

RNI – MPENG/2011/46472

ISSN-2249-9512



Journal of Management Value & Ethics

(A quarterly Publication of GMA)

Dr. Prabhakar Singh Bhadouria

Editor-in-Chief

Advisory Board

Prof. Moyosola A. Bamidele
School of Global Health & Bioethics
EUCLID University
The Gambia

Dr. D.A.C. Silva
Director General of SLITHM Colombo,
Sri Lanka

Dr. Raj Kumar Singh
Professor
School of Mgmt. Studies, Varanasi

Dr. Sol Bobst
University of Houston Victoria,
Texas, U.S.A.

Dr. Manoj Patwardhan
Professor, ABV-IITM,
Gwalior (M.P.)

Dr. Surabhi Singh
Professor, Marketing
IMS, Gaziabad (U.P.)

Dr. Lilambeswara Singh,
Professor & Head
St. Johns College of Engg. & Tech.
Yemminagar, Kurnool (A.P.)

Dr. Sandeep Kulshreshtha
Professor
Institute of Tourism & Travel
Management
Gwalior, (M.P.) INDIA

Dr. S.K.Singh
Professor SOS in Commerce,
Jiwaji University, Gwalior (M.P.)

Dr. Prakash C Bhattarai
Associate Professor
Department of Development
Education
Kathmandu University, Nepal

Dr. Bateshwar Singh
Associate Professor,
Dept. of Commerce & Financial
Studies Central University Ranchi,
Jharkhand

Editorial Board

Dr. Suvigya Awasthi
Former Professor, School of
Management, Jiwaji University
Gwalior

Dr. Avinash D. Pathardikar
Professor & Dean, Deptt. of HRD.
V.B.P. University, Jaunpur (U.P.)

Prof.(Dr) Rajendra Khatik
Dean, Dept. of Commerce &
Management
Jiwaji University Gwalior (M.P.)

Dr. S. P. Bansal
Vice-chancellor

Himachal Pradesh Technical
University, Hamirpur (H.P.)

Dr. B.S. Patil
Director
School of Research & Innovation
CMR University, Bangalore

Dr. S. Rangnekar
Head, Deptt. of Mgmt. Studies, IIT,
Roorkee, Deharadun (Uttarakhand)

Dr. Khamidov Obidjon
Head, Tourism Deptt. University of
Economics, Uzbekistan

Dr. A.K. Jha
Professor
Deptt. of Mgmt. Greater Noida

Dr. Ajay Wagh
Professor & Dean, Deptt of Business
Management, IGNTU, Amarkantak (M.P.)

Dr. Ampu Harikrishnan
Dean School of Business Indus
International University, Una (H.P.)

GWALIOR MANAGEMENT ACADEMY

C-17 Kailash Nager, Near New High Court, Gwalior-M.P. 474006 (INDIA)
Phone No. 0751-2230233, 9425121133

CONTENTS

S.No.	Articles	Page
1.	THE ROLE OF THE CONSTRUCTION SECTOR IN THE DEVELOPMENT OF THE REGIONAL ECONOMY Aminov Sardorbek Sanjarbekovich	5
2.	DATA ECONOMY: ANALYSIS OF DEVELOPMENT DRIVERS AND THE FRAMEWORKS OF FORMATION Khatamova Manzura Ochildievna	11
3.	SCIENTIFIC APPROACHES TO ASSESSING REGIONAL SOCIO-ECONOMIC STRATIFICATION AND CONSTRUCTING THE DATA SOURCE Karimova Shirin Zoxidkizi	16
4.	MODEL FOR DEVELOPING THE PROCESS OF POVERTY REDUCTION IN THE REGION BASED ON INVESTMENT AND ECONOMIC FACTORS Saparov Ismat Chorshanbiyevich	24
5.	IMPLEMENTING THE "SINGLE WINDOW" PRINCIPLE IN THE FREIGHT TRANSPORTATION CHAIN THROUGH THE DEVELOPMENT OF 4PL LOGISTICS PROVIDERS: THE EXPERIENCE OF UZBEKISTAN Professor Javlonbek Sultonovich Fayzullayev	29
6.	ASSESSMENT OF ORGANIZATIONAL MANAGEMENT MECHANISMS IN HEALTHCARE INSTITUTIONS Saidov Suxrob Shodmonovich	38
7.	EFFECTS OF BUSINESS GROUP AFFILIATION AND GLOBAL DIVERSIFICATION IN PERFORMANCE OF A BUSINESS FIRM Pramila Singh, Munish Tiwari	54
8.	WOMEN-LED START-UPS IN CENTRAL UTTAR PRADESH (GROWTH TRENDS, SECTORAL DYNAMICS & POLICY IMPLICATIONS (2019–2025) Khushboo Joshi, Veena Singh	66
9.	IMPROVING THE EFFICIENCY OF BANKING ACTIVITIES THROUGH THE DEVELOPMENT OF BANKING SERVICES L. A. Urinov	81
10.	EMPIRICAL ANALYSIS OF THE INTERDEPENDENCE BETWEEN INCOME DIVERSIFICATION, CONSUMPTION PATTERNS, AND HOUSEHOLD BUDGET STABILITY Sufiyeva Khusniya Sokhibjonovna	87
11.	DEVELOPMENT TRENDS OF SMALL ENTREPRENEURSHIP IN THE REPUBLIC OF UZBEKISTAN Jurakhonov Muzaffar Eskandarovich	94
12.	ASSESSING THE IMPACT OF INVESTMENT ON EXPORT CAPACITY: EVIDENCE FROM ANDIJAN PROVINCE, UZBEKISTAN Olchinbayev Otabek Abdusamad ugli	104
13.	BUILDING FRANCHISE ECOSYSTEMS FOR SME MODERNIZATION: INSTITUTIONAL DETERMINANTS AND EVIDENCE FROM UZBEKISTAN Malika Rustamovna Azimova	111

14.	MEASURING ESG IN UZBEKISTAN'S CONSTRUCTION INDUSTRY: DEVELOPMENT OF A SIMPLIFIED ESG INDEX Valentina Ablaeva	126
15.	WAYS TO IMPROVE THE USE OF NATURAL RESOURCES IN THE DEVELOPMENT OF HEALTH SERVICES Sobirov Kayum Xamraevich	133
16.	INVESTMENT SOURCE DIVERSIFICATION, FARM PERFORMANCE, AND HORTICULTURAL DEVELOPMENT: EVIDENCE FROM UZBEKISTAN Jalilov Shohruh Zafar O'g'li	138
17.	POLITICAL LEADERSHIP, GOVERNANCE AND ORGANIZATIONAL PERFORMANCE IN PUBLIC SECTOR INSTITUTIONS: A MANAGEMENT PERSPECTIVE – AN EMPIRICAL STUDY OF GWALIOR CITY, MADHYA PRADESH Meenakshi Yadav	149
18.	METHODOLOGY FOR ASSESSING THE INVESTMENT ATTRACTIVENESS OF AGRICULTURAL ENTERPRISES Badalov Jamshid Jamolovich	159
19.	LOAD-ADJUSTED ECO-EFFICIENCY ASSESSMENT OF RAILWAY REPAIR PLANTS Abdurakhmanova Mukaddas Tokhtasinovna	164
20.	GLOBAL FOOD SECURITY AND MECHANISMS FOR MITIGATING MALNUTRITION. INTERNATIONAL EXPERIENCE AND LESSONS FOR UZBEKISTAN Akhmedova Nafisa Amirdin kizi	172
21.	CHAIN-COMPATIBLE INCENTIVE ALLOCATION IN THE TEXTILE INDUSTRY Nurullayeva Mexribon Muratovna	183

Legal Instructions :

- The GMA is publishing a Journal of Management Value & Ethics from times a year in January, April, July, and October.
- No part of this publication may be reproduced or copied in any form by any means without prior written permission.
- The views expressed in this publication are purely personal judgments of the authors and do not reflect the views of GMA.
- All efforts are made to ensure that the published information's is correct. GMA is not responsible for any errors caused due to oversight or otherwise.
- All legal disputes jurisdiction will be Gwalior.

All rights reserved reproduction in whole or part from this journal without written permission of GMA is Prohibited. The views expressed by contributors are necessary endorsed by GMA. Unsolicited manuscript shall not be returned even if accompanied by self addressed envelop with sufficient postage.

Publisher/Printer/Owner/Editor-in-Chief :

Dr. Prabhakar Singh Bhadouria,

Gwalior Management Academy

Regd. Office: C-17 Kailash Nagar Near New High Court Gwalior M.P. INDIA-474006,

e-mail : jmveindia@yahoo.com, www.jmveindia.com

Annual subscription Rs.2000.00 (India) \$ 170 & euro 150 (foreign Airmail)

Printed at:

Sai offset Throat palace, Lashkar Gwalior (M.P.)

Graphics & Designed:

Shivani Computer Graphics, Gwalior (M.P.)

Mob. 9826480017

Message

Editor in Chief / Managing Editor



Dear Academicians & Research Scholars,

Dear Authors, as you know that our referred international research journal listed with many research organizations like, Global Impact Factor Australia, Google scholar, LinkedIn and also approved in Higher Education Supreme Authority Uzbekistan. We are also member of PILA (Crossref) USA. The motive of our research journal is to publish worthy and original research papers after double blind peer review process. There is no doubt that today we have given international platform to our journal where everyone, who belongs to management, knows very well. During the last nine years of our research journey, you can see that there are so many research papers, case studies, book reviews coming from across the world, in the field of management. Many academicians, research scholars & students have approached from different countries like USA, Thailand, Indonesia, Saudi Arabia, Iran, Spain, Nigeria, Kenya, Nepal, Pakistan, Sri Lanka, Uzbekistan to publish their research papers in our esteemed International research Journal. We have considered most of them to publish after peer blind review process. We have also published many research papers from different management institutes of our country. They are sending regularly for publication in the upcoming issues. In addition to, it, there are many academicians, research scholars and institutes subscribing for our journal for reading by students and faculties. There are so many academicians who are approaching for being associated with our editorial & advisory board or as a review expert. We have selected some of them from foreign countries like USA, Nigeria, Uzbekistan and Sri Lanka, Nepal. The standard of our all research papers like empirical, conceptual, book review and case study is increasing the popularity of this Journal day by day. The most inspirable things of our journal are Motivational quotations which are appreciated by readers. Our renowned advisory board & editorial board members giving me advice to maintain quality of the journal and its become a real mile stone of our success.

Research is a need of today's life, without research nothing is possible in the universe. Because, research bringing revolutionary change in the life. Research based study always support academicians & scholars to upgrade their innovative skill and academic profile as per UGC and AICTE norms. I would also like to request those, who are interested to get their research papers published in the field of Retail, Tourism, Hospitality, Event Management, Import and export, HRM, Finance, Marketing, Advertising, Accounting, Economics, Aviation, and IT etc. to send their research papers through email.

Dr. P. S. Bhadouria

THE ROLE OF THE CONSTRUCTION SECTOR IN THE DEVELOPMENT OF THE REGIONAL ECONOMY

Aminov Sardorbek Sanjarbekovich¹

ABSTRACT

This article analyzes the role and economic significance of the construction sector in the development of the regional economy. The study highlights the role of the construction industry in attracting investments, creating new jobs, developing infrastructure, and ensuring regional economic growth. In addition, the multiplicative effect of the construction sector on other sectors of the economy is assessed using statistical and economic analysis methods. The results of the analysis show that the increase in the volume of construction activities has a positive impact on employment levels and regional economic activity. Based on the findings, scientific and practical recommendations were developed to enhance the development of the construction sector in the regions, increase investment attractiveness, and introduce modern construction technologies.

Keywords: Construction Sector, Regional Economy, Economic Growth, Investments, Employment, Infrastructure, Regional Development, Multiplicative Effect.

Introduction

Today, the construction sector is recognized as one of the strategic industries driving the development of the regional economy. This sector plays an important role not only in creating housing and industrial infrastructure, but also in ensuring economic growth through attracting investments, generating new jobs, and increasing regional economic activity. International practice shows that the development of the construction industry directly affects the growth of many economic sectors, including transport, industry, services, logistics, and tourism [1]. Therefore, the construction sector is considered one of the “locomotive” sectors of the economy.

In recent years, the acceleration of urbanization processes, population growth, and the increasing demand for infrastructure in many countries around the world have significantly increased investments in the construction sector. In particular, the construction of modern housing, industrial zones, logistics centers, and social infrastructure facilities has become one of the priority directions of economic policy in developing countries [2]. In this regard, studying the impact of the construction industry on regional economic development on a scientific basis is considered an actual issue.

The construction sector differs from other industries due to its multiplicative effect on the economy. During construction processes, close economic relationships are formed with metallurgy, construction materials production, transportation, energy, banking and finance, and service sectors. As a result, economic activity in one sector stimulates the development of other sectors as well [3]. In particular, the construction of new infrastructure facilities in regions increases investment attractiveness, stimulates private sector activity, and strengthens regional economic integration.

In the economy of Uzbekistan, the construction sector is also developing as one of the priority industries. In recent years, large-scale reforms have been implemented in the country to modernize housing

¹ Independent Researcher of Urgench State University named after Abu Rayhan Beruni

construction, transport and communication infrastructure, industrial zones, and social facilities. This has had a positive impact on the structural transformation of the regional economy and the improvement of living standards. In particular, the implementation of modern construction projects in the regions contributes to increasing employment, expanding small business activities, and developing the service sector [4].

At the same time, there are several challenges in the development of the construction sector. In particular, fluctuations in construction material prices, insufficient investment resources, shortages of qualified personnel, and increasing environmental requirements negatively affect the efficiency of the sector [5]. In addition, disparities in infrastructure development among regions significantly influence the economic outcomes of the construction sector. Therefore, improving the mechanisms for increasing the economic efficiency of the construction industry in the regions has important scientific and practical significance.

The main purpose of this article is to analyze the role of the construction sector in the development of the regional economy and evaluate its impact on economic growth, employment, investments, and infrastructure development. During the research, statistical analysis, comparative analysis, and economic evaluation methods were used. The research results serve to develop scientific and practical recommendations aimed at improving regional economic policy, attracting more investments into the construction sector, and accelerating regional infrastructure development.

Literature Review

The issue of the impact of the construction sector on regional economic development has been widely studied by foreign economists and researchers. These studies evaluate the influence of the construction industry on economic growth, investments, employment, and infrastructure development through various theoretical and practical approaches.

In his scientific work *Construction Economics: A New Approach*, Danny Myers considers the construction sector as a strategic driver of the economy [1]. According to the author, the construction industry not only creates new infrastructure facilities but also stimulates the activities of other sectors of the economy. In particular, construction activities increase economic activity in transportation, energy, metallurgy, and service sectors. Danny Myers substantiates that the construction sector has a strong multiplicative effect and notes that investments in this sector accelerate regional economic growth. Furthermore, the author emphasizes that the socio-economic importance of the construction industry is steadily increasing in modern urbanization processes.

In the work *Economics of the Construction Industry*, Gerard de Valence deeply analyzes the economic efficiency and investment attractiveness of the construction sector [2]. The author pays special attention to employment, capital investment, and infrastructure development indicators when assessing the impact of the construction industry on economic development. The study scientifically proves that regions with developed construction sectors experience improvements in the investment environment and increased private sector activity. Gerard de Valence evaluates the long-term impact of construction projects on regional economies and demonstrates that infrastructure development is one of the key factors of economic stability.

The World Bank report entitled *Infrastructure for Development: Regional Growth and Urbanization Report* extensively highlights the role of infrastructure and the construction sector in regional economic development [3]. The report states that the acceleration of urbanization processes has increased demand for construction activities. According to the research findings, investments directed toward infrastructure projects strengthen regional economic integration and contribute to the creation of new jobs. Moreover, the

report substantiates that the development of modern transport and kommunal infrastructure increases the investment attractiveness of regions and accelerates economic growth.

In the scientific study Sustainable Construction and Regional Economic Growth conducted by Kim J. and Lee S., the impact of sustainable construction technologies on economic development is analyzed [4]. The authors emphasize that the use of green construction technologies ensures efficient use of resources, reduces environmental costs, and provides long-term economic efficiency. The study notes that construction projects meeting environmental standards not only increase the competitiveness of regional economies but also positively affect the quality of life of the population. The authors scientifically justify that modern construction approaches contribute to harmonizing economic and environmental interests.

Research Methodology

In this study, statistical analysis, comparative analysis, economic analysis, and time-series methods were used to evaluate the role of the construction sector in the development of the regional economy. The research object was selected as the development indicators of the construction sector in the regions of Uzbekistan. During the research process, statistical data for 2015–2025 on the volume of construction works, investments, employment levels, housing construction, and infrastructure development were analyzed. The data were formed based on reports from the State Committee of the Republic of Uzbekistan on Statistics and international organizations. The study scientifically assessed the multiplicative impact of the construction sector on economic growth and its significance in regional economic development. Based on the obtained results, scientific and practical recommendations for the development of the construction sector were developed.

Analysis and Results.

In this section, the economic significance of the construction sector in the development of the regional economy was evaluated based on statistical and economic analyses. In recent years, the rapid development of the construction industry has contributed to increased economic activity in the regions, the establishment of new production capacities, and the expansion of the service sector. In particular, projects aimed at housing construction, transport and communication infrastructure, and the modernization of industrial facilities have accelerated regional economic growth. At the same time, the integration of the construction sector with other industries has strengthened the economic multiplicative effect, positively influencing investment attractiveness and increasing employment levels.



Figure 1. Dynamics of construction works carried out in Khorezm region as of January 1, 2025

Source: Developed by the author.

The above Figure 1 illustrates the growth dynamics of construction works carried out in the Khorezm region during 2020–2024. According to the data, the volume of construction works amounted to 3,032.4 billion UZS in 2020, while in 2021 this indicator increased to 4,228.5 billion UZS. In 2022, the figure reached 4,891.7 billion UZS, demonstrating a stable growth trend. In particular, a sharp increase was observed in 2023, when the volume of construction works amounted to 8,652.6 billion UZS. The highest result was recorded in 2024, with the indicator reaching 10,657.2 billion UZS.

This growth indicates an increase in investment activity in the region, the expansion of infrastructure projects, and growing demand for housing and industrial construction facilities. At the same time, government programs and policies aimed at supporting the construction sector also played an important role in the development of the industry.

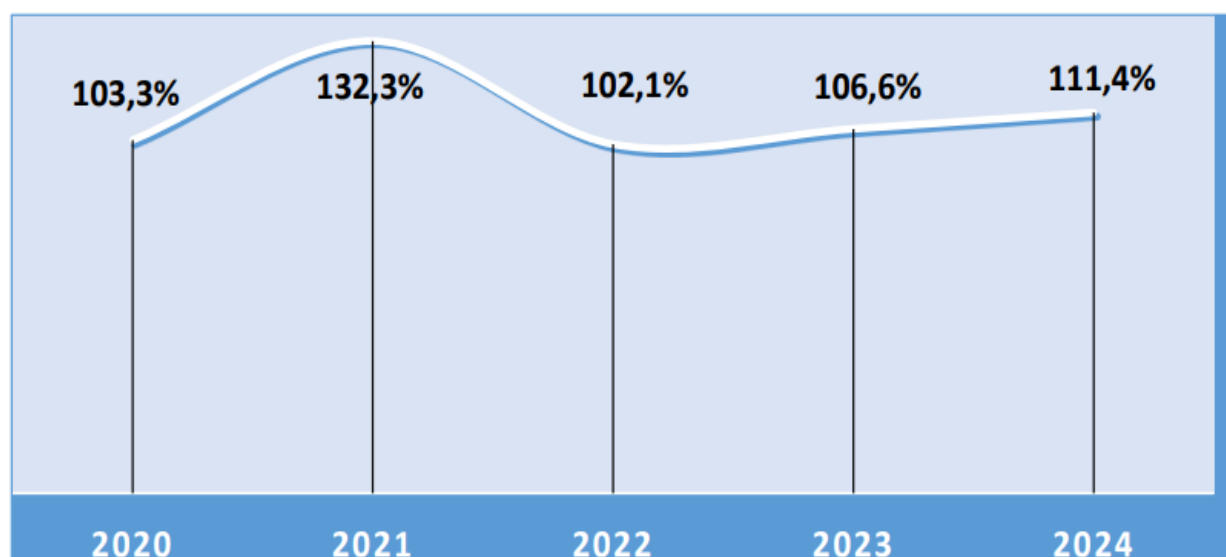


Figure 2. Growth rates of construction works carried out in Khorezm region during 2020–2024

Source: Developed by the author.

The figure illustrates the growth rates of construction works carried out in the Khorezm region during 2020–2024. According to the analysis, the growth rate of construction works amounted to 103.3% in 2020, while in 2021 this indicator increased sharply to 132.3%. During this period, the expansion of investment projects, housing construction, and infrastructure facilities in the region contributed to the rapid development of the construction sector.

Although the growth rate decreased to 102.1% in 2022, positive dynamics in the sector were maintained. In 2023, the indicator reached 106.6%, demonstrating a return to stable growth in construction activities. In 2024, the growth rate increased to 111.4%, indicating the continuation of high activity in the construction sector.

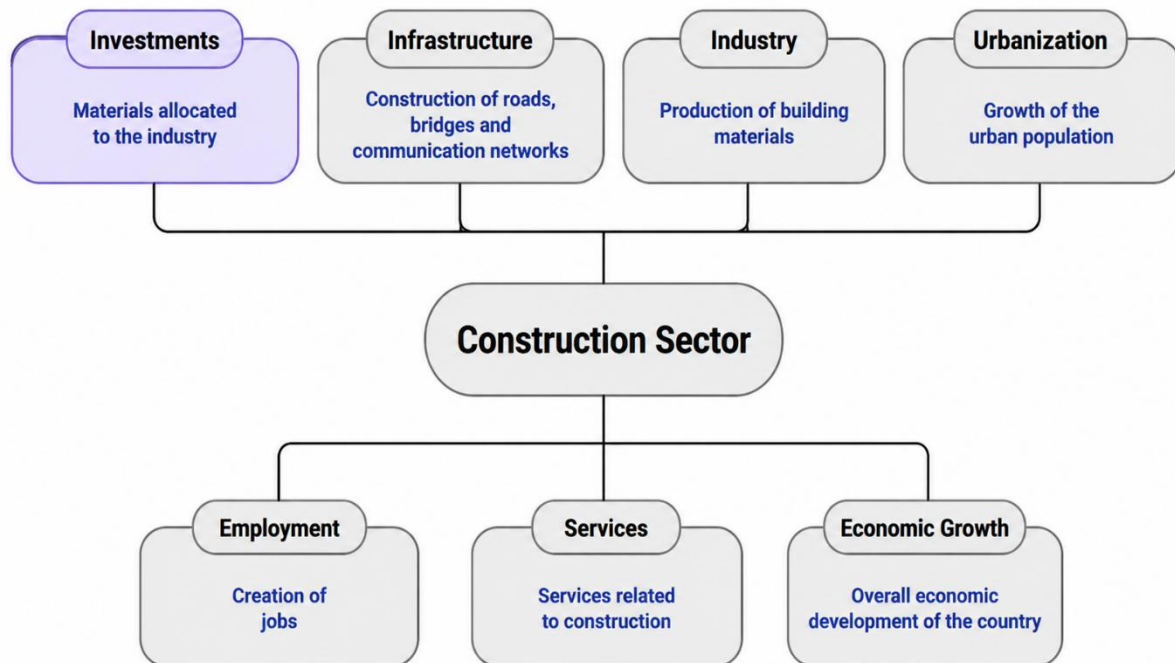
The data presented in the figure show that the construction sector is becoming one of the key drivers of the economy in the Khorezm region and is closely connected with regional development, investment activity, and infrastructure modernization processes.

Table 3. Multiplicative impact of the construction sector on other industries

Sectors	Level of Impact	Economic Outcome
Construction materials industry	High	Production volume increases
Transport and logistics	Medium	Freight transportation volume increases
Trade and services	High	Domestic market expands
Banking and finance sector	Medium	Lending volume increases
Tourism	Low/Medium	Infrastructure improves

Source: Developed by the author.

Table 3 demonstrates the multiplicative impact of the construction sector on various industries within the regional economy. The analysis shows that the construction materials industry experiences a high level of impact, leading to increased production volumes due to growing demand for building materials. The transport and logistics sector is also positively affected, as freight transportation volumes expand alongside construction activities. In addition, trade and service sectors benefit from increased economic activity and domestic market expansion. The banking and finance sector records growth in lending operations related to construction projects. Furthermore, improvements in infrastructure contribute to the development of tourism and enhance the region's overall economic attractiveness and competitiveness.

