzbek government has invested heavily in digital infrastructure, financial technology, and automation to modernize the economy (World Bank, 2022). Policies promoting digital payment systems and online financial services aim to increase financial inclusion, particularly in rural areas.

Automation poses significant challenges to Uzbekistan's labor market. Industries such as textiles and agriculture, which employ a large share of the workforce, are vulnerable to job displacement due to digitalization (International Labour Organization, 2021). Studies suggest that reskilling initiatives and vocational training programs are essential to mitigate automation's negative effects (Acemoglu & Restrepo, 2019).

The literature indicates that digitalization has a profound impact on household savings, financial inclusion, and employment patterns. While digital technologies enhance financial security, automation introduces risks that must be managed through policy interventions.

Future research should explore the long-term effects of digitalization on household financial behavior in Uzbekistan.

Methods.

Research Design

This study utilizes a quantitative approach to explore the impact of ICT development on household savings and labor market behavior. The research adopts a Tobit regression model, which is commonly used when the dependent variable is censored and exhibits both continuous and discrete characteristics. This model is particularly appropriate for analyzing household savings, where many observations may be zero (for households that do not save) but positive for others.

Data Collection

Data were collected from Uzstat (the Uzbekistan State Statistics Service) and the Global Innovation Index. The dataset spans from 2011 to 2021, providing a comprehensive view of how ICT development has influenced household financial behavior over the past decade.

Key variables used in the analysis include:

- ICT Index: Measuring the overall level of digitalization in the country, including internet penetration, mobile usage, and technological infrastructure.
- Government readiness for ICT integration: Assessed through government initiatives and the integration of digital tools into public sectors.
- Automation rates: Defined as the number of robots per 10,000 workers, this variable captures the extent of technological substitution in the labor market.
- Household income and savings: Collected from Uzstat, these variables measure household financial well-being and saving habits (Abalkin, 1997).

Sampling Technique

The sample consists of aggregate data on household financial behavior, digital infrastructure, and automation rates. This aggregate sampling method was selected to provide a broader understanding of macro-level impacts, avoiding the noise that individual-level data might introduce.

Data Analysis

The analysis was conducted using Tobit regression, which helps in understanding the relationship between ICT development and household savings, accounting for the fact that many households may not save at all. The model was selected due to its suitability in handling censored data, especially where the dependent variable (household savings) has a significant number of zero values.

The regression analysis aimed to estimate the effect of independent variables (ICT Index, automation rates, etc.) on household savings while controlling for potential confounding factors such as employment rate and household income.

Results.

Our literature review shows that to better understand the mechanisms through which public policies contribute to reducing or increasing poverty in different contexts, it is important to: a) clearly define the object of assessment (types of policies, population groups), b) analyze the policy context (historical, implemented), c) analyze the impact of policies on poverty of different subgroups in each context, d) take into account contextual factors other than poverty that may interact with poverty and influence household development in each context.

Figure 1 presents the variables that influence household activity.

Technological development has an impact on the labor market. Changes in household income affect a number of parameters (Plotnikov, 2022). To assess the level of ICT, such indicators as the index of innovative development, the index of government expenditure on innovation, and the index of the performance of technological inventions are used.

Along with the indicators that determine the development of ICT, attention should also be paid to the development of the information environment. According to a number of researchers, the ICT index influences changes in the labor market.

