

ECONOSCITECH INTEGRATION

ISSUE
8

INTERNATIONAL SCIENTIFIC
ELECTRONIC JOURNAL



**TASHKENT STATE
UNIVERSITY OF ECONOMICS**



**American University
of Technology**

Powered by Arizona State University®

ISSN: 3060-5075



Acceptance of articles

PUBLISHED EVERY MONTHLY



ARTICLE CONTRIBUTORS

**PROFESSORS-TEACHERS, SPECIALISTS
AND SCIENTIFIC RESEARCHERS.**



Google
scholar

OpenAIRE

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
DENMARK

CONTACT:



+998 94 3540880



<https://econoscitech-integration-journal.uz>



2026

**EDITOR-IN-CHIEF:**

Zufarova Nozima Gulamiddinovna
DSc., Dean of Tourism Faculty, TSUE

DEPUTY EDITOR-IN-CHIEF:

Makhmudov Nosir Makhmudovich
DSc., Prof., Academician

DEPUTY EDITOR-IN-CHIEF:

Suyunov Dilmurod Xolmurodovich
Doctor of Economics (DSc), Professor,

DEPUTY EDITOR-IN-CHIEF:

Allayarov Shamsiddin Amanullayevich
doctor of economics (DSC), professor

RESPONSIBLE SECRETARY:

Otaboyev Axmed Maxsudbek o'g'li
TSUE independent researcher

THE SCIENTIFIC-POPULAR
ELECTRONIC JOURNAL
"ECONOSCITECH-INTEGRATION"
HAS BEEN REGISTERED UNDER
THE NUMBER C-5669651 BY THE
AGENCY FOR INFORMATION AND
MASS COMMUNICATIONS (AOKA)
OF THE REPUBLIC OF UZBEKISTAN,
EFFECTIVE FROM OCTOBER 9, 2024.

In accordance with Resolution No. 384/6 dated April 10, 2026, issued by the Presidium of the Supreme Attestation Commission under the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, this journal is included in the list of recommended international scientific publications for publishing the primary research findings of doctoral dissertations in the field of Economic Sciences.

Partners: Tashkent State University of Economics / American University of Technology in Tashkent (AUT)

Electronic publication. Issue 8. 374 pages.
Approved for publication in August 2026.

Editorial Board Members:

Sharipov Kongratbay Avezimbetovich,
Doctor of Technical Sciences (DSc), Professor



Teshabayev To'liqin Zakirovich,
Doctor of Economic Sciences (DSc), Professor



Said Irandoust,
Doctor of Chemical Engineering Sciences,
Professor



Abdurakhmanova Gulnora Kalandarovna,
Doctor of Economic Sciences (DSc), Professor



Khudoykulov Sadirdin Karimovich,
Doctor of Economics, (DSc), Professor



Tokunaga Masahiro,
professor, PhD of Economics of the Faculty of
Business and Commerce