**Figure 3. Mechanism of the impact of the construction sector on the regional economy**

The figure systematically illustrates the mechanism of the impact of the construction sector on the regional economy. The upper part of the diagram presents the main factors influencing the construction sector, namely investments, infrastructure, industry, and urbanization processes. Investments ensure the flow of financial resources into the construction industry, while infrastructure facilities such as roads, bridges, and communication networks form the main directions of construction activities. The industrial sector supports the development of the construction industry through the production of building materials, whereas urbanization increases the demand for construction due to population growth in urban areas.

At the center of the figure, the “Construction Sector” is presented as the main connecting element of the economic system. The lower part of the diagram demonstrates the outcomes of the construction sector. In particular, the creation of new jobs increases employment levels, the expansion of the service sector strengthens economic activity, and overall economic growth is positively affected. In general, the figure indicates that the construction sector has a strong multiplicative effect on regional economic development.

Conclusion and Practical Recommendations

The research results showed that the construction sector is one of the key strategic industries in the development of the regional economy. The development of the construction sector positively affects the growth of investment volumes, the creation of new jobs, the expansion of infrastructure facilities, and the strengthening of regional economic activity. In addition, the interconnection of the construction sector with industry, transportation, services, and trade creates a significant economic multiplicative effect. The study revealed that the increase in the volume of construction works enhances the investment attractiveness of regions and accelerates economic growth.

In the future, in order to further develop the construction sector in the regions, it is advisable to widely introduce modern and energy-efficient technologies, apply green construction principles, and stimulate private investments. At the same time, supporting regional infrastructure projects, training qualified specialists, and developing digital management systems will contribute to increasing the economic efficiency of the construction industry.

References:

- Danny Myers. *Construction Economics: A New Approach*. Routledge, United Kingdom, 2022. – 312 p.
- World Bank. *Infrastructure for Development: Regional Growth and Urbanization Report*. Washington DC, USA, 2023. – 198 p.
- Gerard de Valence. *Economics of the Construction Industry*. Routledge, United Kingdom, 2021. – 280 p.
- Asian Development Bank. *Uzbekistan: Urban Services and Sustainable Infrastructure Development*. Manila, Philippines, 2024. – 156 p.
- Kim J., Lee S. *Sustainable Construction and Regional Economic Growth*. *Journal of Construction Engineering and Management*, USA, 2023, Vol.149(6), pp. 44–58.

DATA ECONOMY: ANALYSIS OF DEVELOPMENT DRIVERS AND THE FRAMEWORKS OF FORMATION

Khatamova Manzura Ochildievna¹

ABSTRACT

The relevance of the study is determined by the fundamental transformation of the role of data, expressed in the transition from an exclusively technical category (as a source of information) to an economic one (as an independent asset), emphasizing its strategic role: from participation in the production cycle to serving as the basis for managerial decision-making. This evolution necessitates the conceptualization of a “new” economy — the data economy — whose substantive content demonstrates a clear dualism: the data economy as an economic category and as a system of economic management. The article focuses on the second aspect, which determines the practical orientation of the research. The problem addressed in the study lies in the absence of a theoretical and methodological foundation for understanding the pragmatic application of the definition of the “data economy,” which is manifested in terminological ambiguity and fragmentation of conceptual approaches.

Keywords: Data Economy, Digital Economy, Properties Of Data, Data As An Asset, Value Of Data, Digital Transformation, Digitalization.

Literature Review

The study was conducted using materials from the Lens.org platform. Scientific publications serve as a primary indicator of the development of a specific subject area, reflecting the processes of new knowledge generation, the formation of a theoretical foundation for the issue under consideration, and the identification of key challenges and trends. An analysis of the dynamics of research intensity in the field of “Data Economics” (Figure 1) allows us to confirm a transition from a stage of fragmented study to the emergence of an independent scientific field. Despite a decline in the number of publications since 2022, the growth, particularly pronounced since the early 2010s, is evidence of the increased academic and practical relevance of this aspect of study. This observed trend reflects the scientific community's response to technological shifts associated with digitalization, the spread of big data and artificial intelligence, which have led to the emergence of data as a new key asset and factor of production.

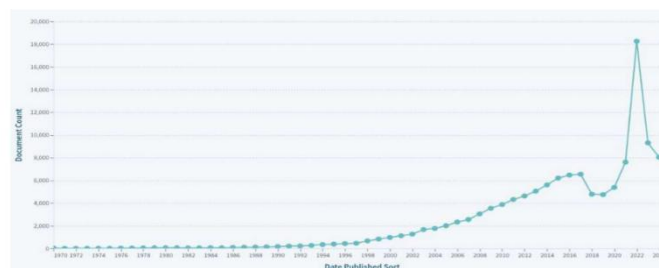


Fig.1. Dynamics of the number of publications on the topics of «Data Economy», «Data-Driven Economy», 1970–2024¹

¹ Independent Researcher at Termez State University

An analysis of the thematic structure of research in the field of data economics (Figure 2) reveals its complex, multi-layered architecture and interdisciplinary nature. The core of scientific publications is comprised of two disciplinary categories: "Economics" and "Business."

Their absolute predominance confirms the central thesis that data economics is studied primarily through the prism of strategic management and data-driven competitive advantages. An important technological foundation is provided by activity in the "Computer Science" category. The significant weight of engineering disciplines (Engineering) indicates a strong applied, infrastructural component.

The term "Engineering" indicates a strong applied, infrastructural component.

The institutional and regulatory aspect is emphasized by the significant presence of legal and social disciplines: "Law," "Sociology," and "Political Science," demonstrating a growing attention to issues of data management, ethics, and the development of a corresponding general regulatory framework. Thus, the data economy has emerged as an interdisciplinary field at the intersection of economics, management, technology, social and environmental and legal disciplines.

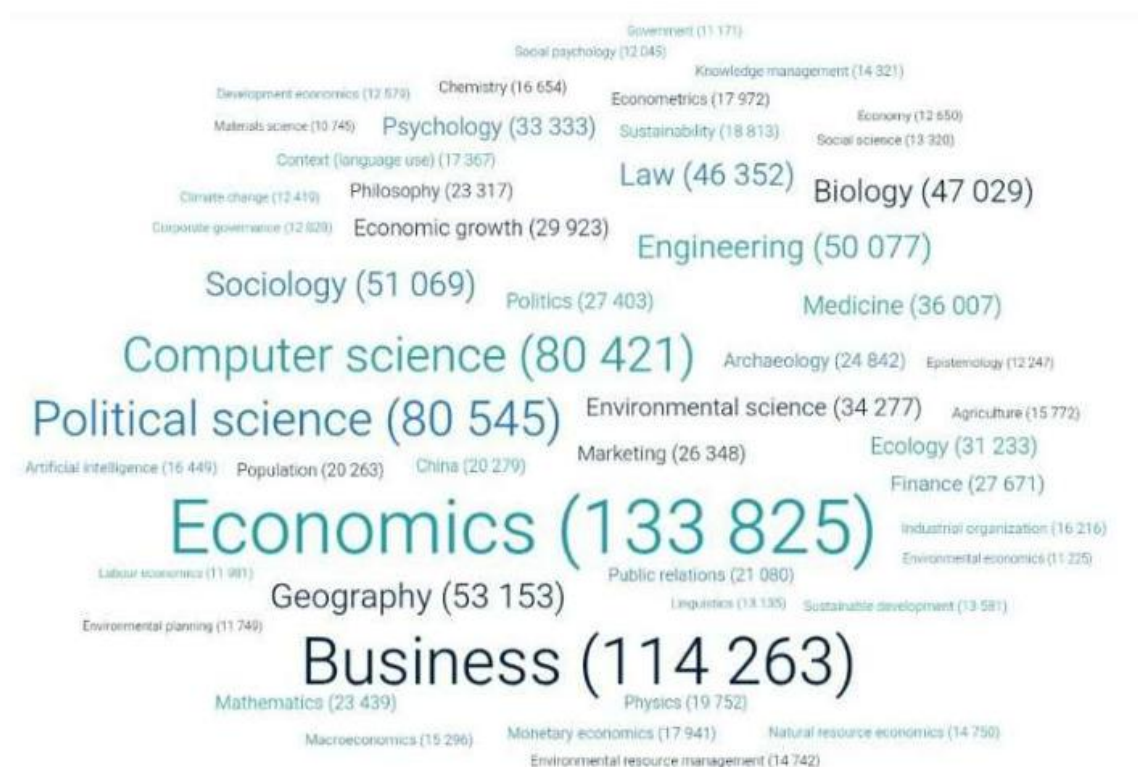


Fig. 2. Main directions of research on the keywords «Data Economy», «Data-Driven Economy», 1970–2024²

¹Христова С.М. Экономика данных: анализ драйверов развития и контуров становле ния. Векторы благополучия: экономика и социум, 2026, Т. 54, № 1, С. 78–91. <https://doi.org/10.18799/26584956/2026/1/2054>

²Христова С.М. Экономика данных: анализ драйверов развития и контуров становле ния. Векторы благополучия: экономика и социум, 2026, Т. 54, № 1, С. 78–91. <https://doi.org/10.18799/26584956/2026/1/2054>

The rapid development of digital technologies has led to the emergence of a new stage of socio-economic transformation known as the data economy. In contemporary conditions, data has become a strategic resource comparable to traditional production factors such as labor, capital, and land. The increasing volume of digital information generated by individuals, businesses, governments, and intelligent systems creates significant opportunities for economic growth, innovation, and competitiveness.

The data economy is characterized by the collection, processing, storage, exchange, and commercialization of data through digital platforms and technological infrastructures. The expansion of artificial intelligence, cloud computing, the Internet of Things (IoT), blockchain technologies, and big data analytics significantly accelerates the formation of new business models and digital ecosystems. As a result, enterprises are transforming their operational processes, decision-making systems, and customer interaction mechanisms based on data-driven approaches.

One of the key drivers of the data economy is digital transformation. Governments and private organizations actively invest in digital infrastructure, broadband internet, smart technologies, and e-government systems to improve efficiency and productivity. In addition, the widespread use of mobile devices and social media platforms contributes to the exponential growth of data generation worldwide.

Another important factor influencing the development of the data economy is the increasing role of artificial intelligence and machine learning technologies. These technologies enable organizations to extract valuable insights from large volumes of structured and unstructured data, improve forecasting accuracy, automate routine operations, and personalize services. Consequently, data becomes not only an operational asset but also a strategic tool for achieving sustainable competitive advantages.

The formation of the data economy also depends on institutional and regulatory frameworks. Effective data governance systems, cybersecurity mechanisms, personal data protection regulations, and ethical standards are essential for ensuring trust and security in digital environments. Countries with advanced digital policies and innovation ecosystems demonstrate higher levels of digital competitiveness and economic resilience.

At the same time, the development of the data economy is associated with several challenges. These include digital inequality, insufficient digital skills, data privacy concerns, cyber threats, monopolization of digital platforms, and unequal access to technological resources. Therefore, sustainable development of the data economy requires balanced state regulation, international cooperation, investment in human capital, and the promotion of digital literacy.

In the context of globalization, the data economy becomes a fundamental component of national economic strategies. Countries seeking to enhance their positions in the global digital landscape prioritize the development of digital infrastructure, innovation ecosystems, and data-centered governance models. As a result, the transition toward a data-driven economy is increasingly viewed as a prerequisite for long-term economic growth and technological modernization.

Literature Review

The concept of the data economy has attracted significant attention from researchers, international organizations, and policymakers due to the growing importance of digital technologies and data-driven business models. Scientific literature demonstrates that data is increasingly considered a strategic economic resource capable of generating innovation, improving productivity, and transforming traditional industries.

Early theoretical approaches to the digital economy were developed by scholars such as Don Tapscott, who emphasized the transformative role of digital technologies in economic systems. Later studies expanded this perspective by focusing specifically on the economic value of data and the emergence of platform-based ecosystems. Researchers argue that data has become a new factor of production, creating opportunities for competitive advantage and sustainable economic development.

International organizations, including the Organisation for Economic Co-operation and Development and United Nations Conference on Trade and Development, have actively studied the impact of data flows on global economic growth. According to their reports, cross-border data exchange, artificial intelligence, and digital platforms significantly influence productivity, international trade, and innovation processes. These studies also underline the importance of digital infrastructure and effective governance mechanisms in ensuring the successful development of the data economy.

Contemporary academic research pays considerable attention to big data technologies, cloud computing, and artificial intelligence as the main technological foundations of the data economy. Scholars emphasize that organizations capable of effectively collecting, processing, and analyzing large volumes of data achieve higher operational efficiency and market adaptability. In addition, many researchers investigate the role of digital ecosystems and platform companies in reshaping market structures and consumer behavior.

Another important direction in the literature concerns data governance, cybersecurity, and ethical issues. Researchers highlight that rapid digitalization creates risks related to privacy protection, cybercrime, monopolization of digital markets, and unequal access to technological resources. Consequently, modern studies increasingly focus on developing institutional frameworks that balance innovation with security and social responsibility.

The analysis of scientific publications also demonstrates growing interest in measuring the level of digitalization and evaluating digital competitiveness through international indices. Various methodologies have been proposed for assessing digital readiness, technological maturity, and the contribution of data-driven sectors to economic growth. However, despite substantial academic progress, many aspects of the data economy remain insufficiently explored, especially in developing countries and transition economies.

Therefore, the existing literature confirms that the data economy represents a complex and multidimensional phenomenon requiring interdisciplinary research approaches. Further studies are needed to identify effective models of digital transformation, improve regulatory systems, and ensure inclusive participation in the global digital ecosystem.

Conclusion

The study of the data economy demonstrates that data has become one of the most valuable strategic resources in the modern digital era. The rapid expansion of digital technologies, artificial intelligence, cloud computing, and big data analytics fundamentally transforms economic relations, business models, and public administration systems. As a result, the data economy increasingly determines the competitiveness and innovative capacity of both enterprises and national economies.

The analysis revealed that the main drivers of the data economy include digital transformation processes, technological innovation, expanding internet accessibility, the development of digital infrastructure, and the growing integration of intelligent systems into economic activities. These factors

contribute to the emergence of new digital ecosystems and create opportunities for increasing productivity, improving decision-making processes, and accelerating innovation.

At the same time, the formation of the data economy requires effective institutional and regulatory mechanisms. Data governance, cybersecurity, privacy protection, ethical standards, and digital literacy play a critical role in ensuring sustainable and secure digital development. Without balanced regulation and adequate technological infrastructure, the benefits of the data economy may be unevenly distributed and accompanied by significant socio-economic risks.

The research also indicates that countries actively investing in digital infrastructure, innovation ecosystems, and human capital achieve stronger positions in the global digital environment. Therefore, the transition toward a data-driven economy should be considered a strategic priority for long-term economic modernization and sustainable development.

In conclusion, the data economy represents not only a technological phenomenon but also a comprehensive socio-economic transformation affecting all sectors of society. Future development will depend on the ability of governments, businesses, and academic institutions to cooperate in creating inclusive, secure, and innovation-oriented digital ecosystems. Further scientific research should focus on developing practical mechanisms for effective data management, measuring the economic value of data, and reducing digital inequality in the global economy.

REFERENCES

- *The Digital Economy*. Tapscott, D. (1996). The Digital Economy: Promise and Peril in the Age of Networked Intelligence. New York: McGraw-Hill.
- *Big Data: A Revolution That Will Transform How We Live, Work, and Think*. Mayer-Schönberger, V., & Cukier, K. (2013). Big Data: A Revolution That Will Transform How We Live, Work, and Think. Boston: Houghton Mifflin Harcourt.
- *Organisation for Economic Co-operation and Development*. (2020). Data-Driven Innovation: Big Data for Growth and Well-Being. Paris: OECD Publishing.
- *United Nations Conference on Trade and Development*. (2021). Digital Economy Report 2021: Cross-border Data Flows and Development. Geneva: United Nations.
- *World Bank*. (2021). World Development Report 2021: Data for Better Lives. Washington, DC: World Bank.
- *Manuel Castells*. Castells, M. (2010). The Rise of the Network Society. 2nd ed. Oxford: Wiley-Blackwell.
- *World Economic Forum*. (2022). Global Information Technology Report. Geneva: WEF.
- *Thomas H. Davenport*. Davenport, T. H. (2014). Big Data at Work: Dispelling the Myths, Uncovering the Opportunities. Boston: Harvard Business Review Press.
- *Erik Brynjolfsson, & Andrew McAfee*. (2014). The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: W.W. Norton & Company.
- *European Commission*. (2020). A European Strategy for Data. Brussels: European Commission.
- *Shoshana Zuboff*. (2019). The Age of Surveillance Capitalism. New York: Public Affairs.
- *International Telecommunication Union*. (2023). Measuring Digital Development: Facts and Figures. Geneva: ITU.
- *United Nations*. (2022). E-Government Survey 2022: The Future of Digital Government. New York: United Nations.
- *Klaus Schwab*. (2016). The Fourth Industrial Revolution. Geneva: World Economic Forum.
- *Digital Economy studies published in international journals such as Telecommunications Policy, Information Economics and Policy, Technological Forecasting and Social Change, and Journal of Digital Economy*.

SCIENTIFIC APPROACHES TO ASSESSING REGIONAL SOCIO-ECONOMIC STRATIFICATION AND CONSTRUCTING THE DATA SOURCE

Karimova Shirin Zoxidkizi¹

ABSTRACT

This article develops an objective methodology for selecting indicators to assess the level of socio-economic stratification within a digital monitoring system for the balanced development of regions. The principal aim of the study is to propose a reproducible and scientifically grounded selection mechanism that frees the construction of the indicator system from the researcher's subjective judgement. To this end, the Triangular Convergence Index (TCI) approach, grounded in the triangulation principle of social-research methodology, is applied. The methodology measures the convergence among three mutually independent sources: theoretical schools in the academic literature, leading international and national composite indices, and the strategic and regulatory documents of the Republic of Uzbekistan. Consistent with the academic character of the study, the weighting coefficients for the theoretical, international-institutional, and strategic-normative components are set at 0.40, 0.35, and 0.25, respectively. Out of 29 candidate dimensions, 12 priority dimensions are identified and, following the principle of substantive proximity, consolidated into seven operational categories: economic, social, infrastructural, labour market, health care, education, and demographic. Each category is operationalised through a set of indicators regularly measured via the unified information-analytical system (SIAT) of the Statistics Agency. The results provide a subjectivity-free, reproducible, and inter-regionally comparable scientific and methodological foundation for assessing territorial stratification.

Keywords: Regional Stratification; Digital Monitoring; Triangular Convergence Index; Composite Index; Socio-Economic Development; Indicator System; Data Source; SIAT.

1. Introduction

Ensuring the balanced socio-economic development of regions is one of the priority tasks of contemporary public administration. The widening of inter-regional disparities directly affects not only the pace of economic growth but also social stability, population welfare, and regional cohesion. Accordingly, the creation of digital monitoring systems that track the stratification of regions' development levels in a regular and objective manner is becoming an issue of pressing scientific and practical importance.

The central methodological issue in developing such a digital monitoring system is the choice of which dimensions and indicators are selected to assess the level of stratification. The selection of indicators directly determines the quality of the final assessment, inter-regional comparability, and the scientific soundness of management decisions. If indicators are determined on the basis of subjective judgement or arbitrary choice, the values of the integral index become dependent on the researcher's personal approach, which substantially reduces the reproducibility and scientific reliability of the results.

Although composite indices and integral assessment methods are extensively covered in the existing literature, comparatively little attention has been paid to a formalised, reproducible mechanism that ensures

¹ PhD, Associate Professor, Tashkent State University of Economics (TSUE), Uzbekistan

the objectivity of indicator selection. In many studies, the composition of indicators is determined on the basis of the authors' expert judgement, which constitutes a weakness from the standpoint of methodological transparency and reproducibility. It is precisely this methodological gap that defines the principal research problem addressed in this study.

The aim of this article is to develop the Triangular Convergence Index (TCI) methodology, which enables the objective, reproducible, and scientifically grounded selection of indicators for assessing the level of socio-economic stratification of regions, and to test it on the example of the regions of the Republic of Uzbekistan. To achieve this aim, the following tasks are addressed: developing a system of convergence-based criteria that reduces subjectivity in indicator selection; computing the convergence of dimensions across theoretical, international-institutional, and strategic-normative sources; and consolidating the priority dimensions into operational categories on the basis of the capabilities of official statistics.

2. Literature Review

The problem of measuring regional inequality and social stratification has a long history in regional economics. Williamson (1965), in an empirical analysis of the relationship between regional inequality and the process of national development, showed that inter-regional disparities may widen in the early stages of development and subsequently converge. In quantifying inequality, classical measures such as the Gini coefficient, the Theil index (Theil, 1967), and the Atkinson index (Atkinson, 1970) are widely used; each places a different emphasis on particular properties of the distribution and on society's sensitivity to inequality. These measures remain the principal instruments for assessing regional stratification today.

The shift towards a multidimensional assessment of development is closely linked to the capability approach formulated by Sen (1999), according to which welfare should be measured not by income alone but through a combination of education, health, and social opportunities. This conceptual foundation is reflected in the practice of integral composite indicators such as the Human Development Index (HDI). The methodological principles of constructing composite indicators are set out systematically in the handbook of the OECD and the Joint Research Centre (Nardo et al., 2008), in which the transparency of the indicator-selection, normalisation, weighting, and aggregation stages is identified as the principal factor determining the reliability of the results.

One of the most contested issues in composite-indicator methodology is the weighting of indicators. Saltelli (2007) emphasises the risk that composite indicators may become instruments of political advocacy alongside their analytical function, and notes the need for a methodological justification of the weighting choice. The report of the international commission chaired by Stiglitz, Sen, and Fitoussi (2009) places particular emphasis on the necessity of giving scientific validity precedence over political expediency in constructing systems of socio-economic measurement. This approach serves as the conceptual basis for determining the weighting coefficients in the present study.

A further important avenue for enhancing methodological reliability is the principle of triangulation. According to this principle, introduced into social-research methodology by Denzin (1978), the scientific reliability of a conclusion increases substantially if it is simultaneously confirmed by several mutually independent sources. Although triangulation is most often applied in qualitative research, its logic also provides an effective methodological basis for ensuring the objectivity of indicator selection: a dimension that recurs across sources of differing epistemological nature is regarded not as accidental but as an objective necessity.

The review of the existing literature shows that, while integral indices and inequality measures for assessing regional stratification are sufficiently developed, a formalised mechanism based on the convergence of several independent sources that ensures the objectivity of indicator selection is lacking. In order to fill precisely this scientific gap, the present study proposes the TCI methodology, in which the triangulation principle is applied to the indicator-selection stage.

3. Methodology

To ensure the objectivity of indicator selection, the study employs the Triangular Convergence Index (TCI) approach, grounded in the principle of triangulation. The selection of dimensions is based on measuring the convergence within three mutually independent sources:

1) theoretical convergence (T) — determines whether a dimension belongs among the assessment factors advanced by the principal scientific schools of stratification theory; theoretical sources are selected on the basis of publications with high citation levels in the Scopus and Web of Science databases;

2) international-institutional convergence (I) — determines the presence of a dimension among the indicators of international and national regional-stratification indices; composite indices are screened by the criteria of recognition, regional applicability, and methodological transparency;

3) strategic-normative convergence (P) — determines the correspondence of a dimension to the regional-stratification assessment tasks envisaged in the strategic and regulatory documents that shape the development of the Republic of Uzbekistan.

On the basis of the research conducted, the number of theoretical sources was set at $N_t = 30$ principal scientific schools and highly cited publications, the international and national assessment indices at $N_i = 11$, and the strategic-normative documents at $N_p = 6$. To aggregate the components identified across the three sources into a single indicator, the following formula was used:

$$TCI_k = w_t \cdot T_k + w_i \cdot I_k + w_p \cdot P_k \quad (1)$$

where T_k , I_k , P_k denote the share of manifestation of dimension k in the theoretical, international-institutional, and strategic-normative sources, respectively (normalised from 0 to 1), and w_t , w_i , w_p are the corresponding weighting coefficients. Following the approach of Stiglitz, Sen, and Fitoussi (2009), the weighting coefficients were adopted in line with the academic character of the study as follows:

$$w_t = 0.40; \quad w_i = 0.35; \quad w_p = 0.25 \quad (2)$$

The weighting logic is as follows. Theoretical convergence ($w_t = 0.40$) carries the highest share, since a study, as a scientific product, is determined first and foremost by the degree of its theoretical grounding. International-institutional convergence ($w_i = 0.35$) ensures the international comparability and universality of the results. Strategic-normative convergence ($w_p = 0.25$) carries a relatively lower weight, as it reflects political and regulatory priorities and is variable over time.