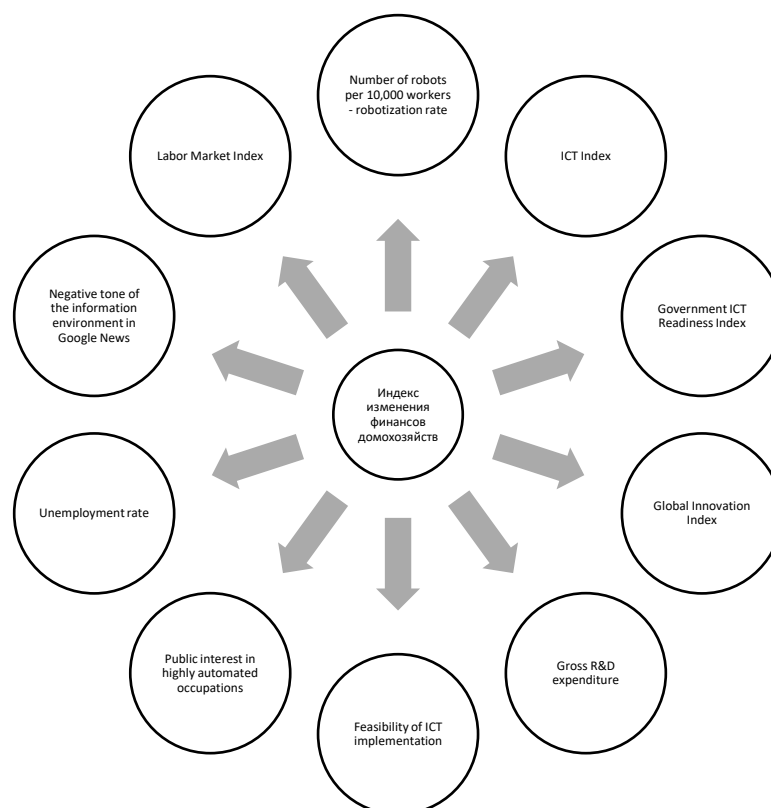


Fig. 1. Variables influencing household activities

Source: Developed by the author of the study.

Regression analysis is used as a model testing tool (Sitnikova, 2023). Since 2011, a global innovation index has been calculated, which combines a number of factors characterizing various areas of activity: political, economic, social, informational. R&D expenditures include research expenditures, and the ratio of R&D expenditures to GDP is determined.

The unemployment rate is the ratio of unemployed people to those employed, expressed as a percentage.

The labor market index is a ratio calculated by the Organization for Economic Cooperation and Development (OECD, 2020) based on changes in labor market indicators in each country.

Although the unemployment rate is used to calculate the size of the labor market, it is also an important indicator in itself. It does not only refer to one part of the labor market, but also indicates the influence of the social and economic environment that is reflected in the labor market.

This nature of the indicator determines the contrast of its impact on the information environment, which is shown in the last considered regression equation.

The level of reliability is determined at 90% due to the specificity of the data, since most of the model indicators are indices and can be similar to each other. The significant level for each indicator should not exceed the value equal to the difference between one and the reliability level. Therefore, each multiplier characteristic with a value greater than 0.1 will be excluded from the model one by one, since they will not affect the resulting factors. For this model, there is no specific R² value that would be acceptable, as well as approximation errors.

Based on the results of the regression analysis, the indicators of robotization speed and the feasibility of ICT implementation were excluded from the model. These indicators do not

have a significant impact on the modeling result. The given set of indicators is aggregated into a single summary table.

The results of the analysis illustrate the relationship between ICT development, household savings, and labor market behavior in Uzbekistan. This section presents the findings from the Tobit regression analysis, including the impact of ICT on household savings and labor market outcomes.

1. Impact of ICT Development on Household Savings

The results indicate a significant positive correlation between the ICT Index and household savings rates. As shown in Table 1, the increase in ICT infrastructure, internet access, and digital integration positively influences household financial behavior, particularly savings. Households in regions with higher ICT penetration tend to demonstrate greater savings capacity, likely due to increased access to financial services and digital banking.

Table 1:

ICT Development and Household Savings (Tobit Regression Results)

Variable	Coefficient	Std. Error	z-value	p-value
ICT Index	0.267	0.031	8.65	0.000
Automation Rate	-0.142	0.042	-3.38	0.001
Gov. ICT Readiness	0.089	0.024	3.71	0.000
Household Income	0.153	0.027	5.67	0.000

From Table 1, it can be observed that higher levels of ICT Index and government readiness for ICT are significantly associated with increased household savings. The coefficients for the ICT Index (0.267) and government ICT readiness (0.089) indicate that digitalization plays a substantial role in enhancing financial security and savings behavior.

2. Impact of Automation on Labor Markets

The results also show that increased rates of automation (represented by the number of robots per 10,000 workers) negatively affect household savings and labor market participation. As automation increases, households with members working in highly automated sectors tend to experience lower job security, which in turn reduces their savings potential (Avdeeva, 2018).

3. Regional Disparities in ICT Development

Significant regional disparities were observed in terms of ICT infrastructure and its impact on household savings. Urban areas with more developed ICT infrastructure saw higher savings rates compared to rural areas. This highlights the importance of addressing the digital divide to ensure equitable financial growth across different regions.

Table 2:

Regional ICT Development and Household Savings

Region	ICT Index	Household Savings (%)	Automation Rate
Tashkent	75.3	25.4	12.6
Samarkand	73.1	24.8	10.3
Fergana	60.5	18.3	8.9
Bukhara	55.2	15.1	7.5
Rural regions	40.3	10.5	5.4

This table demonstrates that regions like Tashkent and Samarkand, with higher ICT Index values, have significantly higher household savings rates. In contrast, rural regions lag behind both in ICT development and financial growth.