Debasis Das,
professor Department of Computer Science



Nitin Goje,
professor and Program Lead - Computer Science



Nargizakhon Shamshieva
Doctor of Economic Sciences, Professor



Rakhmonov Norim Razzakovich,
Doctor of Economic Sciences (DSc), Professor

Bayxonov Bahodirjon Tursunbayevich
Doctor of Science (DSc), Professor



Shomurodov Ravshan Tursunkulovich,
PhD, Associate Professor



Boymuratov Abduraxmat Djumayevich
Doctor of Philosophy (PhD) in Economics



Sharopova Nafosat Radjabovna
DSc, Associate Professor



Sultanova Kamila Mukhtorali Kizi
Master of Science

CONTENTS

EMPIRICAL ASSESSMENT OF INTERNAL AND EXTERNAL FACTORS AFFECTING THE COMPETITIVENESS OF THE FOOD INDUSTRY IN UZBEKISTAN	10
Urolova Sevara Bekhzod qizi	
INTEGRAL MANAGEMENT MODELS FOR IMPROVING THE CIRCULAR ECONOMY SYSTEM IN AGRICULTURE	16
Nazirova Zulfina Salimovna	
IMPROVING THE FINANCING MECHANISM OF LOCALIZATION IN THE METRO INDUSTRY AND ITS SCENARIO-BASED ASSESSMENT	21
Mansurov Khamrokul Ilkhomovich	
THEORETICAL FOUNDATIONS OF TEACHING METHODS IN HIGHER EDUCATION INSTITUTIONS.....	28
Berdiyeva Nilufar Axatovna	
INTERNATIONAL EXPERIENCE IN ROAD SECTOR FINANCING AND ROAD ASSET MANAGEMENT: IMPLICATIONS FOR SUSTAINABLE INFRASTRUCTURE DEVELOPMENT IN UZBEKISTAN.....	34
Feruz Shokirov	
ECONOMIC OPPORTUNITIES FOR POVERTY REDUCTION THROUGH SERVICE SECTOR DEVELOPMENT.....	42
Saparov Murod Irgashovich	
DIGITAL-INTEGRATION MODEL OF GREEN LENDING: INSTITUTIONAL GROUNDING IN COMMERCIAL BANK PRACTICE	46
Melikuzieva Dilrabo Mukhitdinovna	
CURRENT STATE OF ECONOMIC COOPERATION IN THE NAMANGAN REGION: LESSONS FROM INTERNATIONAL EXPERIENCE.....	52
Sattarov Ravshan Alimovich	
MODERN LEVELS OF INNOVATIVE DIGITAL BANKING SERVICES IN COMMERCIAL BANKS.....	60
D. M. Kallibekov	
EFFECTIVENESS OF USING AUTOMATED MANAGEMENT SYSTEMS IN RESOURCE CAPACITY MANAGEMENT IN TEXTILE INDUSTRY ENTERPRISES.....	64
Makhammadieva Izhobat Abdiganievna	
TEXTILE INDUSTRY PRODUCTION CAPACITY GROWTH FORECAST	75
Joraqulov Javakhir Asomiddin's Son	
FORECASTING THE MECHANISM FOR ASSESSING INVESTMENTS ATTRACTED TO SMALL BUSINESS ENTITIES IN THE ANDIJAN REGION THROUGH 2030	80
Jo'rayeva Moxinur Axmadjon qizi	
IMPROVEMENT OF PERSONAL MANAGEMENT IN TEXTILE INDUSTRY ENTERPRISES BASED ON CHOICE OF ORGANIZATION MODELS.....	88
Djumaniyazova Jamila Davronovna	
THE ROLE OF THE INTERNAL CONTROL SYSTEM IN RISK MANAGEMENT OF SMALL BUSINESS ENTERPRISES.....	93
Umarov Azizjon	

SPATIAL ECONOMETRIC MODELING IN THE MASS APPRAISAL OF REAL ESTATE: A GEOGRAPHICALLY WEIGHTED REGRESSION APPROACH (THE CASE OF TERMEZ CITY)	102
Khushvaktov Jasur Shukhrat ugli	
НАПРАВЛЕНИЯ РАЗВИТИЯ РЫНКА ЭЛЕКТРОТЕХНИЧЕСКОГО ОБОРУДОВАНИЯ В УЗБЕКИСТАНЕ	110
Джураев Муротжон Сотиволдиевич	
SCIENTIFIC AND PRACTICAL FOUNDATIONS FOR ASSESSING AND IMPROVING THE EFFECTIVENESS OF INTERNAL AUDIT IN COMMERCIAL BANKS	120
Yuldashev Xurshidbek Mamirjonovich	
ECONOMIC EFFICIENCY OF IMPLEMENTING ARTIFICIAL INTELLIGENCE TECHNOLOGIES IN BEEKEEPING AND FORECAST INDICATORS FOR 2026–2030.....	130
Farmanov Jonibek Ziyadullaevich	
ENSURING SUSTAINABLE ECONOMIC DEVELOPMENT THROUGH THE DIVERSIFICATION OF THE SECTORAL STRUCTURE OF FIXED CAPITAL INVESTMENTS IN A REGION (THE CASE OF KHOREZM REGION)	137
Sultanova Aziza Bahtiyor qizi	
PROSPECTS FOR THE DEVELOPMENT OF ENTREPRENEURIAL ENTITIES PRODUCING FOOD PRODUCTS IN TASHKENT REGION.....	146
Abdulxamidova Nodira Abdura	
DYNAMIC PERFORMANCE OPTIMIZATION AND WEAR REDUCTION OF THE CAM SYSTEM IN CARDAN COUPLINGS FOR METRO ROLLING STOCK TRACTION DRIVES	153
Asamitdin Fayzullaev	
Ziyevutdin Fayzullaev	
RECOGNISED BUT NOT MEASURED: THE SUSTAINABLE DEVELOPMENT GOALS AND THE PERFORMANCE FRAMEWORK OF UZBEKISTAN'S STRATEGY-2030 (PRESIDENTIAL DECREE UP-21 OF 2026).....	160
Salakhutdinova Yulduz Golibovna	
ANALYSIS OF PRODUCTION EFFICIENCY IN CONSTRUCTION MATERIALS MANUFACTURING ENTERPRISES: EVIDENCE FROM ANDIJAN REGION	168
Toshpulatov Asronbek Mutalibovich	
THE IMPACT OF FREE TRADE AGREEMENTS ON UZBEKISTAN'S TEXTILE INDUSTRY: A PANEL DATA ANALYSIS, 2017–2023.....	176
Jurabek Toshbekov	
Navik Istikomah	
A.B. Bobojonov	
HUMAN-AI SYNERGY IN STRATEGIC DECISIONMAKING OF ENTERPRISES IN UZBEKISTAN.....	182
Abdullaeva Odinakhon	
ANALYSIS OF THE CURRENT STATE OF ENTREPRENEURIAL ACTIVITY IN UZBEKISTAN'S TOURISM SECTOR	186
Yuldashev Bekzodjon Sherzodjon ugli	
A COMPREHENSIVE SYSTEM OF CRITERIA FOR ASSESSING THE FACTORS AFFECTING THE EFFECTIVENESS OF INTERNAL AUDIT IN PRIVATE HIGHER EDUCATION INSTITUTIONS.....	190
Turmanqulov Norpo'lat Sa'dullayevich	
DESIGNING A THREE-LEVEL KPI FRAMEWORK FOR RANKING-ORIENTED UNIVERSITY GOVERNANCE: INTEGRATING DIGITAL MONITORING AND RESOURCE OPTIMIZATION	197
Mukhlisa Mamajonova	
ВЛИЯНИЕ IFRS 18 НА ПРЕДСТАВЛЕНИЕ КОНСОЛИДИРОВАННОЙ ФИНАНСОВОЙ ОТЧЁТНОСТИ: СРАВНИТЕЛЬНЫЙ АНАЛИЗ С IAS 1	208
Шамсиева Нозима Шермат кизи	