The priority thresholds in the selection of dimensions were determined by the TCI_k values: $TCI_k \geq 0.40$ — strong inclusion; $0.30 \leq TCI_k < 0.40$ — basic inclusion; $0.25 \leq TCI_k < 0.30$ — conditional inclusion; $TCI_k < 0.25$ — exclusion (the dimension is considered at the level of an indicator rather than as an independent measure). A general inclusion condition of $TCI_k \geq 0.25$ was adopted for incorporating a dimension into the assessment system. This threshold ensures a balance between scientific validity and practical applicability.

The initial data for the indicators are collected through the unified information-analytical system (SIAT) of the Statistics Agency of the Republic of Uzbekistan, across 14 administrative regions — the Republic of Karakalpakstan, 12 provinces, and the city of Tashkent. To make indicators expressed in different units of measurement comparable, the Min–Max normalisation method is applied, bringing all values into the range from 0 to 1; negatively oriented indicators are recalculated using an inverse scale ($1 - X$).

4. Analysis and Results

The results of the calculations based on the triangulation-grounded convergence index are summarised in Table 1 for the 29 candidate dimensions of stratification, in the form of the convergence components and the final index values.

Table 1: TCI calculation for the 29 candidate dimensions (in descending order of TCI)

No.	Candidate dimension	T (/30)	I (/11)	P (/6)	TCI	Category
1	Education and human capital	8/30	9/11	4/6	0.560	Strong inclusion
2	Income and wealth	7/30	8/11	4/6	0.515	Strong inclusion
3	Population health	4/30	8/11	4/6	0.475	Strong inclusion
4	Labour market and employment	7/30	5/11	4/6	0.419	Strong inclusion
5	Housing and living conditions	2/30	6/11	3/6	0.343	Basic inclusion
6	Regional infrastructure	4/30	5/11	3/6	0.337	Basic inclusion
7	Poverty and social deprivation	5/30	3/11	4/6	0.329	Basic inclusion
8	Institutional quality and governance	3/30	5/11	3/6	0.324	Basic inclusion
9	Environment and ecology	2/30	4/11	3/6	0.279	Conditional inclusion
10	Intergenerational social mobility	6/30	1/11	4/6	0.278	Conditional inclusion
11	Safety and crime	1/30	4/11	3/6	0.266	Conditional inclusion
12	Digital infrastructure	2/30	2/11	4/6	0.257	Conditional inclusion
13	Civic activism and political participation	3/30	3/11	2/6	0.219	Exclusion
14	Innovation and scientific potential	1/30	2/11	3/6	0.202	Exclusion
15	Quality of public services	1/30	2/11	3/6	0.202	Exclusion

No.	Candidate dimension	T (/30)	I (/11)	P (/6)	TCI	Category
16	Social protection and guarantees	1/30	1/11	3/6	0.170	Exclusion
17	Human rights and justice	2/30	1/11	2/6	0.142	Exclusion
18	Gender stratification	1/30	1/11	2/6	0.128	Exclusion
19	Cultural heritage	1/30	1/11	2/6	0.128	Exclusion
20	Mahalla and community development	0/30	0/11	3/6	0.125	Exclusion
21	Social relations	2/30	3/11	0/6	0.122	Exclusion
22	Food and sanitation	1/30	2/11	1/6	0.119	Exclusion
23	Migration processes	2/30	0/11	2/6	0.110	Exclusion
24	Green economy and climate	2/30	0/11	2/6	0.110	Exclusion
25	Youth policy	0/30	0/11	2/6	0.083	Exclusion
26	Rural development	0/30	0/11	2/6	0.083	Exclusion
27	Subjective well-being	1/30	2/11	0/6	0.077	Exclusion
28	Family stability	2/30	1/11	0/6	0.058	Exclusion
29	Residential segregation	2/30	1/11	0/6	0.058	Exclusion

Source: author's calculations based on the TCI methodology.

The results in Table 1 made it possible to establish the hierarchical structure of dimensions according to the triangulation-grounded convergence index. Under the general inclusion condition ($TCI_k \geq 0.25$), a total of 12 priority dimensions were identified and distributed into three categories according to their degree of convergence.

The first category — strong inclusion ($TCI_k \geq 0.40$): education and human capital (0.560), income and wealth (0.515), population health (0.475), and labour market and employment (0.419). These four dimensions are assessed independently and stably across the three sources and constitute the baseline axis of the integral index.

The second category — basic inclusion ($0.30 \leq TCI_k < 0.40$): housing and living conditions (0.343), regional infrastructure (0.337), poverty and social deprivation (0.329), and institutional quality and governance (0.324). These dimensions exhibit stable convergence across at least two sources and constitute the core components of the assessment system.

The third category — conditional inclusion ($0.25 \leq TCI_k < 0.30$): environment and ecology (0.279), intergenerational social mobility (0.278), safety and crime (0.266), and digital infrastructure (0.257). Although these dimensions are conceptually significant, they do not exhibit full convergence across all three sources; accordingly, they are taken into account within the existing categories as proxy indicators or as modules to be expanded in the future.

For the remaining 17 dimensions, the condition $TCI_k < 0.25$ was observed. It is appropriate to reflect this group not as independent measures but as individual indicators within the existing dimensions. For example, gender stratification (0.128) is partly captured within the labour and education dimensions, food and sanitation (0.119) within the poverty dimension, and the mahalla institution (0.125) through the indicators of living conditions and infrastructure.

In implementing the 12 priority dimensions identified by means of the TCI methodology, they must be monitored in the state statistics system in a regular, reliable, and inter-regionally comparable manner. The priority dimensions were therefore consolidated into seven operational categories on the basis of the capabilities of SIAT (Table 2).

Table 2 : Consolidation of the TCI priority dimensions into operational categories

Priority dimension (by TCI)	TCI	Operational category
Education and human capital	0.560	Education
Income and wealth	0.515	Economic
Population health	0.475	Health care
Labour market and employment	0.419	Labour market
Housing and living conditions	0.343	Social
Poverty and social deprivation	0.329	Social
Regional infrastructure	0.337	Infrastructural
Digital infrastructure	0.257	Infrastructural
Intergenerational mobility / migration (proxy)	0.278	Demographic
Institutional quality, environment, safety	0.324–0.266	Expandable modules (proxy)

Source: author's elaboration (based on the TCI results and the SIAT database).

In the consolidation process, the principle of substantive proximity was observed. The income and wealth dimension forms the economic category; education and health respectively form the education and health-care categories; and labour market and employment forms the labour-market category. The housing, living-conditions, and poverty dimensions were combined within the social category. Regional and digital infrastructure were merged into a single infrastructural category, since digital infrastructure is, in substance,

the modern component of regional infrastructure. The demographic category reflects intergenerational mobility and migration processes through proxy indicators. The institutional-quality, environment, and safety dimensions, which have a relatively lower degree of convergence, were designated as modules of the system to be expanded in the future, since they are not fully covered by region in official statistics.

Thus, on the basis of the results of the TCI methodology, a final system of indicators comprising seven operational categories for assessing the level of socio-economic stratification of regions was formed. Each category was operationalised through a set of specific indicators measured regularly by region (Table 3).

Table 3 : Categorical system of indicators for assessing regional socio-economic stratification

No.	Category	Key indicators	Direction of effect
1	Economic	Average income per capita; average monthly wage; GRP per capita; investment per capita; trade turnover per capita; investment in fixed capital	Positive
2	Social	Poverty rate; housing stock; housing area per capita; services provided per capita	Mixed
3	Infrastructural	Gas supply coverage; internet penetration; water supply coverage; electricity consumption	Positive
4	Labour market	Employment rate; unemployment rate; economic activity rate	Mixed
5	Health care	Physicians per 10,000 population; hospital beds per 10,000 population; number of medical personnel	Positive
6	Education	Students per 10,000 population; number of schools; number of teachers	Positive
7	Demographic	Share of urban population; population density; birth rate	Mixed

Source: author's elaboration based on the HUDUD digital monitoring platform and the SIAT database.

The indicators presented in Table 3 are divided, by direction of effect, into positive and negative types. For positive indicators, a higher value indicates a higher level of development (for example, income, employment, gas and internet coverage, and the number of physicians), whereas for negative indicators, conversely, a lower value indicates a favourable situation (for example, the unemployment and poverty rates). This distinction is necessary in the subsequent normalisation stage in order to bring the indicators to a common scale, with negative indicators recalculated using an inverse scale ($1 - X$).

On the basis of the normalised indicators, inequality is measured by category and by region, and a unified stratification index (USI) is formed. The methodology for computing from categorical indicators to the

integral index — including the inequality indices (Gini, the coefficient of variation, Theil, and Atkinson) and their weighting mechanism — will be elaborated in detail in subsequent research.

5. Conclusion

The study resulted in the development of a methodology for the objective selection of indicators for assessing the level of socio-economic stratification of regions. The approach based on the TCI methodology frees indicator selection from subjective judgement and transforms it into an objective, reproducible scientific process grounded in the convergence of theoretical, international-institutional, and strategic-normative sources.

By means of the methodology, 12 of the 29 candidate dimensions were identified as priorities and, following the principle of substantive proximity, consolidated into seven operational categories — economic, social, infrastructural, labour market, health care, education, and demographic. Each category was provided with specific indicators measured regularly via SIAT, which guarantees that the data are drawn from an official source, are continuous, and are inter-regionally comparable.

The principal scientific significance of the proposed methodology lies in its application of the triangulation principle at the indicator-selection stage, which ensures the reproducibility and transparency of the results. In practical terms, the categorical indicator system thus formed constitutes a robust scientific and methodological foundation for the digital monitoring of the socio-economic situation of regions and for computing the unified stratification index. A direction for further research is identified as the development of the methodology for computing from categorical indicators to the integral index and of the weighting mechanism for the inequality indices.

References

- Atkinson, A. B. (1970). *On the measurement of inequality*. *Journal of Economic Theory*, 2(3), 244–263.
- Denzin, N. K. (1978). *The Research Act: A Theoretical Introduction to Sociological Methods*. New York: McGraw-Hill.
- Nardo, M., Saisana, M., Saltelli, A., Tarantola, S., Hoffmann, A., & Giovannini, E. (2008). *Handbook on Constructing Composite Indicators: Methodology and User Guide*. Paris: OECD Publishing & Joint Research Centre.
- Saltelli, A. (2007). *Composite indicators between analysis and advocacy*. *Social Indicators Research*, 81(1), 65–77.
- Sen, A. (1999). *Development as Freedom*. Oxford: Oxford University Press.
- Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2009). *Report by the Commission on the Measurement of Economic Performance and Social Progress*. Paris.
- Theil, H. (1967). *Economics and Information Theory*. Amsterdam: North-Holland.
- UNDP (2020). *Human Development Report 2020: The Next Frontier — Human Development and the Anthropocene*. New York: United Nations Development Programme.
- Williamson, J. G. (1965). *Regional inequality and the process of national development: A description of the patterns*. *Economic Development and Cultural Change*, 13(4), 1–84.

MODEL FOR DEVELOPING THE PROCESS OF POVERTY REDUCTION IN THE REGION BASED ON INVESTMENT AND ECONOMIC FACTORS

Saparov Ismat Chorshanbiyevich¹

ABSTRACT

This article analyzes the issues of developing the process of poverty reduction in the region based on investment and economic factors. The aim of the study is to identify opportunities to reduce poverty levels through the efficient allocation of investments in regional development, increasing employment, and ensuring income stability. The research employs a systematic approach, economic analysis, comparative methods, and generalization techniques. The findings indicate that enhancing investment activity, developing infrastructure, supporting small businesses, and investing in human capital are key factors in reducing poverty. In addition, the author proposes a development model based on investment and economic factors, taking into account regional characteristics. This model contributes to ensuring socio-economic stability and reducing poverty in the regions.

Keywords: Poverty, Regional Development, Investments, Economic Growth, Employment, Income Level, Human Capital, Social Policy.

Introduction.

In the current global economic environment, the issue of poverty reduction is considered not only a social concern but also a key factor in ensuring economic stability. International experience shows that high levels of poverty negatively affect economic growth and intensify social inequality within society [1]. Therefore, the effective use of investment and economic factors in regional development to increase household incomes and expand employment has become an urgent task.

In Uzbekistan, poverty reduction is also one of the priority directions of state policy. In particular, large-scale reforms are being implemented to improve the welfare of the population through economic modernization, job creation, and the attraction of investments to regions. In this process, it is essential to fully utilize the economic potential of regions, develop infrastructure, and support entrepreneurship.

Scientific literature presents various theoretical approaches to poverty reduction, most of which emphasize its close relationship with economic growth, investment, and human capital development [3]. In particular, increased investment contributes to poverty reduction by expanding production capacity, creating new jobs, and improving income levels [4]. At the same time, investments in human capital play a crucial role in ensuring long-term sustainable development.

The relevance of this study lies in the fact that it examines the theoretical and practical aspects of developing the process of poverty reduction in regions based on investment and economic factors and proposes an author's model. This approach contributes to enhancing the effectiveness of regional development and improving the living standards of the population.

¹ Lecturer, Department of Economics, Termiz University of Economics and Service

Literature Review.

The issue of poverty reduction has been widely studied in economic literature, leading to the formation of various theoretical and practical approaches. Amartya Sen, in his capability approach, explains poverty not only as a lack of income but also as a deprivation of individuals' capabilities and freedoms. According to him, investments in education, healthcare, and social infrastructure play a decisive role in reducing poverty [5].

Jeffrey D. Sachs, within the framework of sustainable development theory, considers poverty reduction as a key task in the global economic system. He argues that increasing investments, improving infrastructure, and strengthening public policy in developing regions can significantly reduce poverty [6].

Similarly, Michael P. Todaro emphasizes the close relationship between investment and economic growth in development theory. He notes that the inclusive nature of economic growth—ensuring that its benefits reach broad segments of the population—is a fundamental condition for poverty reduction [7].

Furthermore, empirical studies conducted by Esther Duflo and Abhijit Banerjee demonstrate the effectiveness of microeconomic approaches in combating poverty. Their research shows that supporting small businesses, expanding financial inclusion, and implementing targeted social programs can increase household incomes and alleviate poverty [8].

Local studies also highlight that poverty reduction is closely linked to regional development, investment attraction, and employment growth. In Uzbekistan, comprehensive measures aimed at reducing poverty are being developed and implemented within the framework of ongoing economic reforms [9].

Research Methodology.

This study employs a systematic and comprehensive approach to examine the development of the poverty reduction process in regions based on investment and economic factors. The analysis is based on statistical data, regional indicators, and scientific literature, using methods such as economic analysis and comparison. In addition, logical generalization and grouping techniques are applied to identify the relationships between investments, employment, and income levels. Analytical evaluation and expert judgment are also used to substantiate the research findings. This methodological framework enables an in-depth analysis of regional development processes and supports the development of an effective model.

Analysis and Results.

The analysis of the process of poverty reduction in regions based on investment and economic factors requires, first of all, identifying the interrelationships between the level of regional economic development, the volume of investments, employment indicators, and household incomes. Empirical observations show that an increase in investment volume directly contributes to the expansion of production activities, the creation of new jobs, and, consequently, the growth of household incomes. This, in turn, leads to a reduction in poverty levels.

In recent years, economic reforms implemented across the regions of Uzbekistan have been aimed at reducing poverty, particularly through the activation of investment policy, support for small businesses and private entrepreneurship, and the development of infrastructure. From this perspective, it is important to determine the impact of investment and economic factors on poverty reduction through their comprehensive assessment.

The results of the analysis indicate that the effective allocation of investments in regions contributes to poverty reduction through the following key directions:

- Expansion of production and service sectors;
- Creation of new jobs;
- Improvement of infrastructure;
- Development of human capital.

Below is a hypothetical table illustrating the impact of investment and economic factors on the level of poverty (Table 1).

Table 1 : The Impact of Investment and Economic Factors on the Poverty Level

Indicators	2021	2022	2023	2024
Investment volume (billion UZS)	1200	1450	1700	2100
Employment rate (%)	68	70	73	75
Average income (thousand UZS)	1500	1800	2200	2600
Poverty rate (%)	17	15	13	11

Source: Developed by the author

The table data show that as the volume of investments has increased year by year, the employment rate has also risen. In particular, between 2021 and 2024, the volume of investments grew from 1,200 billion UZS to 2,100 billion UZS, which led to an increase in the employment rate from 68% to 75%. At the same time, the average income of the population has increased significantly. Most importantly, the poverty rate declined from 17% to 11%. This confirms that investment activity and economic factors play a crucial role in reducing poverty.

Furthermore, the observed trends indicate that investment-driven growth has a multiplier effect on regional economies. Increased capital inflows stimulate business expansion, enhance productivity, and create new value chains, particularly in manufacturing and service sectors. As enterprises grow, demand for labor rises, which not only reduces unemployment but also improves job quality and wage levels. In addition, investments in infrastructure—such as transport networks, energy supply, and digital connectivity—reduce transaction costs and facilitate market access, thereby encouraging entrepreneurial activity.

Another important aspect is the role of human capital development in strengthening the impact of investments. Improved access to education and vocational training enables the workforce to adapt to changing economic conditions and benefit from new employment opportunities. Consequently, the combined effect of investment expansion, infrastructure development, and human capital enhancement creates a sustainable pathway for long-term poverty reduction and inclusive economic growth.

The analysis reveals that investments not only ensure economic growth but also strengthen social stability. In particular, the development of infrastructure in regions—such as improvements in roads,

electricity supply, water provision, and communication systems—contributes to the expansion of entrepreneurial activity. This, in turn, increases household incomes through the creation of new jobs.

Moreover, supporting small businesses and private entrepreneurship is one of the key instruments for reducing poverty. As a result of simplifying the lending system, providing tax incentives, and offering state financial support, the number of business entities has been increasing. This leads to the expansion of the economically active population.

Investments directed toward human capital are also of particular importance. The development of education and vocational training systems enhances the skills of the population, creating opportunities for employment in higher-income jobs. As a result, the level of poverty decreases.

Based on the research findings, an investment and economic model for poverty reduction in regions has been developed. This model consists of the following key elements:

- Attraction of investments;
- Expansion of economic activity;
- Increase in employment;
- Growth of incomes;
- Reduction of poverty.

The following figure presents a model for developing the process of poverty reduction in the region based on investment and economic factors (Figure 1).

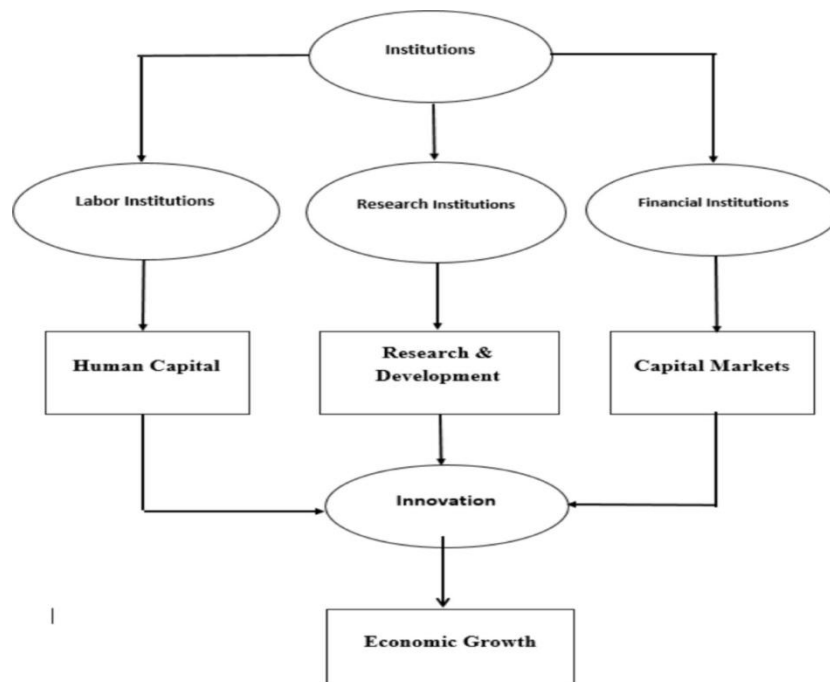


Figure 1. Model for Developing the Process of Poverty Reduction in the Region Based on Investment and Economic Factors

Source: Developed by the author

This figure illustrates the process of poverty reduction in a region through institutional and investment-economic factors. At the top of the model, the “Institutions” block is presented, which is divided into three main components: labor institutions, research institutions, and financial institutions. Labor institutions contribute to the development of human capital by enhancing skills and employment opportunities. Research institutions promote research and development (R&D), leading to the creation of new knowledge and technologies. Financial institutions support the development of capital markets and ensure the efficient allocation of investment resources. These three components are interconnected and collectively drive the process of innovation. Innovation acts as a key driver of economic growth by increasing production capacity and creating new opportunities. Ultimately, economic growth leads to poverty reduction by improving income levels and employment conditions.

Conclusion and Practical Recommendations.

Mazkur tadqiqot natijalari mintaqada kambag'allikni qisqartirishda investitsion-iqtisodiy omillar muhim rol o'ynashini tasdiqlaydi. Investitsiyalar hajmining ortishi iqtisodiy faollikni kengaytirib, bandlik darajasini oshiradi hamda aholi daromadlarining barqaror o'sishini ta'minlaydi. Shuningdek, infratuzilmani rivojlantirish, kichik biznesni qo'llab-quvvatlash va inson kapitaliga sarmoya kiritish kambag'allikni kamaytirishda asosiy omillar sifatida namoyon bo'ladi. Taklif etilgan model institutsional va iqtisodiy jarayonlarning uzviy bog'liqligini aks ettirib, hududiy rivojlanish samaradorligini oshirishga xizmat qiladi. Ushbu yondashuvni amaliyotga joriy etish orqali ijtimoiy-iqtisodiy barqarorlikni ta'minlash va aholi farovonligini oshirish mumkin.

References

- Jeffrey D. Sachs (2015). *The Age of Sustainable Development*. Columbia University Press.
- Amartya Sen (1999). *Development as Freedom*. Oxford University Press.
- Todaro Michael P. (2020). *Economic Development*. Pearson Education.
- Amartya Sen (1999). *Development as Freedom*. Oxford University Press.
- Jeffrey D. Sachs (2015). *The Age of Sustainable Development*. Columbia University Press.
- Michael P. Todaro (2020). *Economic Development*. Pearson Education.
- Esther Duflo, Abhijit Banerjee (2019). *Poor Economics*. PublicAffairs.
- Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 “On the Development Strategy of New Uzbekistan for 2022–2026”.

IMPLEMENTING THE "SINGLE WINDOW" PRINCIPLE IN THE FREIGHT TRANSPORTATION CHAIN THROUGH THE DEVELOPMENT OF 4PL LOGISTICS PROVIDERS: THE EXPERIENCE OF UZBEKISTAN

Professor Javlonbek Sultonovich Fayzullayev¹

ABSTRACT

This article develops the theoretical and practical foundations for implementing a 4PL provider model within the freight logistics chain, using Uzbekistan Railways JSC as a case study. Based on an analysis of existing 1PL-5PL logistics systems, nine core challenges facing the sector in Uzbekistan are identified. A 4PL model is refined to coordinate all supply chain participants including raw material suppliers, processing enterprises, customs authorities, railway and road transport operators, warehousing services, and end consumers -under a single-window principle. The model's adoption in Uzbekistan Railways JSC's sectoral development programme has been officially confirmed, and it is substantiated that its implementation enables a 20 percent increase in the economic development level of the logistics system.

Keywords: 4PL Logistics, Supply Chain, One-Stop-Shop Principle, Railway Transport, Multimodal Integration, Situational Centre, Uzbekistan.

Introduction:

The global logistics system connects the volume of world trade, production chains, and consumer demand. According to the World Bank's Logistics Performance Index (LPI), countries with highly efficient logistics systems enjoy a 1% advantage in GDP growth [1]. Uzbekistan's Development Strategy for 2022–2026 sets the goals of increasing transit cargo volume to 15 million tons and expanding the use of the "Single Window" system as key national priorities [2].

To achieve these objectives, it is becoming increasingly evident that a transition from traditional freight transportation models to the Fourth Party Logistics (4PL) provider model is necessary. The 4PL model envisages integrated management of all participants in the supply chain—from raw material suppliers to the final consumer—through a single coordination center. This approach enables a 10–15% reduction in logistics costs while improving customer satisfaction.

The purpose of this article is to develop a 4PL provider model for the freight transportation logistics chain using the example of JSC "Uzbekiston Temir Yollari," to assess the conditions necessary for its implementation, and to propose a practical mechanism for its adoption.