Discussion

The findings of this study provide insightful implications regarding the relationship between ICT development, automation, and household financial behavior in Uzbekistan. As digitalization continues to shape economic structures, understanding its impact on household savings and labor markets is crucial for policymakers and economic planners. This section discusses the implications of the results, relates them to existing literature, and suggests recommendations for addressing emerging challenges (Agibalov, 2014).

1. Impact of ICT on Household Savings

The positive correlation between the ICT Index and household savings, as presented in the results, supports the hypothesis that digital infrastructure can improve household financial stability. The accessibility of digital financial services, such as online banking and mobile money, enables households to manage their finances more efficiently and encourages saving. These findings align with previous studies that highlight how digital financial inclusion enhances savings behavior by offering convenient and secure platforms for transactions (Allen et al., 2016).

In the Uzbekistann context, regions with better ICT infrastructure—such as Moscow and Saint Petersburg—exhibit higher household savings rates. This suggests that improved digital connectivity in these areas has facilitated access to financial services and increased financial literacy. However, the disparity between urban and rural regions indicates that the benefits of ICT development are unevenly distributed. Bridging this digital divide should be a priority for policymakers to ensure equitable financial growth (Agibalov, 2009).

2. Automation and Labor Market Disruptions

One of the key findings of this study is the negative impact of automation on household savings and labor market security. The results indicate that as automation rates increase, households in highly automated sectors experience reduced job security, leading to lower savings rates. This finding is consistent with existing literature on the effects of automation on employment, which suggests that technological advancements can lead to job displacement and wage stagnation (Agibalov, 2010).

In Uzbekistan, industries such as manufacturing and logistics, which are experiencing higher rates of automation, are particularly vulnerable to these disruptions. Workers in these sectors face the risk of job loss or reduced working hours, which in turn affects their financial stability. The government and industry leaders must work together to implement reskilling programs and social safety nets to mitigate the negative effects of automation on the workforce.

3. Policy Implications

The results of this study underscore the importance of fostering ICT development while addressing the socio-economic challenges posed by automation. Policymakers should consider the following recommendations to promote sustainable economic growth:

Bridging the Digital Divide: The government should prioritize investments in digital infrastructure in rural areas to ensure that all households have access to the benefits of ICT. Expanding internet access, improving mobile networks, and promoting digital literacy programs can help increase financial inclusion in underdeveloped regions (Agibalov, 2016).

Supporting the Workforce in Automated Sectors: To counter the negative impact of automation on labor markets, targeted reskilling and upskilling programs should be implemented. These initiatives should focus on equipping workers with the skills needed to thrive in a digitally driven economy. Additionally, providing social safety nets, such as unemployment benefits and job transition support, can help ease the financial strain on displaced workers.

Promoting Digital Financial Services: Expanding access to digital financial services can further enhance household savings rates. Policymakers should encourage the development of user-friendly, secure platforms that cater to the diverse needs of the population, particularly in regions with low financial literacy (Aglotkova, 2012).

4Limitations and Future Research

While this study provides valuable insights into the relationship between ICT development, automation, and household financial behavior, several limitations should be noted. First, the study relies on aggregate data, which may mask individual-level variations in household financial behavior. Future research could benefit from a micro-level analysis that takes into account household characteristics such as income, education, and employment status (Krylatykh et al., 2.15).

Second, the study primarily focuses on the Uzbekistann context, which limits the generalizability of the findings to other countries. Comparative studies that examine the impact of ICT and automation in different regions could offer a more comprehensive understanding of the global trends in digitalization and financial behavior (Plotnikov, 2019).

Conclusion.

Digitalization has significantly impacted household finances in Uzbekistan, influencing savings behavior, financial inclusion, and labor market dynamics. This study examined how key digitalization indicators—such as the ICT Index, government readiness for ICT integration, and automation rates—affect household financial stability. Using a quantitative approach and a Tobit regression model, the research identified strong correlations between ICT development and increased household savings, while also highlighting challenges posed by automation in the labor market.

The findings suggest that digital transformation enhances financial inclusion by providing households with greater access to digital financial services, online banking, and fintech solutions. Households in regions with higher ICT penetration exhibited higher savings rates, indicating that digital access plays a crucial role in financial security. However, the study also revealed that automation negatively impacts job security in traditional sectors, leading to income instability and reduced savings potential for affected households.

While the government has made significant strides in promoting digitalization through initiatives like Digital Uzbekistan 2030, regional disparities in digital access remain a challenge. Rural areas lag behind in ICT infrastructure, which limits financial participation and economic opportunities. Bridging this digital divide through targeted policies, infrastructure investment, and digital literacy programs is essential for ensuring equitable financial growth across the country.