INNOVATIVE MECHANISMS FOR IMPROVING THE ENVIRONMENTAL MANAGEMENT SYSTEM AT ENTERPRISES.....	218
Uralova Sojida Anvar qizi	
IMPROVEMENT OF ECONOMIC MECHANISMS IN THE ORGANIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY SERVICES.....	225
Rajaboyev Shahboz Shodi o'g'li	
IMPROVEMENT OF INTERNAL CONTROL ASSESSMENT QUESTIONNAIRE IN COMMUNICATION ENTERPRISES INVENTORY AUDIT BASED ON HAS 240 AND HAS 315 REQUIREMENTS.....	233
Jamilov Jushqin Jonon ugli	
IMPROVING DIGITAL TRANSFORMATION MECHANISMS IN THE STRATEGIC MANAGEMENT OF MODERN PAYMENT SYSTEMS.....	239
Iskandarov Xurshid Iskandarovich	
INNOVATIVE DETERMINANTS OF POVERTY: AN ECONOMETRIC ANALYSIS BASED ON REGIONAL PANEL DATA	246
Amrullayev Dadaxon	
ECONOMIC MECHANISMS FOR STIMULATING ENTERPRISES' DEMAND FOR TECHNOLOGY UNDER INDUSTRY 4.0 CONDITIONS.....	251
Erkayev Akrom Normukhammadovich	

ECONOMIC MECHANISMS FOR STIMULATING ENTERPRISES' DEMAND FOR TECHNOLOGY UNDER INDUSTRY 4.0 CONDITIONS

Erkayev Akrom Normukhammadovich

Independent Researcher, Tashkent State University of Economics,

ORCID: 0009-0001-2638-7958

Email: erkayevakrom27@gmail.com

Аннотация: На основе официальных статистических данных за 2016–2025 годы проанализированы спрос промышленных предприятий Узбекистана на технологии и экономические механизмы его стимулирования в условиях парадигмы Industry 4.0. Научно обосновано, что технологическое обновление не происходит спонтанно, а зависит от эффективного спроса предприятий на технологии, который рассматривается как взаимосвязь осознания технологических преимуществ, абсорбционной способности и покупательной способности. Результаты анализа показывают, что в 2016–2025 годах объем капитальных инвестиций в расчете на одного работника увеличился с 6,0 млн до 94,5 млн сумов, тогда как доля высокотехнологичных отраслей в промышленном производстве снизилась с 29,2% в 2018 году до 20,7% в 2025 году. Выявленное расхождение свидетельствует о том, что при сохранении высокого спроса предприятий на основное производственное оборудование спрос на передовые технологии остается недостаточно сформированным. На основе эмпирического анализа в качестве приоритетных направлений стимулирования спроса на технологии определены переориентация инвестиционного капитала с традиционных машин и оборудования на передовые технологии, применение целевых налоговых стимулов, включая повышенные налоговые вычеты, развитие внутренней абсорбционной способности предприятий и формирование конкурентной рыночной среды.

Ключевые слова: Industry 4.0, спрос на технологии, технологическая модернизация, инновационная экономика, абсорбционная способность, национальная инновационная система, цифровые технологии, структура инвестиций, механизмы стимулирования, технологический потенциал, цифровые навыки.

Abstract: Based on official statistical data for 2016–2025, the demand of Uzbekistan's industrial enterprises for technology and the economic mechanisms for stimulating it under the Industry 4.0 paradigm are analyzed. It is scientifically substantiated that technological renewal does not occur spontaneously but depends on enterprises' effective demand for technology, which is conceptualized as the interaction of awareness of technological benefits, absorptive capacity, and purchasing power. The results indicate that, although capital investment per employee increased from UZS 6.0 million to UZS 94.5 million during 2016–2025, the share of high-technology sectors in industrial output declined from 29.2% in 2018 to 20.7% in 2025. This divergence indicates that, while enterprises continue to demonstrate strong demand for basic capital equipment, demand for advanced technologies remains insufficiently developed. Based on the empirical analysis, the key priorities for stimulating technology demand are identified as redirecting investment capital from conventional machinery and equipment toward advanced technologies, introducing targeted tax incentives, including super-deductions, strengthening enterprises' internal absorptive capacity, and fostering a competitive market environment.