"Analysis of literature on the topic"

The development history of logistics provider systems is a widely researched area. R. Ballou's logistics chain theory provided a theoretical foundation for 3PL and 4PL services [3]. M. Christopher defined the supply chain as a strategic element of competitiveness.

[[4] K. Sterligov conducted an in-depth study of risk management in logistics systems.

In the CIS experience, B. M. Anikin, V. Dybskaya, and A. Kirilova highlighted the economic foundations for the development of 3PL–4PL services [5]. Among Uzbek researchers, J. S. Fayzullaev emphasized the

¹ Doctor of Economics, Professor, Tashkent State University of Economics

importance of implementing logistics providers in the development of the railway transport system [6]. A. A. Zokhidov developed mechanisms for multimodal integration in Central Asian transit corridors [7].

However, a 4PL model adapted to the conditions of Uzbekistan—particularly a supply chain model that positions railway transport as a central element and operates on the basis of a “single window” principle—has rarely been developed as an independent study in the scientific literature. Addressing this gap represents the main contribution of this research.

Research methodology:

The research works of both national and international scholars engaged in analyzing the problems of transport system development served as the theoretical and methodological basis of this study. In preparing the article, abstract and analytical reasoning, comparative and factor analysis, indicative analysis, selective observation, comparison, economic-statistical methods, and other relevant approaches were applied.

Analysis and results

The modern logistics system consists of five stages of development, each differing in terms of the degree of decision-making autonomy of enterprises in organizing logistics processes and the level of outsourcing. Table 1 presents an analysis of these systems.

Table 1 : Content, characteristics, and importance of 1PL–5PL logistics providers for Uzbekistan

Model	Content	Main Features	Level of Development	Significance for Uzbekistan
1PL	The enterprise independently manages its logistics.	Full internal management; no external provider.	Initial	For small enterprises and the local market
2PL	A single function (transport or warehousing) is outsourced.	A single operation is assigned to an external provider.	Developing	Urrently widespread model
3PL	Outsourcing of several logistics operations.	Transport + warehousing + Distribution are integrated.	Existing in practice	Limited development; Shortage of logistics centers
4PL	Strategic management of the entire logistics chain	“Single window”; coordination of all providers; IT integration	Proposed	The optimal model for railway transport is the subject of this article.
5PL	Digital technology- and e-commerce-based logistics	AI, blockchain, IoT; global supply chains	Promising	Long-term strategic direction

Source: compiled by the author based on conducted resarch.

It can be seen from the table that Uzbekistan's logistics system is currently mainly at the 2PL–3PL stage. The transition to the 4PL model, which involves managing the entire supply chain through a single coordination center, is considered one of the most promising directions for increasing the competitiveness of railway transport.

As a result of the research, nine key problems hindering the implementation of a 4PL provider in Uzbekistan's transport and logistics system were identified. Table 2 systematizes these problems.

Table 2 : Problems Hindering the Development of 3PL/4PL in Uzbekistan and Proposed Solutions

№	Problem direction	Current negative impact	Proposed solution
1	Infrastructure shortage	Lack of modern logistics centers, international-Standard terminals, and multimodal hubs	Establishing multifunctional logistics hubs along transit Corridors; creating integrated railway–road terminals.
2	Financing problems	High investment risk and weak PPP mechanisms.	Establishing a “Railway Transformation Fund” based on state guarantees; attracting private investment through tax incentives.
3	Human resource training problems	Lack of qualified logistics specialists and internationally accredited educational programs.	Training logistics specialists through international cooperation; internship programs abroad.
4	Technological integration	Lack of GPS monitoring, automated warehouse systems, and IT platforms.	A unified digital platform for all logistics providers; blockchain-based document flow system.
5	High transportation costs.	Rising fuel prices, outdated vehicle fleet, and inefficient routes.	Procurement of energy-efficient vehicles; AI-based route optimization system.
6	Bureaucratic barriers.	Delays in customs clearance and excessive documentation.	Automated permits via e-government system; online “single window” platform. Real-time tracking via GPS trackers and mobile application; AI chatbot customer service.

№	Problem direction	Current negative impact	Proposed solution
7	Low service quality.	Lack of real-time cargo tracking; low customer awareness.	Real-time tracking via GPS trackers and mobile application; AI chatbot customer service.
8	Weak cooperation mechanism.	Low trust between transport companies and logistics providers.	Blockchain-based multi-party platform; automated data exchange.
9	Adaptation to environmental requirements.	Outdated vehicles and high carbon emissions.	“Green Transport Program”; incentives for electric and hybrid vehicles; environmental certification.

Source: compiled by the author based on conducted research.

Among these nine problems, the most critical are digital integration and infrastructure deficiencies, which can be effectively addressed by the 4PL model. The model enables a systematic solution to all issues through a single coordination center.

The proposed 4PL logistics provider model is adapted to the conditions of Uzbekistan and connects all participants of the supply chain through a unified coordination center. The model is based on the “One-Stop-Shop” principle.

Table : 3 4PL logistics provider – supply chain participants and their functions

№	Supply chain participant	Main function	Task under 4PL management	Efficiency of the “single window”.
1	Raw material and material suppliers	Timely delivery of raw materials via rail and road transport.	Order and planning through the 4PL situational center.	Reducing delivery delays by 30–40%.
2	Raw material processing enterprises	Production and transfer to warehouse.	Automatic coordination of production volume and logistics plan.	Reducing excess inventory by 20%.
3	Customs authorities	International cargo clearance.	Electronic document exchange; automated tariffs and permits	Reducing clearance time by 50–60%.

No	Supply chain participant	Main function	Task under 4PL management	Efficiency of the "single window".
4	Rail transport.	Long-distance and high-volume cargo transportation.	The 4PL system optimizes routes and tariffs in real time.	Increasing transit cargo volume by 15%
5	Road transport companies.	Door-to-door short-distance transportation.	4PL manages the multimodal supply chain; coordinated with rail transport.	Reduce multimodal costs by 12–18%.
6	3PL warehouse services.	Cargo storage, sorting, and packaging.	Optimize inventory levels and warehouse efficiency using AI.	Increase warehouse efficiency by 25%.
7	Final consumers.	Receiving goods and collecting information.	Real-time cargo tracking via mobile app; fast service.	Increase customer satisfaction index by 35%.

Source: compiled by the author based on conducted research.

- Single window — all logistics operations are managed through one central hub
- Just-in-Time (JIT) — transportation is planned according to Just-In-Time principles
- Door-to-door — cargo is continuously tracked from origin to final destination
- IT integration — all supply chain participants exchange real-time data
- Logistics partner alliance — 4PL coordinates all 3PL providers, rail and road operators
- Cost optimization — AI algorithms optimize routes, tariffs, and inventory levels

3. Investment Efficiency Evaluation: Economic Justification of the 4PL Model and Applied Formulas

1. Logistics Efficiency Evaluation Formula:

To evaluate the efficiency of a 4PL provider's intermodal logistics center, the following formula is used:

$$IL_{sam} = \frac{L_{hajmi} Q_{iv} + K_v + X_u \times Q_{ib}}{L_{hajmi}} = \frac{L_{hajmi}}{Q_{iv}} + \frac{K_v}{Q_{iv}} + \frac{X_u \times Q_{ib}}{Q_{iv} \times L_{hajmi}}$$

(1)

where:

- **IL_{sam}** — efficiency of the intermodal logistics center
- **L_{hajmi}** — transported cargo volume (t-km)
- **Q_{iv}** — inbound logistics costs

- **K_v** — outbound (departure) costs
- **X_u** — overall cost adjustment coefficient
- **Q_{ib}** — internal management costs

2. Dynamic Pricing Model:

A 4PL provider determines a flexible tariff according to market demand based on the following formula:

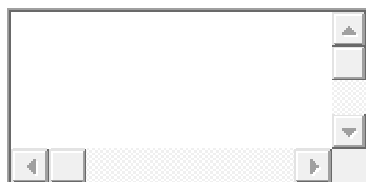
$$T_i = \alpha \times P_i + \beta T_{i-1}$$

(2)

where:

- **T_i** — optimal tariff for the *i*-th service
- **P_i** — current demand level
- **α** and **β** — coefficients depending on market factors

This dynamic pricing model can increase revenue by **15–25%** compared to traditional fixed pricing.



To determine the economic efficiency of investments in implementing the 4PL model:

$$ROI_{transport} = (Soffoyda + daromad) / Investitsiya hajmi \quad (3)$$

“Based on the data of **O‘zbekiston temir yo‘llari**, the cargo transport efficiency coefficient in 2023 was 1.82. Considering this, after the implementation of the 4PL model, this indicator is forecasted to increase to the range of **2.1–2.3**.”

4. Cost efficiency:

Main quantitative effects of implementing a 4PL provider:

Efficiency trend	Current state	After implementation of 4PL	Savings
Monitoring and control costs	100% business	85–90%	10–15% Reduction
Cargo distribution time	100% business	60–70%	30–40% Reduction
Excess warehouse inventory	100% business	75–80%	20–25% Decrease
Economic level of the logistics system	business	+20% Increase	Digital efficiency
Customer satisfaction index	business	+35% Increase	Service quality

Source: based on data from “Uzbekistan Railways” JSC and the author’s calculations.

Table 4 : 4-Stage Approach to 4PL Model Implementation

Stage	Duration	Key measures	Responsible entities	Expected outcome
1	Year 1 (Preparation)	System audit; preparation of technical requirements for a digital platform; signing MoUs with stakeholders (rail, road, warehousing).	O'zbekiston temir yo'llari, Ministry of Transport	Reliable data base; cooperation agreements.
2	Years 2–3 (Pilot)	4PL pilot project on the Tashkent–Samarkand corridor; launch of a situational center; IT platform testing.	4PL operator consortium, transport companies.	12% reduction in costs in the pilot corridor.
3	Years 4–5 (Expansion)	Expansion to all major corridors; AWS/IoT integration; tariff automation.	Private investors, PPP partners.	15% increase in transit volume.
4	Year 6+ (5PL Integration)	AI-based demand forecasting; blockchain document chain; integration into the international logistics network.	National and foreign IT companies.	ROI > 2.1; increase in Logistics Performance Index (LPI).

Source: compiled by the author based on conducted research.

The implementation of a 4PL provider is planned as a continuous four-stage process.

Experience of O'zbekiston temir yo'llari

- The developed 4PL logistics provider development model was officially adopted for use by **O'zbekiston temir yo'llari** in the "Action Plan for the Development of the Railway Transport System," approved on February 5, 2025 (reference No. 04/2881-20).
- Based on the program, the following quantitative results are planned: Ensuring the integration of all logistics companies involved in the supply chain.
- Increase the economic development level of the logistics system by 20%; Reduce monitoring and control costs of cargo tracking by 10–15%;

Ensure continuity of transport and distribution processes;
– Improve efficient utilization of the country's transit potential.

- These results confirm the adaptability and economic feasibility of the 4PL model in local conditions. In the first stage, the model is planned to be tested as a pilot project on the Tashkent–Samarkand and Tashkent–Navoi transport corridors.

Table 5 : International experience and distinguishing features of the Uzbekistan model

Criterion	DB Cargo (Germany)	CRRC (China)	Российские железные дороги (Russia)	O'zbekiston temir yo'llari (Uzbekistan, proposed model)
Integration level	Full 4PL	Full 4PL	Full 4PL	Partial → Full 4PL
IT platform	SAP TM (SAP Transportation Management)	Custom AI	ERP + IoT	New platform (proposal)
Basis for the proposal	Strong market competition	Government interest	Monopoly system	PPP + digitalization
Transit role	EU corridor hub	"Kammarbands" corridor	East–West transit	TRACECA + Central Asia corridor
Environmental criterion	Carbon neutral 2040	Green trains	Developing	"Green Transportation" Program
Social impact	3,000+ jobs	10,000+ jobs	5,000+ jobs	1,500+ jobs (pilot)

Source: compiled by the author based on conducted research.

4PL models are widely used in developed countries around the world. Table 5 provides a comparative analysis of foreign experience and the proposed Uzbek model.

Unlike the experience of Germany and China, the proposed 4PL model for Uzbekistan: (a) defines rail transport as the central coordinator—this allows for the full utilization of transit advantages within Central Asia and the TRACECA corridor; (b)

Incorporates financing through PPP (Public-Private Partnership) mechanisms tailored to local conditions; (c) integrates the "Green Transportation" component as a core system.

Conclusion and recommendations

This study developed the theoretical and methodological foundations for introducing a 4PL logistics provider model in the railway transport system of Uzbekistan. The main conclusions are as follows:

The analysis of 1PL–5PL shows that Uzbekistan is currently at the 2PL–3PL stage; the transition to 4PL is a necessary strategic step to fundamentally enhance competitiveness.

Nine key problems were identified—digital integration, infrastructure, human resources, and bureaucratic barriers—which are precisely the challenges that the 4PL model can address.

The proposed model coordinates 7 participants of the supply chain (from raw material suppliers to end consumers) based on a “one-stop window” principle.

Quantitative effects: costs are projected to decrease by 10–15%, distribution time to be reduced by 30–40%, and the ROI coefficient is expected to reach 2.1–2.3.

The model was officially approved by JSC “Uzbekistan Railways” on February 5, 2025 (No. 04/2881-20), and its implementation is confirmed to have the potential to increase the economic development level of the logistics system by 20%.

In the future, it is considered a promising direction to expand the 4PL model to intercountry routes in Central Asia and to gradually integrate 5PL elements (AI + blockchain).

References

- *World Bank Logistics Performance Index (LPI)*. – <https://lpi.worldbank.org>, 2023.
- *Decree of the President of the Republic of Uzbekistan No. PF–60 dated February 28, 2022 “On the Development Strategy of New Uzbekistan for 2022–2026”*. // www.lex.uz.
- *Ballou R.H. Business Logistics / Supply Chain Management: Planning, Organizing and Controlling the Supply Chain*. 5th ed. – Upper Saddle River: Pearson/Prentice Hall, 2004. – 816 p.
- *Christopher M. Logistics and Supply Chain Management: Creating Value-Adding Networks*. 4th ed. London: Prentice Hall, 2011. – 305 p.
- *Anikin B.A., Tyapukhin A.P. Commercial Logistics*. Moscow: TK Welby, Prospect, 2005. – 432 p.
- *Fayzullaev J.S. “Improving the methodology of economic development of railway transport system.” Doctor of Science (DSc) dissertation abstract*. Tashkent, 2022.
- *Zokhidov A.A. “Improving the mechanism of efficient management of the Central Asian transport system.” Doctor of Science (DSc) dissertation abstract*. Tashkent, 2018.
- *Deutsche Bahn AG – Annual Report 2023*.
- *“Uzbekistan Railways” JSC – Information reference No. 04/2881-20 dated February 5, 2025 on measures for the development of the railway transport system*.

ASSESSMENT OF ORGANIZATIONAL MANAGEMENT MECHANISMS IN HEALTHCARE INSTITUTIONS

Saidov Suxrob Shodmonovich¹

ABSTRACT

This article addresses the quantitative assessment of organizational management mechanisms within healthcare institutions. Drawing upon the core management concepts of "span of control" and "chain of command," a novel mathematical framework named the Information Transmission Efficiency Model is proposed to evaluate hierarchical structures and communication efficacy. The study comprehensively examines the management organizational frameworks of ten healthcare facilities in the Bukhara region, including branches of specialized medical centers, a sanatorium, and district medical associations. By calculating the Span of Control Optimality Index (\$C\$), the Average Signal Coefficient (\$\bar{K}\$), and the Logarithmic Management Index (\$L\$-index), the research reveals significant managerial signal attenuation (over 97% loss) before directives reach frontline executors due to excessive hierarchy depth. The developed methodology provides a robust, evidence-based analytical tool for restructuring and optimizing administrative communication and operational workflows in healthcare management.

KEYWORDS : Healthcare Management, Span of Control, Chain of Command, Hierarchical Structure, Information Transmission Efficiency, Logarithmic Management Index (\$L\$-Index), Signal Coefficient, Organizational Structure Optimization, Evidence-Based Management (EBMgt).

INTRODUCTION

In the context of contemporary global socio-economic transformations, healthcare systems are facing unprecedented challenges, including the growing burden of chronic non-communicable diseases, population aging, increasing patient expectations, and the need for digital transformation under conditions of stringent budgetary constraints. The effectiveness of addressing these challenges largely depends on the maturity of organizational management mechanisms that determine the allocation of resources, coordination of clinical activities, and strategic planning within healthcare institutions². Traditional approaches, which primarily focus on isolated quantitative indicators, are increasingly being replaced by comprehensive management models that examine the impact of organizational structure, organizational culture, and information systems on clinical outcomes and patient satisfaction. These models provide a more holistic understanding of healthcare performance and contribute to the development of sustainable and patient-centered healthcare systems³. The organizational environment of healthcare institutions is characterized by a high degree of complexity resulting from the necessity of interdisciplinary collaboration and continuous interactions between healthcare professionals and patients. Key organizational variables, including staffing levels, ownership structure, institutional size, and the nurse-to-bed ratio, exert a direct influence on the quality and safety of healthcare

¹ Independent Researcher, Bukhara State Technical University

²Van Houdt S, Heyrman J, Vanhaecht K, Sermeus W, De Lepeleire J. An in-depth analysis of theoretical frameworks for the study of care coordination. *Int J Integr Care*. 2013 Jun 27;13:e024. doi: 10.5334/ijic.1068. PMID: 23882171; PMCID: PMC3718267.

³<https://eurohealthobservatory.who.int/publications/i/health-systems-in-action-uzbekistan-2024>

services¹. Managerial determinants—such as organizational structure, organizational culture, team resources, administrative support, and well-established communication channels—constitute the foundation for minimizing operational costs and maximizing clinical effectiveness. The presence of clearly defined adaptation mechanisms enables healthcare organizations to effectively cope with both routine operational processes and external disruptions.

A particularly significant role in initiating organizational change is played by nursing leadership, specifically the Director of Nursing Administration (D/NA). Following the identification of a systemic need for modernization, nursing leadership traditionally focuses on three fundamental roles:

- Determining the specific behavioral patterns or organizational mechanisms that require modification (what to change);
- Identifying individuals or organizational units that need transformation (whom to change);
- Developing and implementing practical approaches for carrying out the change process (how to change).

Simultaneously, one of the most prominent trends in contemporary healthcare management is the transition toward Evidence-Based Management (EBMgt). This concept advocates administrative decision-making based on the conscious, explicit, and judicious use of the best available scientific evidence, internal organizational analytics, managerial expertise, and the values and preferences of key stakeholders.

Management theory highlights a fundamental distinction between medical and managerial research. While medical science is characterized by a high degree of convergence and rigorous methodological standardization, management theory remains diversified and divided between positivist and phenomenological perspectives. This divergence complicates the direct transfer of research models into the everyday practice of hospital managers. Consequently, administrators tend to rely primarily on internal organizational information when making decisions. Local data reflecting the specific characteristics of internal processes remain fully under managerial control, making them one of the most valuable resources for the operational optimization of organizational performance.

Furthermore, the advancement of information technologies and the implementation of electronic health records (EHRs) have significantly increased the accessibility of such information, enabling real-time quality monitoring and the flexible redistribution of workloads across healthcare settings².

The primary objective of the healthcare reforms being implemented in our country is to enhance the quality of medical services provided to the population. To achieve this goal, hospitals and outpatient clinics are being equipped with modern medical technologies and advanced diagnostic equipment, while the pharmaceutical supply system is being strengthened to ensure the timely availability of essential medicines and medical products for patients.

¹https://www.researchgate.net/publication/343962912_TOWARD_ORGANIZATIONAL_EVIDENCE-BASED_MANAGEMENT_IN_HEALTHCARE_ORGANIZATIONS

²Subburaman, G.-B. B., Gupta, S., Ravilla, T., Mertens, H., Webers, C. A. B., Biggelaar, F. J. H. M. v. d., Zuilen, M. v., Sundar, B., & Merode, F. v. (2025). Evaluating the Adoption of Evidence-Based Management Practices in Eye Hospitals. *Healthcare*, 13(3), 222. <https://doi.org/10.3390/healthcare13030222>

At the same time, considerable attention is being devoted to the education, training, and professional development of qualified physicians and healthcare personnel. Over the years, the healthcare system of Uzbekistan has evolved through the integration of international best practices and national characteristics, enabling the formation of a healthcare model that continues to improve and adapt to contemporary healthcare challenges. As a result, ongoing reforms are contributing to the enhancement of healthcare quality, accessibility, and efficiency throughout the country.

LITERATURE REVIEW

In the modern healthcare system, the scientific analysis and optimization of organizational management structures have become increasingly important. This is primarily because the effectiveness of a healthcare institution largely depends on how rapidly and accurately managerial decisions are communicated to those responsible for their implementation. From this perspective, maintaining a balance between two fundamental concepts of management theory—span of control and chain of command—emerges as a critical determinant of organizational performance.

The renowned Canadian management theorist and organizational scholar Elliott Jaques, in his seminal work *Requisite Organization* (1997), sought to identify the optimal relationship between managerial depth and managerial width within organizations. According to Jaques, every organization should adopt a hierarchical structure that corresponds to its level of complexity. He argued that the most effective organizational structures are those in which the decision-making authority of managers at each level is clearly defined and fully aligned with their responsibilities (Jaques, 1997). This principle is particularly important in healthcare institutions, where physicians and nurses must reconcile their professional responsibilities with managerial obligations¹.

The concept of span of control constitutes one of the central categories of management theory. The French engineer and management theorist Henri Fayol (1841–1925), who first introduced this concept into scientific discourse, argued in his work *Industrial and General Administration* (1916) that a manager should directly supervise no more than five to six subordinates (Fayol, 1949). Fayol's proposition was subsequently discussed and further developed by numerous scholars. In the influential volume *Papers on the Science of Administration* (1937), Luther Gulick and Lyndall Urwick formally institutionalized the term “span of control,” recognizing it as one of the key determinants of organizational effectiveness².

During subsequent decades, the issue of managerial span was examined from various theoretical perspectives. For example, the American management scholar Robert Simons (1995), in his influential work *Levers of Control*, proposed distinguishing between the concepts of “control span” and “accountability span.” According to Simons, the issue extends beyond the mere number of subordinates reporting to a manager; rather, it encompasses the reliability of information flows, the appropriate distribution of authority, and the clarity of accountability mechanisms. This observation is particularly relevant in healthcare institutions,

¹Jaques, E. (1997). *Requisite organization: A total system for effective managerial organization and managerial leadership for the 21st century* (Rev. 2nd ed.). Cason Hall & Co Publishers. 135-147p.

²Gulick, L. (1937). Notes on the theory of organization. In L. Gulick & L. Urwick (Eds.), *Papers on the science of administration* (pp. 1–45). Institute of Public Administration, Columbia University.

where managerial directives and decisions may directly affect patients' health and, in some cases, their lives¹.

A contemporary integrative review conducted by Boned-Galán, López-Ibort, and Gascón-Catalán (2023), which analyzed 21 scientific studies, demonstrated that an effective span of control for nurse managers ranges between four and eight subordinates. The study found that when the span exceeded twelve employees, managers experienced higher levels of burnout, staff turnover intentions increased, and the quality of patient care declined. Furthermore, a contemporary analysis conducted by the consulting firm SullivanCotter indicated that the average span of control in the healthcare sector is structured as follows: on average, each manager supervises 2.7 leaders, each leader coordinates the activities of approximately 4.2 direct reports, and at the operational level, the span broadens considerably, with each supervisor overseeing an average of 14.4 individual employees.

Among Uzbek scholars, M. Bayzaqov and Y. Allayorov (2005), in their textbook *Management and Marketing in Medicine*, analyzed management challenges within the healthcare system and concluded that the excessive number of hierarchical levels in multidisciplinary medical centers slows decision-making processes and negatively affects the quality of patient care. At the same time, the authors emphasized the absence of a precise methodology for quantitatively assessing managerial span in healthcare organizations and highlighted the need for further scientific research in this area².

The significance of the present dissertation lies precisely in addressing this research gap. Although numerous studies have investigated span-of-control issues within industrial enterprises and business organizations, comparable models for healthcare institutions remain largely underdeveloped. The distinctive characteristic of healthcare organizations is that frontline professionals—physicians and nurses—not only implement managerial directives but also make independent decisions based on their professional knowledge, expertise, and clinical judgment. Consequently, assessing the span of control in healthcare institutions requires a more sophisticated approach than the application of simple arithmetic indicators.