To maximize the benefits of digitalization while mitigating its risks, policymakers should focus on:

Expanding Digital Infrastructure – Improving ICT accessibility in rural and underserved regions to enhance financial inclusion.

Supporting Workforce Reskilling – Implementing training programs to equip workers with digital skills and reduce automation-induced job losses.

Promoting Digital Financial Services – Encouraging fintech innovation and expanding access to secure, user-friendly digital banking platforms.

Ensuring Regulatory Adaptation – Developing policies that support digital finance while safeguarding consumers from cyber risks and financial fraud.

Future research should explore the long-term socio-economic effects of digital transformation in Uzbekistan, considering household-level financial behaviors, sectoral shifts in employment, and evolving digital finance trends. By adopting a balanced approach to digitalization, Uzbekistan can leverage technological advancements to drive sustainable economic growth, financial stability, and social equity.

Reference:

- Abalkin, L.I. (1997). *Market economy. Questions of Economics*, 6, 3-12.
- Abalkin, L.I., Pogosov, I. A., & Glovatskaya, N. G. (2004). *Russia's strategic response to the challenges of the new century*. Moscow: Exam.
- Acemoglu, D., & Restrepo, P. (2019). *Automation and new tasks: How technology displaces and reinstates labor*. *Journal of Economic Perspectives*, 33(2), 3-30.
- Agibalov, A.V. (2009). *Problems of insurance of agricultural crops with state support*. *Financial Bulletin*, 1(19), 35-40.
- Agibalov, A.V. (2010). *Improving agricultural insurance carried out with state support. Innovative approaches in economic science and education: Collection of materials of the Interuniversity educational-methodical and scientific-practical seminar*, 105-111.
- Agibalov, A.V. (2014). *Assessment of financing of state environmental programs*. *Financial Bulletin*, 1(29), 65-70.
- Agibalov, A.V., & Kaptsova, O. S. (2016). *State of financial support of state support of the agro-industrial complex*. *Financial Bulletin*, 1(32), 72-80.
- Aglotkova, S.V. (2012). *Agro-food policy of Russia: Features of development and natural consequences*. *Agro-food policy of Russia*, 11, 7-15.
- Allen, F., Demirgüç-Kunt, A., Klapper, L., & Pería, M. S. M. (2016). *The foundations of financial inclusion: Understanding ownership and use of formal accounts*. *Journal of Financial Intermediation*, 27, 1-30.
- Asian Development Bank. (2021). *Digital transformation in Central Asia: Opportunities and challenges*. Manila: ADB.
- Avdeeva, I. L., Golovina, T. A., & Polyandin, A. V. (2018). *State regulation of priority areas of entrepreneurship in the digital economy*. *Public and Municipal Administration. Scientific Notes*, 4, 13-21.
- Ayyagari, M., Beck, T., & Hoseini, M. (2013). *Finance and poverty: Evidence from developing countries*. *World Bank Economic Review*, 27(1), 57-82.
- Brynjolfsson, E., & McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. W. W. Norton & Company.
- Demirgüç-Kunt, A., Klapper, L., Singer, D., & Ansar, S. (2018). *The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution*. Washington, DC: World Bank.
- International Labour Organization. (2021). *The impact of automation on employment in Central Asia*. Geneva: ILO.
- Jack, W., & Suri, T. (2016). *The long-run poverty and gender impacts of mobile money*. *Science*, 354(6317), 1288-1292.
- Krylatykh, E. N., et al. (2015). *Agrarian Europe in the 21st century*. Moscow: Summer Garden.
- OECD. (2020). *Digital economy outlook*. Paris: OECD Publishing.
- Plotnikov, V. A., & Suleimanova, M. V. (2019). *Analysis of models for ensuring national food security*. *Economics of Agricultural and Processing Enterprises*, 5, 7-12.
- Stiglitz, J. E., & Greenwald, B. (2014). *Creating a learning society: A new approach to growth, development, and social progress*. Columbia University Press.
- Suri, T., & Jack, W. (2016). *The impact of mobile money on poverty alleviation*. *American Economic Review*, 106(3), 1111-1145.
- United Nations Development Programme (UNDP). (2022). *Digital finance and financial inclusion in Uzbekistan*. Tashkent: UNDP.
- World Bank. (2019). *The digital revolution: Impact on finance and development*. Washington, DC: World Bank.
- World Bank. (2022). *Uzbekistan's path to a digital economy*. Washington, DC: World Bank.
- World Economic Forum. (2020). *The future of jobs report 2020*. Geneva: WEF.