Keywords: Industry 4.0, technology demand, technological modernization, innovation economy, absorptive capacity, national innovation system, digital technologies, investment structure, incentive mechanisms, technological capability, digital skills.

INTRODUCTION

The Industry 4.0 concept signifies the organization of industrial production based on advanced digital technologies, cyber-physical systems, automated processes, and smart machinery. It has emerged as a cornerstone of global industrial transformation. However, technological renewal and structural modernization are fundamentally contingent upon industrial enterprises' active demand for technology. The effective implementation of the strategic goals of Industry 4.0 is therefore closely associated with enterprises' demand for advanced digital solutions.

The main objective of this study is to examine the formation of technology demand among enterprises within the framework of Industry 4.0, evaluate the current extent of this demand in Uzbekistan's industrial sector, and formulate robust economic mechanisms for its stimulation based on empirical data covering the 2016–2025 period. Conceptually, technology demand is defined not merely as financial expenditure but as a composite synthesis of three indispensable elements: an enterprise's awareness of technological benefits, its internal absorptive capacity to integrate technology, and its financial purchasing power.

LITERATURE REVIEW

The theoretical foundation of Industry 4.0 was conceptualized by Schwab (2016, Schwab K. *The Fourth Industrial Revolution*. – Geneva: World Economic Forum, 172 p.), who distinguished the Fourth Industrial Revolution from its predecessors through the qualitative fusion of physical, digital, and biological systems. Schwab's framework underpins this study's premise that technological adaptation has become an essential strategy for maintaining industrial competitiveness, particularly as technological advancement increasingly shapes enterprises' competitive positions.

Analyzing the macroeconomic implications of digitalization, Brynjolfsson and McAfee (2014, Brynjolfsson E., McAfee A. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. – New York: W. W. Norton & Company, 306 p.) established, in their concept of the "Second Machine Age," that modern machinery performs cognitive functions alongside physical labor. They emphasized that digital growth dividends are particularly significant for firms possessing the organizational readiness to adopt technology, while firms with more limited technological readiness may encounter challenges in realizing these benefits. In this research, their insights justify public incentive mechanisms as an important condition for capitalizing on digital productivity growth.

The central role of innovation in economic growth traces back to Schumpeter's (1934, Schumpeter J. A. *The Theory of Economic Development*. – Cambridge, MA: Harvard University Press, 1934. – 255 p.) theory of creative destruction, which demonstrates that economic development proceeds through the continuous replacement of obsolete technologies with radical innovations. Schumpeterian theory positions technology demand as a primary catalyst of structural transformation.

In developing economies, the underlying causes of relatively limited technology demand are thoroughly addressed by Cirera and Maloney (2017, Cirera X., Maloney W. F. *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up*. – Washington, DC: World Bank, 226 p. DOI: 10.1596/978-1-4648-1160-9) through the "Innovation Paradox." They observed that, despite the potentially high returns on technology investments, firms in emerging markets may invest at comparatively modest levels due to limited absorptive capacity. This concept substantiates the argument that stimulating technology demand requires a dual approach: reducing financial barriers and strengthening internal technological capabilities.

Furthermore, Acemoglu and Restrepo (2018, Acemoglu D., Restrepo P. *The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment // American Economic Review*. – Vol. 108, No. 6. – P. 1488–1542) analyzed the interplay between automation and labor, showing that while technology automates routine tasks, it simultaneously creates complex new tasks associated with higher productivity. Their framework supports the premise that, in Uzbekistan's economic context, technological upgrading should aim to augment labor productivity while facilitating the effective adaptation of the labor force to technological change.

The systemic industrial impact of digital production technologies in developing economies was investigated by Andreoni and Anzolin (2019, Andreoni A., Anzolin G. *A Revolution in the Making? Challenges and Opportunities of Digital Production Technologies for Developing Countries*. – Vienna: UNIDO, 38 p.), who highlighted the importance of strong network externalities. Their analysis demonstrates that technology demand incentives can generate substantial effects when implemented across supply chains rather than solely at the level of individual firms.