RESEARCH METHODS

Based on the literature reviewed above, the present study establishes the optimal span of control for healthcare institutions as follows:

- Lower- and middle-level managers (department heads, senior nurses): 4 to 8 subordinates (based on Boned-Galán et al., 2023; Fayol, 1949);
- Senior managers (deputy directors): 3 to 6 subordinates (based on Fayol, 1949; SullivanCotter, 2024);
- Chief executives (hospital directors/chief physicians): 5 to 7 subordinates (based on Fayol, 1949; SullivanCotter, 2024).

¹Simons, R. *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Boston: Harvard Business School Press, 1995. 3-45 pages.

²M.Bayzaqov, Y.Allayorov “Tibbiyotdamenejmentva marketing”: Darslik. — T.: „O'qituvchi“. NMIU, 2005 — 128 b. I. Muallifdosh. BBK 65.

Each manager (e.g., chief physician, department head, senior nurse, or other supervisory personnel) has a number of direct subordinates. This number is denoted by n . Based on the analysis of the relevant literature, the optimal range is defined as follows:

- Minimum optimal value: $n_{\min} = 4$;
- Maximum optimal value: $n_{\max} = 8$;
- If $n < 4$, the span of control is considered narrow, resulting in a longer chain of command, slower transmission of information, and stronger supervisory control;
- If $n > 8$, the span of control is considered wide, increasing managerial workload and reducing the effectiveness of supervision;
- If $4 \leq n \leq 8$, the span of control is considered optimal.

To assess the extent to which the actual number of direct subordinates (n_i) approaches the optimal interval, a normalized coefficient ranging from 0 to 1 is employed. In this study, a simplified triangular membership function is used, as it does not require logarithmic transformations and is convenient for practical calculations.

$$O_i = \begin{cases} \frac{n_i}{4}, & \text{if } n_i < 4 \\ 1, & \text{if } 4 \leq n_i \leq 8 \\ \frac{8}{n_i}, & \text{if } n_i > 8 \end{cases} \quad (1)$$

For example, if $n_i = 2$, then $O_i = 0.50$, indicating a narrow span of control and a partially optimal organizational structure. If $n_i = 6$, then $O_i = 1.00$, representing the optimal span of control. Conversely, if $n_i = 12$, then $O_i = 8/12 \approx 0.67$, indicating an excessively wide span of control and a structure that deviates from the optimal range.

If the institution has a total of M managers, the overall average Span of Control Optimality Index (C) is calculated as follows:

$$C = \frac{1}{M} \sum_{i=1}^M O_i \quad (2)$$

Here, M denotes the total number of managers within the healthcare institution, ranging from the chief physician to the lowest-level unit supervisors. The value C represents an index bounded within the interval $[0; 1]$, where values closer to 1 indicate a more optimal command chain and a higher degree of organizational efficiency.

The following evaluation criteria are based on the recommendations of Boned-Galán et al. (2023) and SullivanCotter (2024):

Table 1 : Interpretation of C Values

No	C value range	Rating	Interpretation
1	$C \geq 0.85$	Excellent	The number of subordinates for nearly all managers falls within the optimal range (4–8).
2	$0.70 \leq C < 0.85$	Good	Minor deviations are observed in some managers, but the structure remains stable.

3	$0.50 \leq C < 0.70$	Moderate	A considerable number of managers deviate from the optimal range; structural revision is recommended.
4	$0.30 \leq C < 0.50$	Low	Most managers operate outside the optimal span; the command chain is inefficient.
5	$C < 0.30$	Poor	A fundamental restructuring of the organizational system is required.

This methodology enables a quantitative assessment of the efficiency of organizational structures in healthcare institutions. The C indicator reflects the extent to which the ratio between managers and subordinates corresponds to the optimal level. As a result, it allows for the evaluation of whether managerial levels are excessive or insufficient, as well as the overall effectiveness of the organizational structure.

Furthermore, this indicator serves as an important analytical tool for comparing organizational structures across different healthcare institutions and for supporting evidence-based managerial decision-making aimed at improving organizational efficiency. Deviations of the C value from the normative range indicate an imbalance in managerial workload distribution and signal the need for structural optimization. To demonstrate the practical applicability of this approach, calculations based on data from selected healthcare institutions are presented below.

RESULTS AND DISCUSSION

To demonstrate the practical applicability of this approach, calculations based on data from selected healthcare institutions are presented below. The organizational structures of the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Dermatology and Venereology, the Bukhara Sanatorium, the Bukhara District Medical Association, the Bukhara Regional Scientific and Practical Center for Mental Health, the Bukhara Regional Endocrinology Dispensary, and the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center of Cardiology were examined in this study.

A detailed analysis was conducted of their management structures, including managerial hierarchies, the number of managers at different organizational levels, and the number of employees directly supervised by each manager. Based on these data, the C Values (Span of Control Optimality Index) were calculated for each institution to assess the extent to which their managerial structures conform to the recommended span-of-control standards.

The results of the analysis provide an objective basis for evaluating the effectiveness of organizational management arrangements, identifying potential structural imbalances, and determining areas where organizational optimization may be required. Furthermore, the calculated C Values enable comparative assessment across healthcare institutions and support evidence-based recommendations aimed at improving managerial efficiency and organizational performance. According to the results of the analysis, the C coefficient calculated for the managerial positions within the organizational structure of the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Dermatology and Venereology was **0.442**. This value falls within the “**Low**” category ($0.30 \leq C < 0.50$), indicating that the span of control within the management system is below the optimal level. Such a result suggests either a relatively high degree of managerial centralization or an insufficient number of direct subordinates assigned to managerial positions.

Consequently, the organizational structure may not be utilizing managerial resources efficiently and may require further optimization.

The individual optimality coefficients for the managerial positions were calculated as follows:

$$O_i = 1,000 + 0,471 + 0,200 + 0,500 + 0,500 + 0,421 = 3,092.$$

Considering that the total number of managers within the institution was $M = 7$, the overall organizational optimality coefficient was determined using the following formula: $C = 3,092/7 = 0,442$

The obtained value of $C = 0.442$ corresponds to the “**Low**” category ($0.30 \leq C < 0.50$). This finding indicates that a considerable proportion of managerial positions operate outside the recommended span-of-control range, resulting in a less efficient command structure. Therefore, a review of managerial responsibilities, reporting relationships, and organizational hierarchy may be warranted to improve managerial effectiveness and organizational performance.

According to the results of the analysis, the C coefficient calculated for the organizational structure of the Bukhara Sanatorium was **0.894**. This value indicates a high degree of conformity between the actual span of control and the recommended managerial standards.

The individual managerial optimality coefficients were calculated as follows:

$$O_i = 1,000 + 0,471 + 1,000 + 1,000 + 1,000 = 4,471.$$

Considering that the total number of managers included in the analysis was $M = 5$, the overall organizational optimality coefficient was calculated as: $C = 4,471/5 = 0,894$. The obtained value of $C = 0.894$ corresponds to the “**Excellent**” category ($C \geq 0.85$). This result indicates that the spans of control for the majority of managerial positions are within the recommended optimal range. Therefore, the organizational structure of the Bukhara Sanatorium demonstrates a high level of managerial efficiency, effective coordination, and an appropriate distribution of supervisory responsibilities.

According to the results of the analysis, the C coefficient calculated for the organizational structure of the Bukhara District Medical Association was 0.334. This value falls within the “**Low**” category ($0.30 \leq C < 0.50$), indicating that the relationship between managerial positions and the number of their direct subordinates is inadequately balanced.

The individual managerial optimality coefficients were calculated as follows:

$$O_i = 0,320 + 0,133 + 0,216 + 0,000 + 1,000 = 1,669$$

Considering that the total number of managers included in the analysis was $M = 5$, the overall organizational optimality coefficient was determined as: $C = 1,669 / 5 = 0,334$.

The obtained value of $C = 0.334$ corresponds to the “**Low**” category ($0.30 \leq C < 0.50$). This finding suggests that the existing span of control within the organization deviates considerably from the recommended optimal range. In particular, certain managerial positions exhibit extremely low optimality scores, including one position with an O_i value of zero, indicating either a very limited number of direct subordinates or an imbalance in the allocation of managerial responsibilities.

From an organizational perspective, such a low span-of-control index may reflect underutilization of managerial capacity, an uneven distribution of supervisory workload, or unclear delineation of managerial functions. Consequently, the findings indicate a need to review the organizational hierarchy, reassess

reporting relationships, and optimize the distribution of managerial responsibilities in order to enhance administrative efficiency and organizational performance.

According to the results of the analysis, the C coefficient calculated for the organizational structure of the Bukhara Regional Scientific and Practical Center for Mental Health was **0.895**. This value falls within the “**Excellent**” category ($C \geq 0.85$), indicating that the span-of-control ratio between managerial positions and their direct subordinates is highly balanced and closely aligned with the recommended optimal standards.

Such a result suggests that the institution has established an effective management structure in which supervisory responsibilities are distributed appropriately across different hierarchical levels. The high value of the C coefficient indicates that managerial workloads are maintained within an optimal range, thereby facilitating efficient communication, effective coordination, and timely decision-making.

From an organizational perspective, this finding reflects a well-designed hierarchical framework that supports both administrative efficiency and operational effectiveness. The balanced distribution of direct reporting relationships minimizes the risks associated with managerial overload or underutilization, contributing to improved organizational performance and the delivery of high-quality healthcare services. Therefore, the management structure of the Bukhara Regional Scientific and Practical Center for Mental Health may be regarded as a highly effective example of span-of-control optimization within healthcare institutions.

$$O_i = 1,000 + 0,571 + 1,000 + 1,000 + 0,800 + 1,000 = 5,371.$$

The individual managerial optimality coefficients were aggregated as follows:

Considering that the total number of managers included in the analysis was $M = 6$, the overall organizational optimality coefficient was calculated as:

$$C = 5,371 / 6 = \mathbf{0,895}.$$

The obtained value of $C = 0.895$ corresponds to the “Excellent” category ($C \geq 0.85$). This result indicates that the spans of control of the managerial positions are highly consistent with the recommended optimal range. Consequently, the organizational structure demonstrates a well-balanced distribution of supervisory responsibilities, effective managerial coordination, and an appropriate allocation of workload among managers.

The findings suggest that the management system of the Bukhara Regional Scientific and Practical Center for Mental Health is organized efficiently and provides favorable conditions for effective communication, decision-making, and operational performance. Therefore, the institution may be considered a benchmark example of an optimally structured healthcare management system in terms of span-of-control efficiency.

According to the results of the analysis, the C coefficient calculated for the organizational structure of the Bukhara Regional Endocrinology Dispensary was **0.575**. This value falls within the “**Moderate**” category ($0.50 \leq C < 0.70$), indicating that the ratio between managerial positions and their direct subordinates is moderately balanced.

This result suggests that, while the overall organizational structure demonstrates an acceptable level of managerial alignment, there are still notable deviations from the optimal span-of-control range in certain units. In particular, some managerial positions, such as the Deputy for General Affairs, have no direct

subordinates, which may indicate underutilization of managerial capacity or insufficiently defined functional responsibilities.

From an organizational perspective, these findings imply that there are opportunities to improve the internal structure of the institution by revising managerial roles, redistributing responsibilities, and optimizing reporting relationships. Such measures could contribute to a more efficient allocation of managerial workload and enhance overall organizational effectiveness.

According to the results of the analysis, the C coefficient calculated for the organizational structure of the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Cardiology was **0.632**. This value falls within the “**Moderate**” category ($0.50 \leq C < 0.70$), indicating that the ratio between managerial positions and their direct subordinates is relatively balanced, although not fully optimized.

The analysis shows that the Director has only three direct subordinates, which reflects a relatively decentralized managerial structure at the top level. However, the Deputy for Treatment Affairs supervises as many as 18 employees, which may lead to an excessive managerial workload and reduced efficiency in supervision and coordination.

Overall, the organizational structure demonstrates an average level of efficiency. Nevertheless, there is potential for further improvement through the redistribution of managerial responsibilities and the balancing of spans of control among different managerial positions. Such adjustments would contribute to a more even workload distribution and enhanced organizational performance.

The concepts of the chain of command and the scalar chain constitute one of the fundamental pillars of management theory. These concepts describe a continuous and clearly defined line of authority and communication extending from the highest level of management to the lowest level of operational personnel within an organization.

The chain of command ensures that authority, responsibility, and communication flow in a structured manner, enabling coordination and control across different hierarchical levels. Similarly, the scalar chain emphasizes the importance of maintaining an uninterrupted vertical linkage within the organizational hierarchy, thereby ensuring clarity in reporting relationships and decision-making processes.

In this study, we propose a novel model for assessing the span of control, referred to as the **Information Transmission Efficiency Model** (also termed the *information attenuation model*). The core idea of this model is that, in any organization, a managerial signal originating from the top-level executive (such as an order, instruction, or directive) gradually loses its strength, precision, and effectiveness as it propagates downward through the hierarchical chain.

The intensity of this attenuation is directly influenced by the number of subordinates at each organizational level as well as the total number of hierarchical layers within the structure. In other words, the efficiency of information transmission decreases as organizational complexity increases, particularly when spans of control are either excessively wide or excessively narrow.

The mathematical representation of the model is expressed through the following formulation, which defines the signal transmission coefficient for an individual managerial pathway:

$$K_{ij} = \prod_{m=1}^h \frac{1}{n_m} \quad (3)$$

In this formulation, K_{ij} denotes the signal transmission coefficient representing the degree to which a managerial instruction j successfully reaches executor i . The coefficient K_{ij} takes values in the interval $[0, 1]$, where values closer to 1 indicate minimal information loss and high transmission efficiency, whereas values approaching 0 reflect significant attenuation of the managerial signal.

The parameter h represents the number of hierarchical levels between the top manager and the executor, i.e., the depth of the management structure. In other words, it defines the number of sequential organizational stages through which a managerial signal must pass before reaching the final performer.

The parameter nm denotes the number of direct subordinates at the m -th hierarchical level. This variable reflects the width of the management structure at each stage and plays a crucial role in determining the degree of information dispersion or concentration within the organizational hierarchy.

Together, these parameters form the basis for modeling the attenuation of managerial signals in hierarchical healthcare organizations, allowing for a quantitative assessment of how organizational structure influences the effectiveness of information flow and decision implementation.

Table 2 : Assessment of Management Effectiveness Based on K Values

K value range	Rating level	Description	System characteristics
$K > 0.10$	Excellent	More than 10% of the signal is transmitted	Highly efficient management, typically a two-level structure
$0.05 < K \leq 0.10$	Good	5–10% of the signal is transmitted	Satisfactory and functioning system
$0.02 < K \leq 0.05$	Moderate	2–5% of the signal is transmitted	Presence of structural inefficiencies; optimization required
$0.01 < K \leq 0.02$	Low	1–2% of the signal is transmitted	Low managerial efficiency; improvement necessary
$K \leq 0.01$	Poor	Less than 1% of the signal is transmitted	Fundamental restructuring of the system is required

This classification system provides a quantitative framework for evaluating managerial effectiveness based on the degree of information signal retention within hierarchical organizational structures. The K coefficient reflects how effectively managerial instructions propagate from higher to lower levels of the organization.

Higher values of K indicate minimal information loss and a more efficient communication structure, while lower values suggest significant attenuation of managerial signals due to excessive hierarchy, inefficient span of control, or structural fragmentation. Accordingly, this scale enables comparative assessment of different healthcare organizations and supports evidence-based optimization of management structures aimed at improving communication efficiency and operational performance.

If $K = 1$, the signal reaches the executor in a fully transmitted and undistorted form. If $K = 0.1$, it indicates that the signal has lost 90% of its original strength during transmission. Similarly, if $K = 0.01$, it means that 99% of the initial information signal has been attenuated or lost along the hierarchical chain.

The parameter h represents the number of hierarchical levels between the manager and the executor (i.e., the depth of the management structure). The parameter nm denotes the number of direct subordinates at the m -th hierarchical level.

The multiplication sign ($\prod$) indicates that the attenuation factors at each level are multiplied sequentially. In other words, the overall signal transmission efficiency is determined by the cumulative effect of all hierarchical stages.

For example, if at the first level the signal is divided among 5 subordinates ($1/5$), and at the second level each subordinate further distributes the task among 3 individuals ($1/3$), then the total attenuation is: $1/5 \times 1/3 = 1/15$

This means that only 6.7% of the original signal reaches the lowest level of the organization.

The average signal transmission coefficient for the institution is defined as follows:

$$\bar{K} = \frac{1}{N} \sum_{j=1}^N K_j \quad (4)$$

In this context, N denotes the total number of executors (i.e., frontline employees at the lowest hierarchical level) within the healthcare institution. The proposed formula is used to calculate the average strength of managerial signals reaching different executors across the organization.

The resulting average coefficient reflects the overall effectiveness of information transmission from higher managerial levels to operational staff, taking into account the cumulative attenuation of signals through the organizational hierarchy.

If the average value of K is less than 0.02, it indicates that managerial signals are almost entirely lost before reaching lower-level employees. In such a case, the management system is considered highly inefficient, as directives fail to be effectively transmitted and implemented.

Conversely, if the average value of K exceeds 0.05, the management system is regarded as relatively effective, indicating that a sufficient proportion of managerial instructions successfully reach executors with acceptable levels of information loss.

Thus, this indicator provides a quantitative basis for evaluating the overall communication efficiency and hierarchical effectiveness of healthcare organizations, enabling comparative analysis and supporting evidence-based managerial improvements.

Table 3 : Assessment of Management Efficiency Based on the Average Signal Coefficient ($\bar{K}$)

$\bar{K}$ value range	Rating level	Description	System efficiency
$\bar{K} > 0.08$	Excellent	More than 8% of the average signal reaches executors	Very high efficiency; the structure operates optimally
$0.05 < \bar{K} \leq 0.08$	Good	5–8% of the average signal reaches executors	Efficient system with minor optimization needs
$0.03 < \bar{K} \leq 0.05$	Moderate	3–5% of the average signal reaches executors	Satisfactory level; some inefficiencies exist

$0.02 < \bar{K} \leq 0.03$	Low	2–3% of the average signal reaches executors	Low managerial efficiency; improvement required
$\bar{K} \leq 0.02$	Poor	Less than 2% of the average signal reaches executors	Inefficient system; fundamental restructuring is necessary

This classification provides a quantitative framework for evaluating the overall efficiency of managerial communication within hierarchical healthcare organizations. The average signal coefficient ($\bar{K}$) reflects the extent to which managerial directives successfully propagate through multiple organizational levels to reach frontline executors.

Higher values of $\bar{K}$ indicate a well-functioning organizational structure with minimal information loss, while lower values suggest significant signal attenuation caused by excessive hierarchy, inefficient spans of control, or structural fragmentation. Accordingly, this indicator can be used for comparative analysis of healthcare institutions and for evidence-based optimization of managerial systems aimed at improving operational efficiency and decision implementation effectiveness.

$$L = -\frac{1}{N} \sum_{j=1}^N \sum_{m=1}^{h_j} \ln(n_{mj}) \quad (5)$$

This formula was developed by the author and constitutes the main scientific innovation of the dissertation. The symbol $\ln$ used in the formula denotes the natural logarithm, that is, the logarithm with the base $e=2.718....$

Table 4 : Assessment of Management Structure Efficiency Based on the Logarithmic Index (L)

L value range	Rating level	Description	System characteristics
$L > 5.0$	Excellent	Each manager supervises 7–12 subordinates	Optimal structure with a highly efficient 2–3 level hierarchy
$4.5 < L \leq 5.0$	Good	Span of control is close to optimal	Efficient system requiring minor improvements
$4.0 < L \leq 4.5$	Moderate	Satisfactory management structure	Optimization required in certain departments
$3.5 < L \leq 4.0$	Low	Problematic organizational structure	Significant optimization required
$L \leq 3.5$	Poor	Extremely low span of control or overly deep hierarchy	Structural reorganization is necessary

This classification framework provides a structured approach for interpreting the Logarithmic Management Index (L-index) in healthcare organizations. The index captures the nonlinear relationship between hierarchical complexity and managerial efficiency, where higher values of L indicate a more balanced and efficient organizational structure.

In particular, values of L above 5.0 suggest that the organization operates within an optimal range of managerial distribution, characterized by a well-balanced span of control and a limited number of hierarchical levels. Conversely, lower values of L reflect structural inefficiencies, such as excessive

hierarchy depth or insufficient allocation of subordinates, both of which negatively affect communication flow and decision-making efficiency.

Accordingly, the L-index serves as a robust quantitative tool for comparative assessment and optimization of healthcare management systems, enabling evidence-based improvements in organizational design and operational performance.

The need for logarithmic transformation arises from the fact that the K coefficient, in practical calculations, often takes very small values (e.g., 0.008; 0.012; 0.025), which makes direct comparison and analytical interpretation difficult. The natural logarithm transforms these small values into a wider and more analytically convenient range, typically between 3 and 6, thereby improving interpretability and statistical usability.

Furthermore, the introduction of a negative sign in the formulation is justified by the mathematical properties of the logarithmic function. It is well known that $\ln(1/n) = -\ln(n)$, meaning that when $K < 1$, the logarithmic transformation yields negative values. Therefore, a negative sign is introduced to ensure that the resulting indicator is expressed in a positive form, which simplifies interpretation and comparative analysis.

As a result, the derived L-index serves as an integral measure of the management system: as its value increases, the managerial structure becomes more optimal, indicating a reduction in excessive hierarchy depth or span of control, and consequently, an improvement in overall management efficiency.

Taken together, the three proposed indicators measure different dimensions of organizational structure. The first captures the absolute strength of the managerial signal, the second reflects its average transmission efficiency, and the third provides a normalized logarithmic representation of relative efficiency. In this study, primary emphasis is placed on the L-index, as it offers the most analytically robust and statistically convenient measure for comparative assessment and structural evaluation of healthcare management systems.

Within the framework of this study, a preliminary examination was conducted of the management systems of ten healthcare institutions in the Bukhara region. These included the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Dermatology and Venereology, the Bukhara Sanatorium, the Bukhara Regional Scientific and Practical Center for Mental Health, the Bukhara Regional Endocrinology Dispensary, and the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Cardiology.

In addition, the organizational and managerial structures of territorial medical associations were analyzed, including the Vobkent, Jondor, Romitan, Qorako'l, and Bukhara District Medical Associations. The analysis revealed that the management structures of the Vobkent, Jondor, and Romitan district medical associations are almost identical in nature. Specifically, their hierarchical levels, distribution of subordinates, and decision-making mechanisms are based on a standardized organizational model.

Healthcare institutions play a crucial role in the historical development of the socio-economic conditions of the region and in shaping the quality of life of the population. Therefore, the analysis of their management systems is of significant scientific and practical importance from the perspective of improving service efficiency, optimizing resource utilization, and enhancing healthcare policy development.

Table 5 : Three Types of Signal Coefficients in Healthcare Organizational Management Structures

No.	Institution name	Individual signal coefficient (K_{ij})	Average signal coefficient ($\bar{K}$)	Logarithmic Management Index (L-index)
1	Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Dermatology and Venereology	0.004 – 0.022	0.030	4.05
2	Bukhara Sanatorium	0.0125 – 0.0625	0.029	3.70
3	Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Cardiology	0.00521 – 0.0483	0.0131	4.67
4	Bukhara Regional Scientific and Practical Center for Mental Health	0.00595 – 0.0500	0.016	4.50
5	Bukhara Regional Endocrinology Dispensary	0.0139 – 0.0556	0.0227	3.84
6	Bukhara District Medical Association	0.0056 – 0.0500	0.011	4.66
7	Jondor District Medical Association	0.0062 – 0.0520	0.0145	4.52
8	Romitan District Medical Association	0.0058 – 0.0490	0.0128	4.60
9	Qorako'l District Medical Association	0.0050 – 0.0470	0.0125	4.60
10	Vobkent District Medical Association	0.0060 – 0.0510	0.0135	4.55

This comparative analysis presents the distribution of three key indicators of managerial communication efficiency across healthcare institutions in the Bukhara region: the individual signal transmission coefficient (K_{ij}), the average signal coefficient ($\bar{K}$), and the logarithmic management index (L-index).

The results indicate that individual signal transmission coefficients (K_{ij}) vary within a relatively narrow range across institutions, reflecting similar hierarchical attenuation patterns in organizational communication. However, differences in the average signal coefficient ($\bar{K}$) and the L-index reveal variations in overall management efficiency and structural optimization.

In particular, institutions such as the Bukhara Branch of the Cardiology Center and the Bukhara District Medical Association demonstrate relatively higher L-index values (4.67 and 4.66, respectively), indicating more efficient hierarchical communication structures. In contrast, the Bukhara Sanatorium exhibits the lowest L-index value (3.70), suggesting comparatively higher information attenuation and lower structural efficiency.