In the literature of the Commonwealth of Independent States (CIS), Bodrunov (2018, *Noonomika* [Noonomics]. Kulturnaya Revolyutsiya. [in Russian], 432 p.) established knowledge and technology as core drivers of the "noonomy" paradigm. Glazhev (2018, *Ryvok v budushchee: Rossiya v novykh tekhnologicheskoy i mirokhozyaistvennom ukladakh* [Leap into the Future: Russia in the New Technological and World Economic Structures]. Knizhny Mir. [in Russian], 768 p.) demonstrated, in his theory of techno-economic paradigms, that effective demand for new technologies is crucial during structural economic transitions. Keshelava (2017, *Vvedenie v "Tsifrovuyu" ekonomiku* [Introduction to the "Digital" Economy]. VNIIGeosistem. [in Russian], 28 p.) conceptualized the digital economy as real-time digital modeling of production, highlighting the digital dimensions of technology demand, while Ivanov and Malinetsky (2017, *Tsifrovaya ekonomika: mify, realnost,*

perspektiva [Digital Economy: Myths, Reality, Perspective]. Russian Academy of Sciences. [in Russian], 64 p.) emphasized the importance of aligning digital modernization with institutional capacity.

National economic research in Uzbekistan provides crucial contextual grounding. Gulyamov et al. (2019, Gulyamov S. S., Ayupov R. Kh., Abdullaev O. M., & Baltabaeva G. R. *Raqamli iqtisodiyotda blokcheyn texnologiyalari* [Blockchain Technologies in the Digital Economy]. Moliya. [in Uzbek], 447 p.) systematically analyzed the integration of digital technologies and blockchain into industrial workflows. Abdurakhmanov (2019, *Mehnat iqtisodiyoti: nazariya va amaliyot* [Labor Economics: Theory and Practice] (Textbook). Fan va Texnologiya. [in Uzbek], 592 p.) established the structural interdependence between technological renewal and human capital development. Islamov (2022, *Tsifrovaya ekonomika: vyzovy i vozmozhnosti dlya Uzbekistana* [Digital Economy: Challenges and Opportunities for Uzbekistan]. Institute for Economic Research under the Ministry of Economic Development and Poverty Reduction of the Republic of Uzbekistan. [in Russian], 186 p.) examined the strategic opportunities and structural challenges of the digital economy in Uzbekistan. Moreover, foundational textbooks by Olmasov and Vakhobov (2014, *Iqtisodiyot nazariyasi* [Economic Theory] (Textbook). Iqtisod-Moliya. [in Uzbek], 480 p.) and Shodmonov and Khojayev (2017, *Iqtisodiyot nazariyasi* [Economic Theory] (Textbook). Barkamol Fayz Media. [in Uzbek], 784 p.) position scientific and technological progress as a primary driver of intensive economic growth. Together, these national studies reinforce the theoretical framework of this research.

RESEARCH METHODOLOGY

This study relies on official statistical data published by the National Statistics Agency of Uzbekistan, covering the period from 2016 to 2025. To evaluate technology demand comprehensively, three primary quantitative indicators were selected: (1) capital investment per employee, (2) investment intensity (the ratio of fixed investment to industrial output), and (3) the share of high-technology sectors in total manufacturing output. Capital investment per employee serves as an indirect proxy for the volume of technological demand, whereas the high-technology sector share measures the qualitative orientation of technological adoption.

A core analytical innovation of this methodology is the conceptual dichotomy between gross technology demand and qualitative technology demand. Gross demand reflects aggregate capital expenditure allocated to machinery and equipment, whereas qualitative demand specifically captures investment directed toward frontier, digital, and Industry 4.0 technologies. The analytical workflow involved evaluating investment dynamics, contrasting aggregate expenditure with high-technology output trends, identifying structural discrepancies between gross and qualitative demand, and categorizing policy incentive mechanisms based on their systemic transmission channels.

ANALYSIS AND RESULTS

To assess technology demand within Uzbekistan's industrial sector, the magnitude and trajectory of capital investment were examined. Capital investment per worker provides a direct metric of firms' readiness to acquire physical and technological assets. Table 1 outlines the empirical trends of these key indicators over the 2016–2025 period.

Table 1. Dynamics of Key Indicators Representing Technology Demand in Industry (2016–2025)¹

Indicator	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Investment per worker (million UZS)	6.0	7.7	16.1	31.6	35.0	31.9	41.6	57.7	88.6	94.5
Investment intensity (%)	22.1	21.1	29.7	44.3	38.7	29.8	33.8	39.5	44.8	38.7
High-tech sector share (%)	17.8	23.0	29.2	26.9	24.4	23.0	25.2	26.1	23.5	20.7

As detailed in Table 1, capital investment per employee experienced substantial growth, increasing from 6.0 million UZS in 2016 to 94.5 million UZS in 2025. This indicates significant growth in enterprises' financial capacity to fund capital goods. At the same time, the share of high-technology industries in industrial output

¹ Source: Compiled by the author based on National Statistics Agency data.

followed a different trajectory, peaking at 29.2% in 2018 before gradually declining to 20.7% by 2025. This structural divergence provides an important empirical finding: while enterprise investment has increased substantially, capital flows have predominantly financed conventional physical equipment within existing technological paradigms rather than advanced Industry 4.0 innovations. Consequently, enterprises demonstrate strong demand for standard machinery, while demand for frontier technologies has considerable potential for further development.

This divergence reveals an important structural insight: while overall capital investment has expanded rapidly, funds have been predominantly directed toward purchasing standard, conventional machinery and expanding existing production capacity rather than acquiring advanced, transformative digital technologies. Consequently, industrial enterprises exhibit strong demand for basic physical equipment, while demand for advanced frontier technologies remains an important area for further development.

This distinction is vital for Industry 4.0 policy design. Acquiring basic machinery primarily supports traditional manufacturing processes, whereas adopting advanced digital technologies fundamentally restructures production paradigms. In Uzbekistan, capital formation has largely followed an extensive growth model. To realize the potential of Industry 4.0, strategic policy should increasingly shift from supporting generic equipment procurement toward explicitly stimulating demand for smart, high-tech systems.

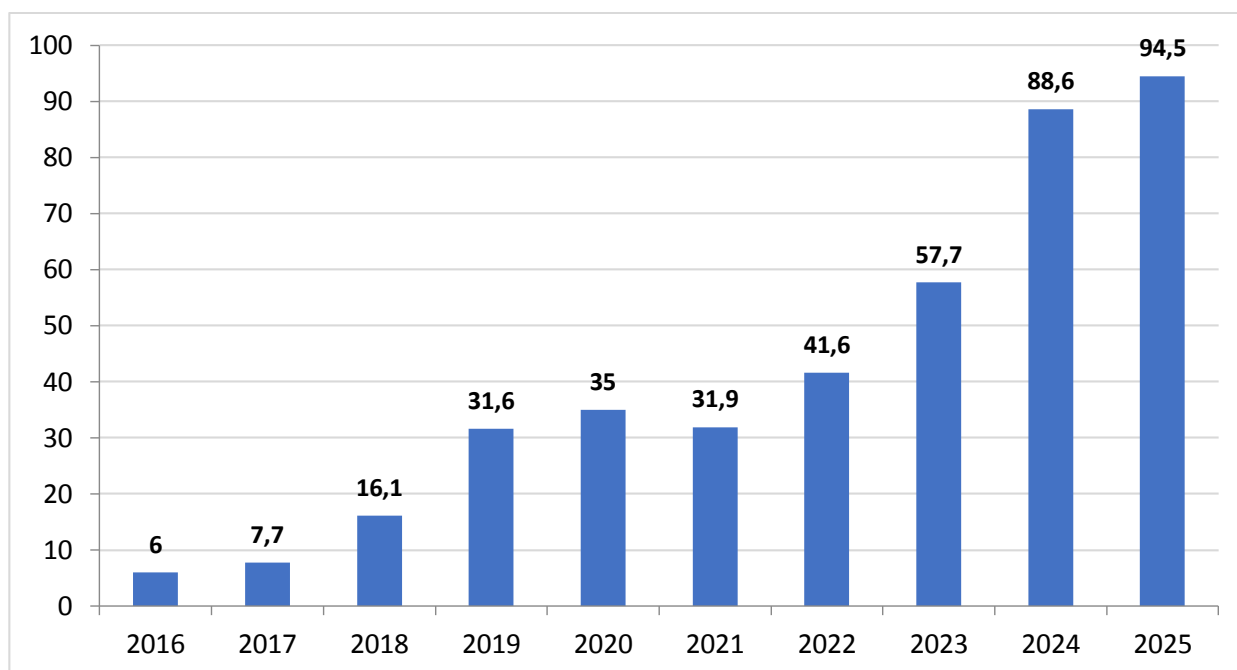


Figure 1. Dynamics of Investment per Worker, 2016–2025 (million UZS)²

Figure 1 illustrates the steady upward growth in investment per worker, with accelerated momentum observed after 2023. This trajectory confirms that industrial enterprises possess growing financial capacity for capital expenditure. The key objective of policy intervention is therefore not merely to expand capital volume but also to strategically redirect existing financial resources toward advanced Industry 4.0 solutions.

Two distinct forms are differentiated when measuring the demand for technology. Gross demand represents total corporate investment in technology, whereas qualitative demand specifically reflects investment directed toward advanced and digital technologies. These two indicators may diverge significantly: gross demand can be high while qualitative demand remains relatively low, particularly when investments are primarily allocated to conventional equipment. This pattern is observed in Uzbekistan's industrial sector, where gross technological investment has increased, while qualitative demand demonstrates substantial potential for further growth. Therefore, efforts to stimulate technology demand should focus on enhancing its qualitative composition rather than merely expanding its gross volume. While increasing gross volume is relatively straightforward, it does not necessarily improve the quality of industrialization; conversely, enhancing the qualitative composition requires more comprehensive measures, yet it is precisely this process that advances the industry's technological level.