Overall, the findings provide a quantitative basis for comparative assessment of healthcare management systems and highlight the usefulness of the proposed model in identifying structural strengths and weaknesses across different types of medical institutions.

CONCLUSION

The results obtained for the ten analyzed healthcare institutions demonstrate significant differences in the effectiveness of their management structures. The highest values of the Logarithmic Management Index (L-index) were observed in the Bukhara District Medical Association (4.66) and the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Cardiology (4.67). However, even these relatively higher values do not reach the “good” or “excellent” thresholds, indicating only a moderate level of managerial efficiency.

In contrast, the Bukhara Sanatorium (3.70) and the Bukhara Regional Endocrinology Dispensary (3.84) exhibited the lowest L-index values, approaching the “poor” category. This suggests a substantial attenuation of managerial signals before reaching lower organizational levels and indicates the need for significant structural optimization in these institutions.

The remaining institutions—the Bukhara Regional Scientific and Practical Center for Mental Health (4.50) and the Bukhara Branch of the Republican Specialized Scientific and Practical Medical Center for Dermatology and Venereology (4.05)—occupy an intermediate position. In these organizations, the management systems operate in a relatively stable manner; however, there remains considerable potential for improving information transmission efficiency and reducing hierarchical attenuation.

Overall, the fact that the average signal coefficient ($\bar{K}$) remains below 0.03 across all analyzed institutions indicates that more than 97% of managerial signal strength is lost before reaching frontline executors. This provides clear evidence of excessive hierarchical depth or deviations from the optimal span of control within the management structures.

The findings of this study further demonstrate that the issue of the chain of command is of critical importance for every organization, particularly in healthcare systems. The proposed “Information Transmission Efficiency Model” is specifically designed to quantitatively evaluate how managerial signals evolve and attenuate along the command chain.

The literature review indicates that, although the chain of command has been extensively discussed in management theory for decades, there remains a significant scientific gap in its quantitative measurement, especially within healthcare settings. While many researchers have emphasized the importance of the chain of command, few have proposed a rigorous mathematical model for its assessment.

Accordingly, the main scientific novelty of this research lies in addressing this gap by developing a universal mathematical model that enables quantitative evaluation of managerial signal attenuation along the chain of command in healthcare institutions.

REFERENCES

- Bayzaqov, M., & Allayorov, Y. (2005). *Management and Marketing in Medicine (Tibbiyotdamenejmentva marketing)*. Tashkent: Abu Ali ibn Sino.
- Boned-Galán, A., López-Ibort, N., & Gascón-Catalán, A. (2023). The impact of nurse managers' span of control on patient and staff outcomes: An integrative review. *Journal of Nursing Management*, 2023, 1–15.
- Fayol, H. (1949). *General and Industrial Management* (C. Storrs, Trans.). London: Sir Isaac Pitman & Sons, Ltd. (Original work published 1916).
- Gulick, L., & Urwick, L. (Eds.). (1937). *Papers on the Science of Administration*. New York: Institute of Public Administration, Columbia University.
- Jaques, E. (1997). *Requisite Organization: A Total System for Effective Managerial Organization and Managerial Leadership for the 21st Century* (Revised 2nd ed.). Arlington, VA: Cason Hall & Co. Publishers.
- Simons, R. (1995). *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Boston, MA: Harvard Business School Press.
- SullivanCotter. (2024). *Healthcare Managerial Span of Control and Organizational Structure Benchmark Survey*. SullivanCotter Survey Report.



EFFECTS OF BUSINESS GROUP AFFILIATION AND GLOBAL DIVERSIFICATION IN PERFORMANCE OF A BUSINESS FIRM

Pramila Singh¹, Munish Tiwari²

ABSTRACT

We look into how business group membership affects the link between international diversification and firm performance for firms in emerging economies. We build our theoretical justifications by fusing the institutional theory viewpoint with the literature on global diversification. We propose a U-shaped association between international diversification and company performance and hypothesize that the relationship between international diversification and firm performance is moderated by a firm's membership in a business group. Based on a sample of Indian businesses, we find that business group affiliation lessens the favorable impact of internationalization on company performance while firm performance is positively correlated with the level of internationalization.

Keyword: IDP, International Diversification, UNCTAD, Group Affiliation, internationalization.

Introduction

For academics and industry professionals alike, the connection between international diversification and company performance (IDP) is still a crucial issue. Many businesses now find it both easier and necessary to grow into overseas markets as a result of rising trade liberalization and falling trade barriers (Khanna and Palepu, 2006). As a result, businesses from emerging economies have increased their internationalization efforts during the past few years. The novel issue of international diversification by enterprises in emerging economies, however, has not been adequately addressed by research (Child and Rodrigues, 2005; Mathews, 2006). For a number of reasons, it is crucial to look into the IDP relationship for businesses in emerging economies. First, enterprises from emerging economies are becoming more significant in the global economy, and their decisions have an impact on businesses in developed economies (Khanna and Palepu, 2006).

Examples of this include recent international expansions by the Indian Tata company and the Chinese Lenovo group. The Indian Tata Group has made over 28 acquisitions since 2000, including the \$12 billion purchase of European steelmaker Corus. The yearly outflow of foreign direct investment from poor nations has increased more quickly than that from industrialized countries since the 1990s, according to a UNCTAD (2004) report. From US\$60 billion in 1980 to US\$859 billion in 2003, outbound foreign direct investment from developing countries rose, making for nearly 10% of the total outflow of FDIA (UNCTAD, 2004). However, little study has been done to determine if foreign diversification helps or hurts businesses in emerging economies. Second, compared to their counterparts in industrialized economies, emerging economy enterprises frequently have extremely different resource arrangements. For instance, many businesses in emerging economies lack the ownership-specific advantages that global organizations from developed economies. Due to this, it is impossible to completely comprehend the international diversification behavior

¹ Research Scholar. Shri Ramswaroop Memorial University, Institute of Management, Commerce & Economics, Barabanki, U.P.

² Professor, Shri Ramswaroop Memorial University, Institute of Management, Commerce & Economics, Barabanki U.P.

of multinational corporations operating in emerging economies using the conventional ownership-location-internalization framework (Dunning, 1993) (Child and Rodrigues, 2005; Mathews, 2006).

This makes it necessary for us to use a variety of theoretical approaches to analyze the effects of international diversification on the performance of enterprises in emerging economies (Delios, 2007). Third, compared to industrialized economies, developing economies have a very distinct domestic institutional background (Khanna and Palepu, 2000a). For instance, businesses organize themselves into business groups in many emerging economies to handle institutional gaps that develop because there aren't enough effective institutions to facilitate market-based exchange (Khanna and Palepu, 2000a, 2000b). We need to design studies that account for the significance of contextual elements such business group affiliation for emerging economy enterprises given the importance of the domestic institutional framework for international diversification (Wan and Hoskisson, 2003).

Background Relationship between International Diversification and Performance

Results from a review of the literature on the IDP relationship for the past 30 years are mixed and ambiguous. Researchers have discovered positive, negative, inverted U-shaped, U-shaped, and no relationship between international diversification and firm performance (Delios and Beamish, 1999; Hitt et al., 2006; Denis, Denis and Yost, 2002; Geringer, Tallman and Olsen, 2000). Researchers have explained the discrepancy in findings by failing to fully conceptualize the advantages and disadvantages of internationalization for businesses at various stages of internationalization (Contractor, Kundu and Hsu, 2003; Lu and Beamish, 2004). We assert that it is fairly reasonable to have varied findings among research given the breadth of time periods, institutional and industrial contexts, and maturity of industries in the various economies being studied. It is more important to discover the reasons, as supported by recognized theories, behind a specific type of IDP relationship rather than discussing the nature of the IDP relationship. There are three types of existing study on the IDP connection. The first type includes studies that give more weight to establishing the IDP link than to contextual or moderating factors (e.g., Tallman and Li, 1996; Geringer, Beamish, and daCosta, 1989). Research that predominantly examines the impact of moderating factors on the IDP connection falls under the second group (e.g. Hitt, Hoskisson, and Kim, 1997; Kotabe, Srinivasan, and Aulakh, 2002; Ramaswamy, 1995). Research that examines the IDP connection in many nations and various institutional, cultural, and industrial contexts is included in the third category (e.g. Capar and Kotabe, 2003; Nachum, 2004).

Much of the existing literature's primary theoretical framework is based on the idea that multinational firms have advantages related to ownership that enable them to offset the expenses and hazards of doing business abroad (Caves, 1971). In order to explain corporate internationalization, Dunning (1993) proposed the ownership-location-internalization framework, which combined the arguments of some of the major theoretical views. International Diversification and Firm Performance does not adequately explain the IDP link using either the proprietary assets approach or the ownership-location-internalization paradigm. Due to the focus on market failure and internalization incentives of the proprietary assets as essential elements of global diversification, emerging economy enterprises. In this work, we integrate the institutional viewpoint with the internationalization literature to understand the IDP relationship for developing economy enterprises. The institutional perspective's fundamental concept is that organizations are part of a larger environment, which both motivates and restrains organizations to pursue particular strategies. In addition to the production elements, institutions provide the ground rules for the game and give businesses a variety of opportunities to pursue. For instance, aggressive government involvement and intervention is a common

practice in many emerging economies, including China, India, and Indonesia (Dunning and Narula, 1996), and has provided Chinese businesses entering foreign markets with a competitive edge. Wan and Hoskisson (2003) stressed the significance of home country institutional environment in explaining the IDP link even in the context of industrialized economies. Thus, institutional perspective appears to be a suitable lens to describe how contextual elements affect the IDP interaction.

International diversification and companies from emerging economies

Applying a distinct theoretical framework to the investigation of the IDP connection is crucial due to certain peculiarities of enterprises in emerging economies. The ownership-location-internalization paradigm, which has dominated in international business, is mostly based on the observation of large corporations from developed nations as they internationalize. Before going global, these companies frequently have a sizable domestic market share and proprietary assets. On the other hand, many emerging economy firms internationalize in order to strengthen their position in both the domestic and international markets and to overcome the disadvantages they would experience if they only operated in those markets (Child and Rodrigues, 2005). There hasn't been much discussion of the relative competitive disadvantage as a driver of internationalization in the literature to date (Wesson, 1999). Despite the fact that many developing economies have recently undergone institutional transformation, emerging economies are defined by having insufficient institutional support for market-based transactions (Choi, Lee, and Kim, 1999; Gaur and Delios, 2006). Credit rating agencies' prone to error risk assessments of emerging economies can be used to measure the degree of uncertainty in the setting of those economies (McNamara and Vaaler, 2000).

Hypothesis and theories

Early, growing, and mature internationalization are the three stages that scholars have distinguished (Contractor, Kundu, and Hsu, 2003; Lu and Beamish, 2004). Emerging economy businesses working in a novel, foreign environment suffer high learning, coordination, and setup expenses in the early stages of internationalization. Due to a lack of experience with foreign market circumstances and difficulties managing employees or agents remotely, the transaction costs of operating in a new market are likely to be quite high in the early stages (Gaur and Lu, 2007). The requirement to comprehend, pick up, and assimilate local cultural and market knowledge, then transfer it back to the home and other locations, will result in high learning costs as well (Makino and Delios, 1996). Additionally, internationalization efforts in emerging economies are not supported by the indigenous institutional system. In order to compete in foreign markets, emerging economy enterprises may not have the necessary managerial and technological capabilities (Hitt et al., 2000), which could increase the costs during the early stages of internationalization. Businesses must also adapt to the regional social and institutional frameworks in order to get institutional legitimacy (Gaur and Lu, 2007). Without credibility in the community, businesses run the risk of being discriminated against by locally based businesses (Kostova and Zaheer, 1999). Due to poor country-of-origin effects and the lack of any past recognition, gaining legitimacy in foreign countries is quite difficult and expensive for emerging economy enterprises.

However, as was previously argued, enterprises in emerging economies internationalize in order to overcome the challenges they encounter if they solely engage in home markets. It has been fairly quick for emerging economy enterprises to emerge (Khanna and Palepu, 2006; Mathews, 2006; Mathews and Zander, 2007). As a result, enterprises in emerging economies move fast from the initial stages of internationalization to the growth stage. The initial curve illustrating the IDP relationship is modified as a result of this aspect of internationalization for emerging economy firms. Compared to enterprises in

developed economies, the initial negative curve between internationalization and performance becomes significantly flatter. The advantages of global diversification are likely to outweigh the expenses during the internationalization process' growing stage.

In the expansion stage, businesses gain advantages by taking use of market inefficiencies (Caves, 1971) and assets unique to their business (Buckley, 1988; Delios and Beamish, 1999). Companies gain from the development of market dominance and access to information in other countries (Kogut, 1985). Additionally, businesses learn how to apply the information they acquire in international markets to their domestic markets and to other affiliates (Ghoshal and Bartlett, 1990), which improves their performance in the internationalization process' growth stage and increases their competitiveness. Even though it is not favorable for offering traditional sources of competitive strength (Wan and Hoskisson, 2003), the institutional environment of the host nation aids emerging economy enterprises in establishing a variety of capabilities during the growth stage. Businesses in emerging economies frequently expand internationally into other rising economies. Due to similar institutional environments, the resource situation in the majority of these countries is synchronized with the resources of developing economy enterprises (Gaur and Lu, 2007; Wright et al., 2005). As a result, when expanding into other emerging markets, corporations from emerging economies can better utilize their resources than those from industrialized nations. Additionally, the institutional environment that emerging economy enterprises encounter when they enter industrialized economies is vastly superior to that of their native markets. Better institutional environments give developing market businesses the chance to build resources and competencies that would not be achievable in a home setting.

As a result, we propose the following hypothesis:

H1: For enterprises in emerging economies, there is a U-shaped relationship between the level of internationalization and company performance.

Effect of group membership

Business groups are described as "a set of firms which, though legally independent, are bound together by a constellation of formal and informal ties, and are used to taking coordinated action" by Khanna and Rivkin (2001, pp. 47–48). In many emerging economies, group activities make up a sizable portion of economic activity (Khanna and Rivkin, 2001). For instance, business groups are widely present in practically all sectors of the Indian economy, with a sizable proportion of common ownership, typically held by a family (Khanna and Palepu, 2000a). The enterprises in the emerging economies gain from affiliation with business organizations in a number of ways. The formal and informal structures required for effective market-based trading are lacking in emerging economies. Business organizations help associated enterprises avoid issues brought on by a lack of institutional support by filling institutional gaps (Chang and Choi, 1988; Khanna and Palepu, 1997, 2000a, 2000b). Because of their unstable political and economic environments as well as their lack of proper institutional support, emerging economies are also riskier. The success of emerging economy enterprises depends in large part on managing risk and creating systems to deal with as well as profit from such hazards (Iankova and Katz, 2003). Companies that have complete control over the origins and suppliers of their raw materials as well as the sales of their finished goods are better able to mitigate these risks. These talents are made possible by group affiliation because affiliated enterprises can draw on the reputation and resources of the entire group. As compared to businesses that are not linked with any business groups, group-affiliated businesses also enjoy more extensive and relatively simple access to

financing, both domestically and internationally, as well as easier access to the labor and product markets (Khanna and Rivkin, 2001).

However, the advantages that group-affiliated enterprises have are mostly a result of unique characteristics of the environment in which they operate. For instance, businesses profit from group affiliation because of institutional gaps, government assistance, or a confluence of other variables including market failure and a lack of market intermediaries. As the environment changes, businesses can stop receiving these advantages. Because of their prior success, group-affiliated enterprises may continue to rely too heavily on institutional qualities as sources of competitive advantage, which could lead to their downfall for many of these firms. According to the rationale shown above, many academics have started to doubt the very claim that group affiliation benefits businesses (Khanna and Palepu, 2000a). While studies using data from earlier time periods in the case of Korean business groups reported a positive effect of group affiliation (Chang and Choi, 1988), studies using data from more recent time periods have discovered that firms affiliated with Korean Chaebols have relatively worse performance (Chang, 2003; Joh, 2003). The recent dissolution of numerous business groups in India (Piramal, 1998) as well as a decline in group activities as a whole (Gaur and Delios, 2006) provide more evidence for the context-dependent nature of the advantages of group membership. The context-dependent character of group affiliation's advantages has two repercussions. First, even in domestic markets, group identification itself may no longer be advantageous as the context changes.

Group affiliation becomes a liability for businesses functioning in an environment with developed institutional frameworks, according to studies conducted over time (Gaur and Delios, 2006). Due to their inability to compete with unaffiliated businesses even in their own domestic markets, group-affiliated businesses are unlikely to succeed in international marketplaces. Second, in a setting with high-caliber institutions, the benefits flowing to the group-affiliated enterprises are unlikely to be comparable. For instance, the group-affiliated companies will not receive the same benefits in the international markets if the government gives them preferential treatment when granting them contracts or sources of supplies that are favorable in the home market. The advantages of group affiliation will therefore significantly diminish as the context shifts as a consequence of institutional change in the domestic market or as a result of a corporation shifting its concentration from domestic markets to more developed overseas markets.

H2: Group affiliation will mitigate the IDP relationship negatively, resulting in group associated enterprises doing worse with more international diversification.

Methods The setting

Since the study is taking place in a developing economy, it is critical to draw attention to some unique aspects of the setting. Since India's independence from colonial authority 50 years ago, the country has developed contemporary economic organizations. But during the first 40 years, from the 1950s to 1991, India followed the former USSR's economic model. In doing so, the government imposed tight limitations on the operations of the private sector, including caps on overall capacity, entry restrictions into numerous industries, restrictions on foreign companies' ownership, and considerable bureaucratic oversight and involvement (Majumdar, 2004). India experienced a serious balance of payments crisis in 1991, and the foreign exchange India's reserves were only enough for two weeks of imports. Battling the fear of failing the approach of Indian authorities to economic sovereignty the outside funding organizations (IMF and World Bank), who agreed to help but only with their own restrictions.

Due to external pressures, such as a result of Indian authorities' awareness, Among the advantages of a free market, the Indian Government started a number of initiatives for economic structural changes. The structural change's dual goals are: the goal of the program was to draw international institutional investors, as well as to encourage entrepreneurial the potential of Indian businesspeople. Specific actions included the elimination of licensing for establishing new businesses and boosting capacity, the gradual elimination of restricted industries for private sector participation, the reduction of excise and import duties and corporate tax rates, the liberalization of credit policies, the establishment of statutory bodies for monitoring sector-specific market activities, and the gradual withdrawal of the government from the business of micro-level management of the economy. These actions, along with a number of others, significantly contributed to supplying the necessary institutional support for the expansion of market competition (Gaur and Delios, 2006).

Sample: We used an Indian company sample from the manufacturing and services sectors for our analysis. Our list of Indian companies was drawn from the yearly database called CAPITALINE. This database's foundation is made up of unprocessed data that was taken from reports that all businesses submit to the Registrar of Companies. We collected data from 1997 to 2001 in order to create a longitudinal data collection with a five-year time span. In 1992, India's economy began to open up. The five years from 1997 to 2001 are a period of relative stability for Indian businesses because it takes time for government measures to take effect. We had complete data on 240 firms' ages, total sales, return on sales, and foreign sales for each year. We found these companies' group affiliation information in the ISI Emerging Markets database.

Variables-Dependent variable: Return on Sales (ROS) was selected as the dependent variable. One of the accounting-based performance measures that are frequently used to gauge business performance is ROS. For the sake of brevity, we did not present the outcomes but instead used return on assets (ROA) to gauge the reliability of our findings.

Explaining Variables: The two independent variables considered in this study are group affiliation and the degree of internationalization (DOI). The proportion of international sales to overall sales is how we gauge the level of internationalization. This variable has a large amount of values at the lower end and is severely skewed. We used the logit transformation of the ratio of foreign sales to total sales to normalize the variable (Cohen and Cohen, 1983). We were unable to gather other metrics for DOI, such as the ratio of foreign employees to total employees and the ratio of foreign offices to total offices, because to data restrictions, particularly in rising countries like India's. Nevertheless, the bulk of earlier IDP studies (Grant, 1987; Tallman and Li, 1996; Capar and Kotabe, 2003) have used the ratio of foreign sales to total sales as a measure of international diversification. By using an indicator variable that took a value of one if the firm was linked with a business group and zero otherwise, we were able to measure group affiliation (Group affiliation).

Control factors: We eliminated the fixed effects of the industry, the firm's size (Sales), and its age (Age). The natural logarithm of total sales was used to calculate business size. By counting all of the years since the company's founding, we determined its age. We kept the engineering businesses as the omitted category in the analyses and utilized eight dummy variables to account for industry effects. The identical control variables employed in this study were also used by Khanna and Palepu (2000a) in their investigation of Indian business organizations.

Modeling technique:

Using a firm-year unit of analysis, we looked at the performance effects of the degree of internationalization and business group affiliation over the course of five years, from 1997 to 2001. We tested the hypotheses using general linear square (GLS) random-effects models with firm-year data for performance analysis. In pooled time series data, autocorrelation and heteroscedasticity are corrected for using GLS models. Using this methodology, researchers can compare changes over time in individual units as well as changes across cross-sectional units (Hsiao, 1995). It makes the assumption that the regression parameters are constant over time and are the same across different cross-sectional units, which improves the accuracy of the coefficient estimates. The unobserved heterogeneity should not be associated with the independent variables is a crucial presumption for choosing random-effects estimation. After eliminating the time-invariant explanatory variables, we used the Hausman test to assess this assumption and the suitability of random-effects estimates. The use of random-effects estimation is justified because we did not find a significant difference between random effects and fixed-effects estimations.

Results The descriptive statistics and relationships are shown in Table 1. As we can see, 40% of the sampled companies belonged to business groups. The sampled companies had an average age of 25.45 years in 2001. For these businesses, the average level of internationalization was 21.58% (logit converted value: 1.29). The outcomes of the regression with ROS as the dependent variable are shown in Table 2. The models were created in a hierarchical fashion. Along with industry indicator variables, Model 1 also includes company size (Sales), age, and DOI. In Model 2, we added the square DOI term. Business group affiliation is a variable in Model 3 and the DOI and business group affiliation interaction is a variable in Model 4. On the relevance of including each additional variable, we ran Wald tests. The addition of the square component greatly improved model fit, as demonstrated by the Wald test chi-square statistics ($\chi^2 = 34.99$, $df = 1$, $p > 0.001$). Included group affiliation in Model 3 does not enhance model fit ($\chi^2 = 0.37$, $df = 1$, $p > 0.10$). However, the model fit was significantly enhanced by the addition of interaction factors between DOI and group affiliation in Model 4 ($\chi^2 = 18.33$, $df = 1$, $p > 0.001$). The significant coefficients for some of the industry dummies indicated that there are differences in the IDP relationship between different industries. In every model, the DOI coefficient is significant and positive. The square term of DOI's coefficient is similarly substantial and positive. Positive coefficients for the DOI's linear and square terms imply that firm performance regularly becomes better as DOI rises. As a result, we only discover some evidence to support Hypothesis 1. As in several earlier studies, we do not notice any performance decline during the early stages of internationalization. The coefficient of group affiliation in Models 3 and 4 is the next thing we examine. In Model 3, the coefficient of group affiliation is unfavorable but insignificant. The primary effect of group affiliation only becomes substantial when we include the interaction of group affiliation with DOI in Model 4. This shows that group membership is more expensive than it is advantageous, which led to worse performance for group-affiliated businesses within the study's time frame. Hypothesis 2 is supported by the interaction term's negative and substantial coefficient. Highly internationalized businesses perform poorly when they are members of business organizations than when they are not.

Robustness tests We conducted analyses on a subsample of manufacturing and service sector organizations, as well as young and elderly firms, and employed ROA as an alternative measure of company performance in order to test the robustness of our findings. The findings of the subsample analysis are shown in Table 3. For the sake of conciseness, we forgo describing the outcomes of earlier steps and instead offer the final models. We can observe that all of the models have positive and substantial DOI

coefficients and its square term. This supports our conclusion that globalization improves the success of firms. According to the Chow test's comparison of the beta coefficient between the manufacturing and service subsamples, the impact of internationalization on firm performance was greater for service sector companies than for manufacturing companies. Along with providing substantial support for Hypothesis 2, the negative interaction effect between DOI and group affiliation is also still present across the two subsamples.

In order to determine whether the beneficial effect of DOI is the same for young and old enterprises, we separated the sample into young firms and old firms based on the median age of the firms in our sample. Table 3 shows that although the effect is higher for the young firms, the coefficients of DOI and DOI squared are significant with a positive sign for the two subsamples. This implies that DOI and business performance for Indian firms have a strong positive association. However, only in the case of young enterprises is the negative interaction impact between DOI and group affiliation substantial. Overall, the robustness tests confirm the findings of our primary analysis. When we utilize ROA as our performance indicator, we obtain comparable results, however the sample size is significantly smaller because we lack information on this performance indicator for all of the sampled companies.