² Author's work

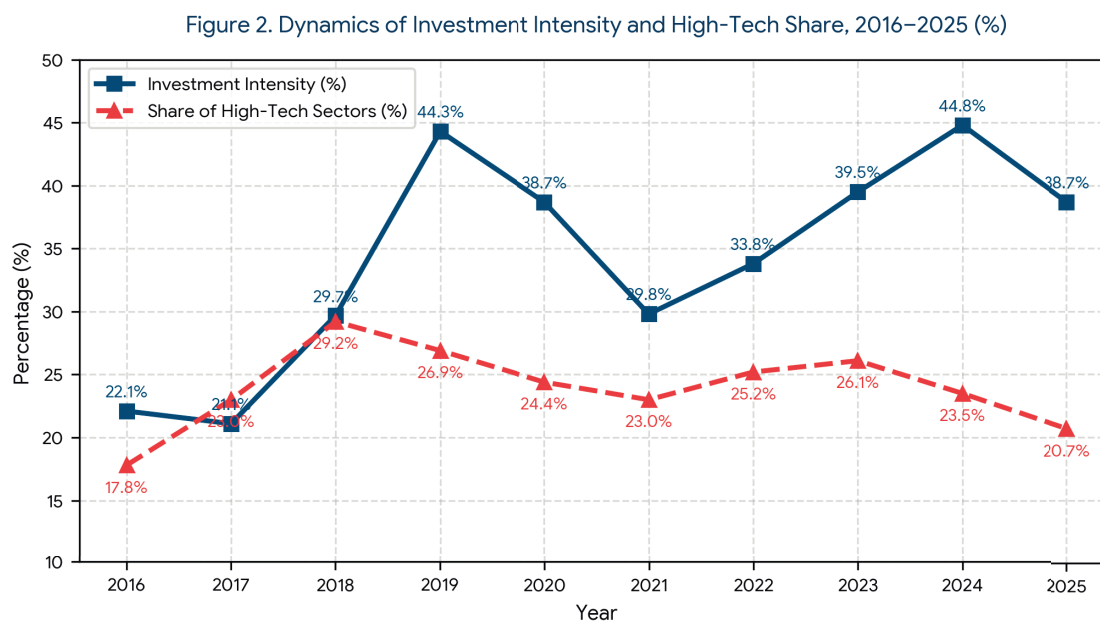


Figure 2. Dynamics of Investment Intensity and High-Tech Sector Share, 2016–2025 (%)³

Figure 2 clearly highlights the divergence between investment intensity and the share of high-technology manufacturing. While investment intensity remained high, reaching 44.8% in 2024, the high-tech sector share followed a downward trajectory. This indicates that the potential of capital investment to structurally upgrade industrial output can be further strengthened, while positive feedback mechanisms between technology demand and labor productivity provide opportunities for further development.

To evaluate structural interventions, policy instruments for stimulating technology demand are classified into financial and institutional mechanisms, as detailed in Table 2.

Table 2. Classification and Impact Mechanisms of Technology Demand Incentives⁴

Incentive Instrument	Impact Mechanism	Primary Economic Outcome
Tax Incentives	Reduces net technology procurement costs	Increases effective demand volume
Accelerated Depreciation	Accelerates capital asset write-off	Shortens technology renewal cycles
Tech Loans & Leasing	Lowers initial financial entry barriers	Broadens capital access for SMEs
Workforce Development	Enhances firms' absorptive capability	Maximizes technology productivity
Competitive Environment	Creates market incentives for modernization	Sustains long-term technology demand

As illustrated in Table 2, policy instruments function through two complementary avenues. Financial instruments, including tax incentives, accelerated depreciation, and preferential leasing, lower acquisition costs. Institutional instruments, including skills development and the promotion of a competitive market environment, strengthen enterprises' internal capacity to absorb and operate technologies efficiently. Financial tools make technology more affordable, while institutional tools contribute to its productive utilization.

Institutional quality—including legal certainty, contract enforcement, and intellectual property rights (IPR)—exerts an important indirect effect. A well-developed institutional environment encourages firms to undertake long-term technological investments by strengthening confidence in intellectual property protection and asset security. Further strengthening IPR protection and contract enforcement in Uzbekistan can therefore provide an important foundation for stimulating technology demand.

³ Author's work

⁴ Source: Developed by the author.

Policy design should also account for firm size. Large state-owned enterprises generally possess greater capital capacity, while strengthening market incentives, competitive exposure, and effective governance can further encourage their technological modernization. Conversely, small and medium-sized enterprises (SMEs) may face financial and technical constraints, making targeted subsidies, credit guarantees, and extension services important mechanisms for supporting their technological development. Given that SMEs constitute a substantial share of industrial entities, increasing their technology demand is important for strengthening national competitiveness.

Crucially, fiscal incentives should be appropriately targeted. Broad-based tax credits may also support expenditures on generic machinery; therefore, more targeted mechanisms can facilitate the efficient allocation of capital toward advanced technologies. In particular, incentives could adopt a “super-deduction” model, allowing enterprises to deduct 200% of expenditures on certified Industry 4.0 digital assets, automation systems, and high-tech R&D from taxable corporate income. Such targeted incentives can reorient private investment toward advanced technologies and facilitate the transition to Industry 4.0.