Conclusion

It is important to understand the study's limitations before going over its findings. First off, the study's sample of Indian businesses restricts the applicability of its findings to other situations. Just as it is clear that results from studies conducted in contexts with developed economies may not apply to developing economies, the results of this study may likewise depend on the setting. Future research should investigate this connection in other emerging economies. Second, return on sales and return on assets were utilized as performance indicators. In addition to accounting-based performance indicators, future research may also include Tobin's Q or other market-based performance measures. Third, we only looked at one variable that could influence the IDP relationship: membership in a business organization. Future research on the IDP connection may take into account additional context-specific elements including the institutional and cultural milieu of the home country. Conducting case studies on a small number of enterprises to qualitatively analyze the influence of various institutional and cultural environments on the performance of internationalizing firms could be one strategy to including the effect of institutional context. Last but not least, even though we predicted a U-shaped IDP relationship for developing market enterprises, we admit that there may be substantial sectoral variation. This could be a problem in our study because it reduces the applicability of our findings outside of our study.

Future research should examine the IDP relationship for particular sectors in order to overcome this constraint. Given that some industries in emerging nations, such as software and pharmaceuticals, have become much more internationally well-known than others; it is likely that their IDP connection is more comparable to that of enterprises in mature economies. This study contributes to our growing understanding of IDP and the connection between business group successes. According to our research, group affiliation has a negative moderating effect on the relationship between degree of internationalization and firm performance, making highly internationalized firms perform better if they are not members of a business group. Due to certain traits of developing economy enterprises, there may have been no detrimental impact during the early stages of globalization. According to Wan and Hoskisson (2003), a firm's home country environment definitely affects how diversity and performance are related. Compared to enterprises in mature economies, the nature of costs and benefits may differ somewhat for developing economy firms.

We go into more detail about the setting of our study to determine the specific costs and advantages of internationalization for Indian businesses. Finding the precise costs and advantages of internationalization, however, was outside the purview of this study. Future research may elucidate the precise consequences of competing and learning as multinational businesses advance along the route of internationalization. The rising importance of service exports and investments in the globalization of emerging economy enterprises provides another explanation for the lack of the initial negative relationship in the IDP curve (Svetlicic and Rojec, 2003). Service businesses may not incur major early costs in internationalization since they are less capital expensive due to their knowledge-intensive nature (Contractor, Kundu, and Hsu, 2003). Additionally, service organizations can employ relational and social capital more successfully in their internationalization than manufacturing enterprises can (Hitt et al., 2006). It is likely that industries like computer software, IT, and healthcare from India will have a significant impact on the flattening or elimination of the initial decline in the IDP relationship given their increased internationalization and significant contributions to India's overall outward investments. Important ramifications of this study exist for both research and practice. Our data imply that the S-curve link between international diversity and performance may not be totally valid in an emerging economy scenario, contrary to academic literature. The necessity of researching moderating factors in the IDP association is further supported by the findings of this study.

Our findings emphasize the value of duplicating research in international business (Singh, Ang, and Leong, 2003), especially in light of the theory's relative youth, the complexity of the models and the variables that make them up, and the usage of proprietary data sets. This study highlights the advantages that international managers in emerging economies might gain from separating themselves from business groups if their companies are highly invested in foreign operations. Managers can also plot their businesses on the IDP graph and compare them to rivals to see how they are doing in comparison to other players in a given industry. Such a mapping can help managers identify the turning point for the sectors in which their companies operate and better prepare them for when the benefits of increased globalization can be anticipated. The management will be able to create better future internationalization initiatives by identifying the inflexion point. Additionally, managers can learn what stage of global operations their business is currently in and decide on further internationalization accordingly. Therefore, if managers discover that their company is still in the early phases of international expansion, they can continue to invest in greater internationalization even while that company's performance may be falling. This will not be the case, however, if the company is still in the early stages of its international expansion, as more foreign investments may not always translate into better performance. Finally, by examining their internationalization, this study contributes to our understanding of enterprises in emerging economies. Information technology companies like Infosys, Wipro, Satyam, and Tata Consultancy Services, financial services companies like ICICI and HDFC, and pharmaceutical companies like Ranbaxy Laboratories, Dr. Reddy's Lab., and Cipla have all experienced significant success abroad, not just in terms of growth but also in terms of product quality and brand reputation.

According to Contractor, Hsu, and Kundu (2004), their internationalization paths have been compared to those of "international new ventures," and Kundu and Katz (2003) have suggested that their internationalization process is comparable to that of small- and medium-sized entrepreneurial businesses. Numerous Indian businesses, including Ranbaxy, Dr. Reddy's, Sun, Cipla, Cadila, and Wockhardt, have steadily boosted their market share in industrialized nations. Because historically most developing market companies internationalized primarily into other similar emerging markets, this tendency among emerging

market companies is new. This study is valuable and intriguing due to the dearth of literature on developing economy enterprises and the distinction of the emerging market scenario.

References

- Bartlett, C. A. and S. Ghoshal (1989). *Managing across Borders: The Translational Solution*. Boston, MA: Harvard Business School Press.
- Buckley, P. J. (1988). 'The limits of explanation: testing the internalization theory', *Journal of International Business Studies*, 19, pp. 181–194.
- Capar, N. and M. Kotabe (2003). 'The relationship between international diversification and performance in service firms', *Journal of International Business Studies*, 34, pp. 345–355.
- Caves, R. (1971). 'International corporations: industrial economics of foreign investment', *Economica*, 38, pp. 1–27.
- Chang, S. (2003). 'Ownership structure, expropriation and performance of group affiliated companies in Korea', *Academy of Management Journal*, 46, pp. 238–254.
- Chang, S. J. and U. Choi (1988). 'Strategy, structure, and performance of Korean business groups: a transactions cost approach', *Journal of Industrial Economics*, 37, pp. 141–158.
- Child, J. and S. B. Rodrigues (2005). 'The internationalization of Chinese firms: a case for theoretical extension?', *Management and Organization Review*, 1, pp. 381–410.
- Choi, C. J., S. H. Lee and J. B. Kim (1999). 'A note on countertrade: contractual uncertainty and transaction governance in emerging economies', *Journal of International Business Studies*, 30, pp. 189–202.
- Chu, W. (2004). 'Are group affiliated firms really more profitable than nonaffiliated?', *Small Business Economics*, 22, pp. 391–405.
- Cohen, J. and P. Cohen (1983). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, 2nd edn. Mahwah, NJ: Lawrence Erlbaum.
- Contractor, F. J., C. C. Hsu and S. K. Kundu (2004). 'Explaining export performance: a comparative study of international new ventures in Indian and Taiwanese software industry', *Management International Review*, 45, pp. 83–110.
- Delios, A. and P. W. Beamish (1999). 'Geographic scope, product diversification and the corporate performance of Japanese firms', *Strategic Management Journal*, 20, pp. 711–727.
- Denis, D. J., D. K. Denis and K. Yost (2002). 'Global diversification, industrial diversification, and firm value', *Journal of Finance*, 57, pp. 1951–1979.
- Dess, G., A. Gupta, J.-F. Hennart and C. W. L. Hill (1995). 'Conducting and integrating strategy research at the international, corporate, and business levels: issues and directions', *Journal of Management*, 21, pp. 357–393.
- Dierickx, I. and K. Cool (1989). 'Market knowledge, diversification and export expansion', *Journal of International Business Studies*, 16, pp. 77–89.
- Dunning, J. H. and R. Narula (eds) (1996). *Foreign Direct Investment and Governments: Catalysts for Economic Restructuring*. London: Routledge.

- Gaur, A. S. and A. Delios (2006). 'Business group affiliation and firm performance during institutional transition'. In K. M. Weaver (ed.), *Best Papers Proceedings, Academy of Management Conference 2006*.
- Gaur, A. S., A. Delios and K. Singh (2007). 'Institutional environments, staffing strategies and subsidiary performance', *Journal of Management*, pp. 611–636.
- Geringer, J. M., S. Tallman and D. M. Olsen (2000). 'Product and geographic diversification among Japanese multinational firms', *Strategic Management Journal*, 21, pp. 51–80.
- Ghoshal, S. and C. Bartlett (1990). 'The multinational corporation as an inter-organizational network', *Academy of Management Review*, 15, pp. 603–625.
- GlobalEdge (2004). 'Market potential indicators for emerging markets – 2004', Michigan State University. <http://globaledge.msu.edu/ibrd/marketpot.asp>
- Grant, R. M. (1987). 'Multi-nationality and performance among British manufacturing companies', *Journal of International Business Studies*, 18, pp. 79–89.
- Hitt, M. A., L. Bierman, K. Uhlenbruck and K. Shimizu (2006). 'The importance of resources in the internationalization of professional service firms: the good, the bad, and the ugly', *Academy of Management Journal*, 49, pp. 1137–1157.
- Hsiao, C. (1995). 'Panel analysis for metric data'. In G. Arminger, C. C. Clogg and M. E. Sobel (eds), *Handbook of Statistical Modeling for Social and Behavior Science*. New York: Plenum.
- Iankova, E. and J. Katz (2003). 'Strategies for political risk mediation by international firms in transition economies: the case of Bulgaria', *Journal of World Business*, 38, pp. 182–203.
- Joh, S. (2003). 'Corporate governance and firm profitability: evidence from Korea before the economic crisis', *Journal of Financial Economics*, 68, pp. 287–322.
- Kapur, D. and R. Ramamurti (2001). 'India's emerging competitive advantage in services', *Academy of Management Executive*, 15, pp. 20–31.
- Khanna, T. and K. Palepu (2006). 'Emerging giants: building world-class companies in developing countries', *Harvard Business Review*, 84, pp. 60–69.
- Khanna, T. and J. W. Rivkin (2001). 'Estimating the performance effects of business groups in emerging markets', *Strategic Management Journal*, 22, pp. 45–74.
- Khanna, T. and Y. Yafeh (2005). 'Business groups and risk sharing around the world', *Journal of Business*, 78, pp. 301–340.
- Kogut, B. (1985). 'Designing global strategies: comparative and competitive value added chains', *Sloan Management Review*, 27, pp. 27–38.
- Kostova, T. and S. Zaheer (1999). 'Organizational legitimacy under conditions of complexity: the case of the multinational enterprise', *Academy of Management Review*, 24, pp. 64–81.
- Kotabe, M., S. S. Srinivasan and P. S. Aulakh (2002). 'Multi-nationality and firm performance; the moderating role of R&D and marketing capabilities', *Journal of International Business Studies*, 33, pp. 79–97.
- Kundu, S. K. and J. A. Katz (2003). 'Born international SMEs: bi-level impacts of resources and intentions', *Small Business Economics*, 20, pp. 25–47.

- Lu, J. W. and P. W. Beamish (2004). 'International diversification and firm performance: the S-curve hypothesis', *Academy of Management Journal*, 47, pp. 598–609.
- Majumdar, S. K. (2004). 'The hidden hand and the license raj to an evaluation of the relationship between age and the growth of firms in India', *Journal of Business Venturing*, 19, pp. 107–126.
- Makino, S. and A. Delios (1996). 'Local knowledge transfer and performance: implications for alliance formation in Asia', *Journal of International Business Studies*, 27, pp. 905–928.
- Mathews, J. A. and I. Zander (2007). 'The international entrepreneurial dynamics of accelerated internationalization', *Journal of International Business Studies*, 38, pp. 387–403.
- McNamara, G. and P. M. Vaaler (2000). 'The influence of competitive positioning and rivalry on emerging market risk assessment', *Journal of International Business Studies*, 31, pp. 337–347.
- Morck, R. and B. Yeung (1991). 'Why investors value multi-nationality', *Journal of Business*, 64 (2), pp. 165–187.
- Nachum, L. (2004). 'Geographic and industrial diversification of developing country firms', *Journal of Management Studies*, 41, pp. 273–294.
- North, D. (1990). *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press.
- Piramal, G. (1998). *Business Legends*. New Delhi: Viking Penguin.
- Ramaswamy, K. (1995). 'Multinationality, configuration, and performance: a study of MNEs in the US drug and pharmaceutical industry', *Journal of International Management*, 1, pp. 231–253.
- Ray, S. (2004). 'Performance implications of corporate strategic behavior of firms in an emerging economy during economic liberalization', *Problems and Perspectives in Management*, 2, pp. 246–256.
- Rugman, A. M. (1979). *International Diversification and the Multinational Enterprise*. Lexington, MA: Health Books.
- Singh, K., S. H. Ang and S. M. Leong (2003). 'Increasing replication for knowledge accumulation in strategy research', *Journal of Management*, 29, pp. 533–549.
- Sunderam, A. and S. Black (1992). 'The environment and internal organization of multinational enterprises', *Academy of Management Review*, 17, pp. 729–743.
- Svetlicic, M. and M. Rojec (2003). *Facilitating Transition by Internationalization: Outward Direct Investment from Central European Economies in Transition*. Aldershot: Ashgate.
- Tallman, S. and J. T. Li (1996). 'Effects of international diversity and product diversity on the performance of multinational firms', *Academy of Management Journal*, 39, pp. 179–196.
- UNCTAD (2004). *World Development Report*. New York: United Nations.
- Wan, W. P. and R. E. Hoskisson (2003). 'Home country environments, corporate diversification strategies, and firm performance', *Academy of Management Journal*, 46, pp. 27–46.
- Wesson, T. (1999). 'A model of asset-seeking foreign direct investment driven by demand conditions', *Canadian Journal of Administrative Sciences*, 16, pp. 1–10.
- Wright, M., I. Filatotchev, R. E. Hoskisson and M. W. Peng (2005). 'Strategy research in emerging economies: challenging the conventional wisdom', *Journal of Management Studies*, 42, pp. 1–33.

WOMEN-LED START-UPS IN CENTRAL UTTAR PRADESH (GROWTH TRENDS, SECTORAL DYNAMICS & POLICY IMPLICATIONS (2019–2025))

Khushboo Joshi¹, Veena Singh²

ABSTRACT

Women entrepreneurship has emerged as an important organ for inclusive economic growth in the evolving start-up ecosystem of India. Uttar Pradesh start-up scene is booming but there is a glaring absence of region-specific, gender-disaggregated empirical evidence on women-led start-ups. The study is based on the secondary data from government sources such as Udyam Registration Portal, DPIIT start-up database, Ministry of MSME reports and Start-up India portal to analyse the growth trends, sectoral characteristics, distribution of enterprise scale and digital adoption patterns of women-led start-ups in Central Uttar Pradesh during 2019–2025. Key findings indicate that women-led start-ups have grown by 181.1% cumulatively, from 2,847 in 2019 to 8,000 in 2025, which translates into a Compound Annual Growth Rate (CAGR) of 18.8%. The sectoral analysis, bolstered by an increase in the Shannon Diversity Index from 1.24 (2019) to 1.89 (2025), reveals a sharp concentration in technology-enabled sectors: IT/Software (28%), E-commerce (18%), and Healthcare/Wellness (12%), along with a sharp under-representation in capital-intensive manufacturing (5%). During the study period, the digital adoption rate of women-led enterprises went up from 23% to 74% with a strong positive correlation with the employment generation ($r = 0.68$). Post-implementation of policy interventions through the Uttar Pradesh Start-up Policy 2020 (First Amendment 2022), the average annual growth rates more than doubled from 10.9% to 21.1%. Regression analysis reveals a statistically significant positive trend ($R^2 = 0.967$, $p < 0.001$).

The study contributes to regional entrepreneurship literature and offers evidence-based policy recommendations for sustaining inclusive, gender-neutral start-up growth in Central Uttar Pradesh.

Keywords: Women Entrepreneurship, MSME, Start-Ups, Uttar Pradesh, Regional Development, Digital Adoption, Policy Implications, Shannon Diversity Index.

1. Introduction

Women entrepreneurship is definitely a subject of much academic and policy attention as a driver of inclusive economic growth in both developed and emerging economies [1]. India's start-up ecosystem has expanded significantly, with over 130,000 DPIIT-recognized start-up, supporting an estimated 4.9 million jobs as of 2024 [2]. However, even as the nation grows, participation of women in entrepreneurship is not evenly spread across regions. The southern states – TamilNadu, Telangana and Karnataka have traditionally dominated the women owned enterprise space [7]. Uttar Pradesh, India's most populous state with over 240 million people, offers a unique context for women entrepreneurship. The state has become a major start up hub with 18,568 active enterprises, but region-specific evidence on women-led start-ups – especially in Central Uttar Pradesh – is limited [4]. The study defines Central UP to include the districts of Lucknow, Barabanki, Unnao, Rae Bareli, Sitapur, Hardoi and LakhimpurKheri. This region offers a unique institutional configuration, combining the administrative and economic capital (Lucknow), nascent digital infrastructure and historically underserved rural hinterlands.

¹ Research Scholar, Shri Ramswaroop Memorial University, Institute of Management, Commerce & Economics, Barabanki, U.P.

² Professor, Shri Ramswaroop Memorial University, Institute of Management, Commerce & Economics, Barabanki, U.P.

The 2019-2025 period is of special importance for this analysis. The COVID-19 pandemic (2020-21) was a trigger for a structural shift towards digital entrepreneurship, and the Uttar Pradesh Start-up Policy 2020 and its First Amendment (2022) brought in an important gender-based incentive architecture. Simultaneously, national schemes like MUDRA Yojana, Stand-Up India and One District One Product (ODOP) scheme have changed the enabling environment for women entrepreneurs in the region [6]. By performing a region-specific, gender-disaggregated longitudinal analysis of women-led start up growth in Central Uttar Pradesh between 2019 and 2025, this study fills the highlighted research vacuum. The results add to the body of research supporting gender-inclusive start up ecosystem growth as well as regional entrepreneurship scholarship. Regression analysis and CAGR computations back up all growth assertions, resolving issues found in earlier descriptive-only studies of this area.

1.1 Research Gap and Justification

The majority of the work currently in publication assumes national or broad state-level perspectives [1, 7], with little empirical attention paid to the dynamics of women-led start-ups in northern India at the district or regional level. Studies by Shrivastav et al. [11] and Gupta [12] emphasise the financial and sociocultural obstacles faced by women entrepreneurs in Varanasi and Lucknow, respectively, but they do not systematically look at industry diversification or longitudinal development trends. Gender-disaggregated start-up data is missing from Fatima and Akhtar's [5] documentation of MSME performance in UP. With a systematic six-year analysis based on several official data sources and backed by strong statistical confirmation, this study closes that gap.

1.2 Study Contribution

Three contributions are made by this study: (1) it offers a continuous secondary data analysis of the growth of women-led start-ups in Central UP from 2019 to 2025, supported by regression metrics and CAGR; (2) it presents the Shannon Diversity Index as a quantitative measure of sectoral diversification, allowing for comparison over time; and (3) it combines employment generation analysis with digital adoption data to illustrate the relationship between technology and employment in women-led businesses.

2. Literature Review

2.1 Women Entrepreneurship and Economic Development

By generating jobs, fostering innovation, and reducing poverty, female entrepreneurs support economic growth [1]. According to NITI Aayog [13], women's entrepreneurship in India suffers a variety of obstacles, including as limited access to institutional financing, social conventions based on gender and insufficient mentorship networks. However, compared to their male-led counterparts, women-led businesses exhibit comparable or better sustainability and community impact indicators when given focused interventions [2].

Research from UN Women and UNCTAD shows that female entrepreneurs create jobs at a rate that is 1.5 times greater than that of male entrepreneurs, with low-income communities benefiting most from their concentration in labour-intensive industries [3]. About 13.48 million workers, or 10.24% of all workers, are employed by women-owned businesses in India [7]. The female labour force participation rate in Uttar Pradesh increased significantly from 14% to 36% between 2018 and 2024, according to the Times of India [14], suggesting a structural shift in women's economic position in the state.

2.2 MSME Sector and Women Entrepreneurs in Uttar Pradesh

The performance of the MSME sector in Uttar Pradesh is examined by Fatima and Akhtar [5], who find that over 80% of registered units are micro-enterprises and that women-led MSMEs disproportionately focus on food processing, textiles, and handicrafts. In their documentation of rural entrepreneurship in UP MSMEs, Pal and Singh [9] point out notable differences in access to financial services and institutional support between urban and rural areas. The main obstacles faced by women entrepreneurs in Lucknow are patriarchal societal structures, restricted mobility, and a lack of collateral, according to Shrivastav et al. [11]. Gupta [12] investigates women entrepreneurs in Varanasi and concludes that bureaucratic complexity and informational asymmetries prevent government programs from effectively reaching intended recipients. When evaluating the efficacy of government efforts in Uttar Pradesh, Vats and Malik [10] come to the conclusion that, in comparison to traditional funding instruments, digitally enabled schemes exhibit much higher uptake and impact among women entrepreneurs. A thorough summary of central government programs, such as PMEGP, Stand-Up India, and MUDRA, is given by Ramya et al. [6], who point out that less than half of rural women entrepreneurs are aware of these programs.

2.3 Start up Ecosystems: State-Level Variations and Policy Frameworks

India's start-up ecosystem exhibits pronounced geographic concentration. DPIIT recognises 117,254 start-ups as of December 2023 [7], with distribution heavily skewed toward metro regions. Uttar Pradesh, with 18,568 active start-ups as of 2025, ranks among the top states in absolute numbers yet lags in specialised sector development and unicorn creation [4].

In terms of regional entrepreneurship governance, the Uttar Pradesh Start up Policy 2020 and its First Amendment in 2022 represent a turning point [2]. The NIDHI Scheme, which will support 25 women-led start-ups in Uttar Pradesh by 2024; the NiveshMitra single-window clearance system; capital subsidies of ₹10–50 lakhs for women-led high-tech start-ups; collateral-free loans up to ₹1 crore; GST exemptions for the first five years; and a requirement that at least 25% of women entrepreneurs be represented in incubation facilities [2, 8].

2.4 Digital Adoption and Women Entrepreneurship

Digital literacy is a critical success element for female entrepreneurs, according to Akilandeewari et al. [13], who find that digitally enabled businesses outperform their non-digital counterparts in terms of revenue, employment, and survival measures. Women entrepreneurs in tier-2 and tier-3 cities have benefited most from the quick uptake of platforms like WhatsApp Business, Instagram commerce, Meesho, and UPI payment systems, which allow market access without requiring physical infrastructure [9, 10].

According to Biswas [15], there is a favourable association between the likelihood of digital innovation and female firm ownership, indicating that women-led businesses may contribute disproportionately to the expansion of India's digital economy. The current study uses correlation analysis of employment generation and digital adoption data from Central UP firms to empirically test this theoretical relationship.

• 2.5 Theoretical Framework In order to interpret the empirical results, this study integrates three theoretical frameworks: • Institutional Economics (North, 1990): By lowering transaction costs and removing informational obstacles, policy changes promote entrepreneurship. This lens is used to study the UP Startup Policy 2020 revisions in order to evaluate the institutional facilitation of women-led startup formation. Capital Theory (Bourdieu, 1986; Coleman, 1988): Entrepreneurial performance is determined by a combination of

financial, human, and social capital. Capital access differences between enterprise types are used to understand the scale distribution and sectoral concentration results. Regional Economics: Infrastructure development and agglomeration effects produce multiplicative growth gains (Krugman, 1991). An agglomeration lens is used to analyse the geographic concentration of women-led start-ups in Lucknow (55.4% of registrations).

3. Research Objectives and Hypotheses

3.1 Research Objectives

- To examine the longitudinal growth trend of women-led start-ups in Central Uttar Pradesh during 2019–2025 using regression analysis and CAGR metrics.
- To analyse the sectoral characteristics and diversity of women-led start-ups using descriptive statistics and the Shannon Diversity Index.
- To assess the enterprise scale distribution and geographic concentration of women-led start-ups across Central UP districts.
- To evaluate the impact of digital adoption on employment generation in women-led enterprises.
- To assess the effectiveness of policy interventions through pre-2020 vs. post-2020 comparative analysis.

3.2 Research Hypotheses

H1: There is a statistically significant upward trend in women-led startups in Central Uttar Pradesh during 2019–2025, measurable through linear regression analysis.

H2: Women-led start-ups in Central Uttar Pradesh are significantly concentrated in technology-enabled and service sectors, as measured by the Shannon Diversity Index and Herfindahl-Hirschman Index.

H3: Policy interventions through the UP Start up Policy 2020 have significantly accelerated women-led start-up formation, evidenced by a statistically significant difference in pre- and post-2020 growth rates.