CONCLUSION AND RECOMMENDATIONS

The empirical analysis of Uzbekistan’s industrial sector over the 2016–2025 period reveals opportunities for further improvement in the structural composition of technological modernization. Despite a substantial increase in capital investment per employee, from 6.0 million UZS to 94.5 million UZS, the share of high-technology industries in total manufacturing output changed from 29.2% to 20.7%. This indicates that capital allocation has primarily supported the extensive procurement of conventional machinery, while the qualitative adoption of advanced Industry 4.0 technologies retains considerable potential for further development.

To address this structural divergence and foster sustainable technology demand, the following economic mechanisms are recommended:

- **Targeted “Super-Deduction” Tax Mechanism:** Implement fiscal policies allowing firms to deduct 200% of capital expenditures on Industry 4.0 equipment, digital infrastructure, and industrial IoT from their corporate profit tax bases.
- **Absorptive Capacity Enhancement:** Link state modernization subsidies directly to enterprise investments in human capital, digital skills, and internal R&D capabilities.
- **Pro-Competitive Market Reforms:** Strengthen market competition and optimize tariffs on capital goods to encourage enterprises to pursue technological modernization in response to market incentives.
- **SME Technological Extension Services:** Establish national technology transfer centers that provide technical advisory services, co-financing, and preferential leasing opportunities for SMEs adopting smart technologies.
- **Institutional and IPR Enforcement:** Strengthen intellectual property rights protection and commercial contract enforcement to create favorable conditions for long-term private investment in technology.

REFERENCES

1. Abdurakhmanov K. Kh. *Labor Economics: Theory and Practice: Textbook*. — Tashkent: Fan va texnologiya, 2019. — 592 p. — (In Uzbek).
2. Acemoglu D., Restrepo P. The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment // *American Economic Review*. — 2018. — Vol. 108, No. 6. — P. 1488–1542.
3. Andreoni A., Anzolin G. *A Revolution in the Making? Challenges and Opportunities of Digital Production Technologies for Developing Countries*. — Vienna: UNIDO, 2019. — 38 p.
4. Bodrunov S. D. *Noonomy*. — Moscow: Cultural Revolution, 2018. — 432 p. — (In Russian).
5. Brynjolfsson E., McAfee A. *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. — New York: W. W. Norton & Company, 2014. — 306 p.
6. Cirera X., Maloney W. F. *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up*. — Washington, DC: World Bank, 2017. — 226 p.
7. Glazyev S. Yu. *Jump into the Future: Russia in the New Technological and World Economic Structures*. — Moscow: Knizhny Mir, 2018. — 768 p. — (In Russian).
8. Gulyamov S. S., Ayupov R. Kh., Abdullaev O. M., Baltabaeva G. R. *Blockchain Technologies in the Digital Economy*. — Tashkent: Finance, 2019. — 447 p. — (In Uzbek).
9. Islamov B. Kh. *Digital Economy: Challenges and Opportunities for Uzbekistan*. — Tashkent: ISR under MER RUz, 2022. — 186 p. — (In Russian).
10. Ivanov V. V., Malinetsky G. G. *Digital Economy: Myths, Reality, Perspective*. — Moscow: Russian Academy

- of Sciences, 2017. — 64 p. — (In Russian).
11. Keshelava A. V. (ed.). *Introduction to the "Digital" Economy*. — Moscow: VNIIGeosistem, 2017. — 28 p. — (In Russian).
 12. National Statistics Agency under the President of the Republic of Uzbekistan. *Official Statistical Databases* [Electronic resource]. — Available at: www.stat.uz; www.siat.stat.uz.
 13. Olmasov A., Vakhobov A. V. *Economic Theory: Textbook*. — Tashkent: IQTISOD-MOLIYA, 2014. — 480 p. — (In Uzbek).
 14. Schumpeter J. A. *The Theory of Economic Development*. — Cambridge, MA: Harvard University Press, 1934. — 255 p.
 15. Schwab K. *The Fourth Industrial Revolution*. — Geneva: World Economic Forum, 2016. — 172 p.
 16. Shodmonov Sh. Sh., Khojayev B. Yu. *Economic Theory: Textbook*. — Tashkent: Barkamol Fayz Media, 2017. — 784 p. — (In Uzbek).

Proofreader: Xondamir Ismoilov
Layout and Designer: Hasan Maqsudov

2026. № 8

© When materials are reproduced, the ECONOSCITECH-INTEGRATION journal must be cited as the source. Authors are responsible for the accuracy of the information in materials and advertisements published in the journal. Editorial opinions may not always align with those of the authors. Submitted materials will not be returned to the editorial office.

To publish articles in this journal, you may submit articles, advertisements, stories, and other creative materials through the following links. Materials and advertisements are published on a paid basis.

You may subscribe to the journal at any time using the following details. Once subscribed, please send a screenshot or photo of your payment confirmation to our Telegram page @iqtisodiyot_77. Based on this, we will send the latest issue of the journal to your address each month.

Our address: Tashkent city, Yunusobod district, 19th block, House 17.