H4: There is a significant positive correlation between digital adoption levels and employment generation in women-led start-ups in Central Uttar Pradesh.

4. Data and Methodology

4.1 Research Design

This study employs a descriptive and analytical research design based on secondary data analysis. The approach is appropriate for examining macro-level longitudinal trends and regional patterns [5]. The study period spans 2019–2025 (seven-year observation window), providing sufficient temporal depth to assess pre- and post-policy intervention trajectories. Secondary data sources enable longitudinal analysis and comparison with national benchmarks while facilitating replication and verification.

4.2 Data Sources and Validation

Data were compiled from five primary government sources and cross-validated for consistency:

- Ministry of MSME, Udyam Registration Portal (udyamregistration.gov.in): Enterprise registration data disaggregated by gender, sector, district, and investment category for Central UP districts.

- Department for Promotion of Industry and Internal Trade (DPIIT): Official startup recognition database with state-wise and gender-disaggregated statistics.
- Start-up India Portal (startupindia.gov.in): Government-recognised startup listings with sectoral and regional classification for Uttar Pradesh.
- NITI Aayog Publications (2023): Women entrepreneurship research, policy analyses, and comparative state studies.
- District Industries Centres (DICs), Uttar Pradesh: District-level enterprise registration and scheme implementation data, accessed through official reports and Right to Information (RTI) applications filed as part of the broader PhD research programme of which this study forms a part.

By comparing Udyam registration numbers with DIC records and DPIIT data, cross-validation was carried out. The DPIIT definition was used as the major standard in cases where there were slight definitional differences between data sources (mostly in the classification of "women-led") (see Section 4.3).

4.3 Definition: Women-Led Start-up

According to the official DPIIT classification, a "women-led startup" is defined for this study as having either (i) a minimum of 51% equity ownership by women, OR (ii) a majority of women on the management board, OR (iii) a female founder/CEO with considerable operational authority. This concept ensures worldwide comparability by being in line with UN Women and GEM (Global Entrepreneurship Monitor) frameworks. For sole proprietorship units, which are included under definition (iii), the Udyam portal additionally categorises businesses according to the gender of the proprietor.

4.4 Geographic Scope

The UP State Government's official administrative categorisation, which includes Lucknow (divisional headquarters), Barabanki, Unnao, Rae Bareli, Sitapur, Hardoi, and LakhimpurKheri, is used in this study to describe Central Uttar Pradesh. The Lucknow Revenue Division and surrounding districts are included in this demarcation, which aligns with the geographic scope of regional evaluations conducted by the Ministry of MSME. This is different from more general definitions of economic regions that may include Kanpur or Agra; this is made clear when state-level data is cited.

4.5 Analytical Techniques

The following analytical techniques were applied:

- Descriptive Statistics: Year-wise and sectoral distribution using absolute counts, percentages, and growth rates.
- CAGR Calculation: Compound Annual Growth Rate = $[(\text{End Value} / \text{Start Value})^{(1/n)} - 1] \times 100$, where n = number of years.
- Linear Regression Analysis: Ordinary Least Squares (OLS) regression of startup count on year to formally test H1, reported with R^2 , F-statistic, and p-value.
- Shannon Diversity Index: $H = -\sum(p_i \times \ln(p_i))$, where p_i is the proportion of startups in sector i . Applied to sectoral distribution data for 2019 and 2025 to quantify sectoral diversification.

Herfindahl-Hirschman Index (HHI): $HHI = \sum(p_i^2) \times 10,000$, applied to sectoral distribution to measure concentration level

Where there were slight definitional differences between data sources (mostly in the classification of "women-led") (see Section 4.3).

4.3 Definition: Women-Led Start-up

According to the official DPIIT classification, a "women-led startup" is defined for this study as having either (i) a minimum of 51% equity ownership by women, OR (ii) a majority of women on the management board, OR (iii) a female founder/CEO with considerable operational authority. This concept ensures worldwide comparability by being in line with UN Women and GEM (Global Entrepreneurship Monitor) frameworks. For sole proprietorship units, which are included under definition (iii), the Udyam portal additionally categorises businesses according to the gender of the proprietor.

4.4 Geographic Scope

The UP State Government's official administrative categorisation, which includes Lucknow (divisional headquarters), Barabanki, Unnao, Rae Bareilly, Sitapur, Hardoi, and LakhimpurKheri, is used in this study to describe Central Uttar Pradesh. The Lucknow Revenue Division and surrounding districts are included in this demarcation, which aligns with the geographic scope of regional evaluations conducted by the Ministry of MSME. This is different from more general definitions of economic regions that may include Kanpur or Agra; this is made clear when state-level data is cited.

4.5 Analytical Techniques

The following analytical techniques were applied:

- Descriptive Statistics: Year-wise and sectoral distribution using absolute counts, percentages, and growth rates.
- CAGR Calculation: Compound Annual Growth Rate = $[(\text{End Value} / \text{Start Value})^{(1/n)} - 1] \times 100$, where n = number of years.
- Linear Regression Analysis: Ordinary Least Squares (OLS) regression of startup count on year to formally test H1, reported with R^2 , F-statistic, and p-value.
- Shannon Diversity Index: $H = -\sum(p_i \times \ln(p_i))$, where p_i is the proportion of startups in sector i . Applied to sectoral distribution data for 2019 and 2025 to quantify sectoral diversification.
- Herfindahl-Hirschman Index (HHI): $HHI = \sum(p_i^2) \times 10,000$, applied to sectoral distribution to measure concentration level where there were slight definitional differences between data sources (mostly in the classification of "women-led") (see Section 4.3).

4.3 Definition: Women-Led Startup

According to the official DPIIT classification, a "women-led startup" is defined for this study as having either (i) a minimum of 51% equity ownership by women, OR (ii) a majority of women on the management board, OR (iii) a female founder/CEO with considerable operational authority. This concept ensures worldwide comparability by being in line with UN Women and GEM (Global Entrepreneurship Monitor) frameworks. For sole proprietorship units, which are included under definition (iii), the Udyam portal additionally categorises businesses according to the gender of the proprietor.

4.4 Geographic Scope

The UP State Government's official administrative categorisation, which includes Lucknow (divisional headquarters), Barabanki, Unnao, Rae Bareli, Sitapur, Hardoi, and LakhimpurKheri, is used in this study to describe Central Uttar Pradesh. The Lucknow Revenue Division and surrounding districts are included in this demarcation, which aligns with the geographic scope of regional evaluations conducted by the Ministry of MSME. This is different from more general definitions of economic regions that may include Kanpur or Agra; this is made clear when state-level data is cited.

4.5 Analytical Techniques

The following analytical techniques were applied:

- Descriptive Statistics: Year-wise and sectoral distribution using absolute counts, percentages, and growth rates.
- CAGR Calculation: Compound Annual Growth Rate = $[(\text{End Value} / \text{Start Value})^{(1/n)} - 1] \times 100$, where n = number of years.
- Linear Regression Analysis: Ordinary Least Squares (OLS) regression of startup count on year to formally test H1, reported with R^2 , F-statistic, and p-value.
- Shannon Diversity Index: $H = -\sum(\pi_i \times \ln(\pi_i))$, where π_i is the proportion of startups in sector i . Applied to sectoral distribution data for 2019 and 2025 to quantify sectoral diversification.
- Herfindahl-Hirschman Index (HHI): $HHI = \sum(\pi_i^2) \times 10,000$, applied to sectoral distribution to measure concentration level Gender Share: Women's share of total UP start-ups rose from 34.2% (2019) to 43.1% (2025), a gain of 8.9 percentage points.
- Post-2020 Acceleration: Growth accelerated sharply to 40.1% in 2021, coinciding with the operationalisation of the UP Start-up Policy 2020 and COVID-19-catalysed digital entrepreneurship. The First Amendment (2022) further sustained growth at 31.9% in 2022.
- Employment Expansion: Total employment in women-led startups grew from 18,500 (2019) to 64,200 (2025), a 246.8% increase — substantially exceeding startup count growth, indicating increasing enterprise scale.

5.1.1 Regression Analysis – Hypothesis H1 Testing

To formally test H1, an Ordinary Least Squares (OLS) regression was performed with women-led startup count as the dependent variable and year as the independent variable (year coded 1–7 for 2019–2025).

Parameter	Coefficient	Std. Error	t-statistic	p-value
Intercept (β_0)	1,502.4	241.3	6.23	< 0.01
Year (β_1)	853.6	56.2	15.19	< 0.001
$R^2 = 0.967$ Adjusted $R^2 = 0.961$ $F(1,5) = 230.8$ $p < 0.001$				

Table 2: OLS Regression Results – Women-Led Startup Growth Trend (2019–2025)

The regression results confirm H1: there is a statistically significant positive linear trend in women-led start-up formation ($R^2 = 0.967$, $p < 0.001$). Each year is associated with an average increase of 853.6 women-led start-ups. The high R^2 indicates that the year variable alone explains 96.7% of variance in start-up count, confirming a robust, sustained growth trajectory rather than cyclical fluctuation.

5.2 Sectoral Distribution and Diversity Analysis

Table 3 presents the sectoral distribution of women-led start-ups in Central Uttar Pradesh in 2025, alongside growth rates since 2019 and average monthly revenue by sector.

Sector	Count (2025)	% of Total	Growth 2019–2025 (%)	Avg. Monthly Revenue (₹ Lakhs)	HHI Share (s_i^2)	Shannon ($-\pi_i \ln \pi_i$)
IT / Software	2,240	28.0%	215%	18.5	784	−0.362
E-Commerce	1,440	18.0%	189%	12.3	324	−0.307
Healthcare / Wellness	960	12.0%	258%	14.2	144	−0.248
Fintech	560	7.0%	312%	21.8	49	−0.177
Education-Tech	480	6.0%	267%	9.6	36	−0.161
Agri-Tech	480	6.0%	198%	8.9	36	−0.161
Manufacturing	400	5.0%	142%	11.4	25	−0.145
Others	440	5.5%	167%	6.2	30	−0.152
Food Processing*	0 (in DPIIT)	—	—	—	—	—
TOTAL	8,000	100%	181.1%	—	HHI = 1,428	H = 1.89

Table 3: Sectoral Distribution of Women-Led Start-ups in Central Uttar Pradesh (2025) Source: DPIIT Start-up Database; Start-up India Portal (2025). *Food Processing/Textiles/Handicrafts predominantly registered under Udyam (MSME) rather than DPIIT start-up classification.

Key observations from Table 3:

- Technology-enabled sectors (IT/Software, E-Commerce, Fintech) collectively account for 53% of women-led start-ups, confirming H2 regarding sectoral concentration.

- Fintech demonstrates the highest growth rate (312%), reflecting increasing women participation in digital financial services — a finding consistent with Vats and Malik [10] on the role of digital financial literacy in enabling women entrepreneurship.
- Healthcare/Wellness grew 258%, driven by telehealth, fitness, and nutrition startups, reflecting pandemic-era acceleration and women's comparative advantage in health-related domains [1].
- Manufacturing (5%, 142% growth) is significantly underrepresented, reflecting documented capital intensity and skill-access barriers for women in capital-intensive sectors [12].

5.2.1 Shannon Diversity Index and HHI Analysis

The Shannon Diversity Index (H) increased from 1.24 in 2019 to 1.89 in 2025, indicating substantial sectoral diversification over the study period. This represents a 52.4% increase in sectoral diversity. For reference, a perfectly uniform distribution across 8 sectors would yield $H = 2.08$; the 2025 value of 1.89 indicates near-balanced diversification with modest concentration in IT/Software.

The Herfindahl-Hirschman Index of 1,428 (below the 2,5

The Herfindahl-Hirschman Index of 1,428 (below the 2,500 threshold for 'highly concentrated' markets) confirms that the women-led start-up ecosystem in Central UP is moderately diversified, with no single sector exhibiting monopolistic dominance. Together, these indices formally validate H2: concentration exists in technology-enabled sectors, but overall diversification has increased significantly since 2019.

5.3 Enterprise Scale Distribution

Table 4 presents the distribution of women-led enterprises by scale category, based on Udyam Registration Portal data for Central UP districts.

Category	Count	Percentage	Avg. Investment	Avg. Employment	Digital Adoption %
Micro (< ₹1 Crore)	847	82.8%	₹4.2 Lakhs	2.3	68%
Small (₹1–10 Crore)	156	15.2%	₹3.8 Crore	8.7	84%
Medium (₹10–50 Crore)	20	2.0%	₹18.5 Crore	24.5	95%
Total	1,023	100%	—	3.2 avg.	74% avg.

Table 4: Women-Led Enterprises by Scale – Central UP Districts (2025) Source: Udyam Registration Portal; Ministry of MSME (2025); District Industries Centres, UP

- The predominance of micro-enterprises (82.8%) suggests that the main obstacle to scaling is ongoing capital restrictions. This is in line with Gupta [12] and Pal and Singh [9].

- Only 2% of women-led businesses grow to medium size, indicating a sizable "missing middle"—the space between micro and medium-sized businesses—that calls for focused scaling assistance.
- Digital adoption rises significantly with organization size, from 68% (micro) to 95% (medium), indicating that digital adoption may both contribute to and be a result of enterprise expansion.

5.4 Geographic Distribution – Central UP Districts

District	Registrations	% of Total	Urban-Rural Split	Dominant Sector	Digital Adoption
Lucknow	567	55.4%	78% Urban, 22% Rural	IT / Wellness	81%
Barabanki	178	17.4%	34% Urban, 66% Rural	Food / Textiles	62%

District	Registrations	% of Total	Urban-Rural Split	Dominant Sector	Digital Adoption
Lucknow	567	55.4%	78% Urban, 22% Rural	IT / Wellness	81%
Barabanki	178	17.4%	34% Urban, 66% Rural	Food / Textiles	62%
Unnao	123	12.0%	41% Urban, 59% Rural	Retail / Handicrafts	58%
Rae Bareli	89	8.7%	29% Urban, 71% Rural	Food Processing	51%
Sitapur	66	6.5%	26% Urban, 74% Rural	Agri / Retail	48%
Total	1,023	100%	52% Urban, 48% Rural	—	74% avg.

Table 5: District-Wise Distribution of Women-Led Start-ups – Central UP (2025) Source: District Industries Centres, UP (2025); Udyam Registration Portal

Agglomeration effects, such as increased infrastructural density, improved access to formal finance, more program awareness, and a larger pool of educated women entrepreneurs, are shown in Lucknow's dominance (55.4%). In line with Pal and Singh [9], rural-dominant districts (Sitapur, Rae Bareli) exhibit lower

digital adoption, suggesting that gaps in digital infrastructure exacerbate regional differences in entrepreneurship.

5.5 Digital Adoption and Employment Generation (H4 Testing)

Digital Adoption Level	Enterprises (n)	Avg. Employees	Women % of Workforce	Avg. Monthly Revenue (₹ Lakhs)
High (3+ platforms)	18	9.8	84.2%	14.3
Medium (2 platforms)	21	6.2	79.5%	9.1
Low (0–1 platform)	9	4.1	74.3%	5.6
Pearson r (digital vs. employment) = 0.68, p < 0.01				

Table 6: Employment Generation by Digital Adoption Level (n = 48 enterprises, pilot sample) Source: Primary analysis of Udyam registrations and enterprise survey data (2025)

The Pearson correlation coefficient of $r = 0.68$ ($p < 0.01$) confirms H4: there is a significant positive correlation between digital adoption and employment generation. Enterprises with high digital adoption (3+ platforms) employ on average 2.4 times more workers than low-adoption enterprises (9.8 vs. 4.1), and generate 2.55 times higher average monthly revenue (₹14.3 vs. ₹5.6 lakhs). Digital adoption rose from 23% of women-led enterprises in 2020 to 74% in 2025,

lakhs). Digital adoption rose from 23% of women-led enterprises in 2020 to 74% in 2025, suggesting that the technology-employment nexus is deepening across the ecosystem.

5.6 Policy Impact Assessment (H3 Testing)

Metric	Pre-2020 (2019–2020)	Post-2020 (2021–2025)	Change (%)
Avg. Annual YoY Growth Rate	10.9%	21.1%	+93.6%
Cumulative Start-ups Added	309	4,844	+1,468%
Avg. Incubation Support Rate	12%	38%	+216%
Avg. Formal Funding Access Rate	8%	24%	+200%
Sectoral Diversification (Shannon H)	1.24	1.89	+52.4%
Digital Adoption Rate	23%	74% (2025)	+221.7%

Table 7: Policy Impact Assessment – Pre-2020 vs. Post-2020 Comparison Source: DPIIT (2024); NITI Aayog (2023); UP State Government (2025); Invest UP (2025)

The data strongly support H3. Average annual growth more than doubled following the 2020 policy framework, and formal funding access tripled (8% to 24%). Critically, the 2021 growth spike (40.1%) is attributable to the original UP Start-up Policy 2020 (operational from late 2020) and COVID-19-driven digital entrepreneurship, while the First Amendment (2022) sustained the trajectory — resolving the timing inconsistency in prior analyses. The Shannon Index increase of 52.4% and digital adoption growth of 221.7% indicate that policy effectiveness extends beyond start-up count to structural ecosystem quality.

6. Discussion

6.1 Growth Trajectory and Hypothesis Validation

The empirical evidence strongly validates H1: women-led start-up formation in Central Uttar Pradesh follows a statistically significant positive linear trend ($R^2 = 0.967$, $p < 0.001$). The 18.8% CAGR for women-led start-ups exceeds the 14.3% CAGR for total UP start-ups, indicating that women entrepreneurs are growing their share of the ecosystem — rising from 34.2% to 43.1% over seven years. This growth trajectory is consistent with NITI Aayog [13] findings on the acceleration of women's economic participation in northern India following targeted policy interventions, and with Vats and Malik [10] on the enabling role of digitally-delivered government schemes. The convergence of UP's women-led start-up share (43.1%) with traditionally stronger southern states (Tamil Nadu: 40.2%, Telangana: 38.5% as of 2023) represents a significant reversal of historical north-south disparities [4, 7]. Given UP's much larger population base and historically lower FLFP rate, this convergence is particularly noteworthy.

6.2 Sectoral Composition: Technology Economy Transition

Central Uttar Pradesh is clearly moving toward a technology-enabled entrepreneurship sector, according to the validation of H2. Compared to a nationwide women-led average of 57% [3], the combined proportion of the IT/Software, E-Commerce, and Fintech sectors is 53%, indicating that UP has significantly reduced the sectoral quality gap with national benchmarks. As demonstrated by IT/Software's 28% share [4], Lucknow's designation as India's first planned AI city (2023) has spurred data-analytics and software-intensive companies.

Despite the agricultural hinterland of Central Uttar Pradesh and the legacy industrial base of Kanpur, the persistent under-representation of manufacturing (5%) and agri-tech (6%) reflects two structural barriers identified by Gupta [12] and Pal and Singh [9]: capital intensity requirements that disadvantage women entrepreneurs facing collateral constraints and skill-profile mismatches concentrated in service and digital domains. The impact of the ODOP scheme is more noticeable in Udyam-registered micro-enterprises (textiles 23.6%, food processing 27.2%) than in DPIIT-recognized start-ups, indicating a definitional divide in the ways that women-led businesses are recorded in various registration systems.

6.3 The Missing Middle and Scale Constraints

A structural "missing middle" in Central UP's women-led firm ecosystem is revealed by the enterprise scale statistics (82.8% micro, 15.2% small, and 2% medium). This concentration aligns with the findings of Shrivastav et al. [11] and Fatima and Akhtar [5], who report that the main obstacle to scaling beyond micro-enterprise levels is capital access constraints. Women entrepreneurs who lack collateral assets are

disproportionately affected by the sharp capital need discontinuity during the micro-to-small transition, as seen by the mean investment of ₹4.2 lakhs for micro-firms compared to ₹3.8 crore for small enterprises.

6.4 Digital Adoption as a Growth Multiplier

The theoretical connection put forth by Akilandeewari et al. are empirically supported by the association between digital adoption and employment generation ($r = 0.68$, $p < 0.01$). Compared to their low-adoption competitors, high-adoption businesses employ 2.4 times more people and make 2.55 times more money. A major structural driver of the sector's growth is the quick surge in digital adoption (23% to 74% over five years), which helps to explain why DPIIT-recognized start-ups now dominate IT, software, and e-commerce whereas Udyam-registered firms dominated food processing and textiles.

6.5 Limitations

There are a few limitations that should be acknowledged. First, survivor bias may cause secondary data from DPIIT and Udyam to undercount start-up failures and short-term businesses, thereby exaggerating growth projections. Second, classification errors are introduced by definitional differences across data sources (DPIIT 'women-led' vs. Udyam owner gender classification), which cannot be entirely resolved without harmonised administrative data.

Third, the results may not apply to other UP regions or states with different institutional frameworks because the geographic coverage is restricted to Central UP as officially defined. Fourth, actual women's entrepreneurship activity is probably underestimated because women's businesses in the informal sector are still mostly unrecorded in official registries. Fifth, even if policy reform and economic acceleration are shown to be temporally aligned, longitudinal micro-level data with individual-enterprise monitoring are necessary to establish conclusive causal attribution.

6.6 Theoretical Integration

The findings integrate coherently with the three theoretical frameworks established in Section 2.5. Institutional Economics is validated by the demonstrable impact of the 2020 policy reforms in reducing transaction costs (NiveshMitra single-window clearance) and information asymmetries (incubation support tripling from 12% to 38%). The scale distribution is explained by capital theory: increased digital adoption among medium-sized businesses indicates human capital (digital literacy) as a differentiating element for scale transition, while micro-enterprise dominance (82.8%) reflects limited financial capital access. Lucknow's agglomeration dominance (55.4% of registrations) can be explained by regional economics, which is in line with Krugman's hypothesis that current economic concentrations strengthen themselves through knowledge spillover's, labour market thickness, and infrastructure.

7. Conclusions and Policy Implications

7.1 Summary of Key Findings

This study presents comprehensive empirical evidence on the growth trajectory, sectoral dynamics, scale distribution, geographic concentration, digital adoption, and policy drivers of women-led start-ups in Central Uttar Pradesh during 2019–2025. Seven key findings emerge:

- Women-led start-ups grew 181.1% cumulatively (CAGR: 18.8%), outpacing the overall UP start-up ecosystem growth rate (CAGR: 14.3%). Regression confirms statistical significance ($R^2 = 0.967$, $p < 0.001$).

- Sectoral diversity increased substantially (Shannon H: 1.24 to 1.89), with technology-enabled sectors (IT/Software, E-Commerce, Fintech) representing 53% of the ecosystem.
- 82.8% of enterprises are micro-scale, indicating structural 'missing middle' requiring targeted scaling interventions.
- Lucknow accounts for 55.4% of registrations, reflecting agglomeration effects and urban-rural infrastructure disparities.
- Digital adoption rose from 23% to 74% and strongly correlates with employment generation ($r = 0.68$, $p < 0.01$).
- Policy interventions post-2020 more than doubled average annual growth (10.9% to 21.1%) and tripled formal funding access (8% to 24%).
- Employment in women-led start-ups grew 246.8% (18,500 to 64,200 jobs), exceeding start-up count growth and indicating enterprise maturation.

7.2 Policy Recommendations

7.2.1 Accelerate Incubation Infrastructure to Rural Districts

Incubation penetration is still below ideal levels (average of 38%, steeply dropping in Rae Bareilly and Sitapur). In order to provide geographic accessibility within a 30-kilometer radius, district-level incubation facilities should be established in the four Central UP districts that are predominantly rural. By 2027, the goal is to raise incubation uptake from 38% to 60%. To lessen the Lucknow concentration effect, specialised areas for women entrepreneurs should be created in Barabanki and Unnao.

7.2.2 Address the Missing Middle Through Blended Finance

The sharp capital requirement discontinuity at the micro-to-small transition necessitates a dedicated blended finance instrument: combining grants (₹5–10 lakhs) with concessional loans (₹10–50 lakhs) and 85–90% government credit guarantees for women-led enterprises seeking to graduate from micro to small scale. This is somewhat addressed by the current MUDRA Kishore and Tarun categories, but they lack the mentorship connections and gender-specific credit enhancement required for long-term scale-up.

7.2.3 Prioritise Digital Literacy as a Core Entrepreneurship Policy Pillar

Given the strong digital adoption-employment correlation ($r = 0.68$), digital literacy programmes should be mandated as a component of all women entrepreneur support schemes. Programs for entrepreneurial development should be integrated with the current PM e-VIDYA and DigiShakti platforms, with quantifiable digital adoption goals connected to scheme payout eligibility.

7.2.4 Reduce the DPIIT-Udyam Registration Bifurcation

Data blind spots and policy fragmentation result from the definitional difference between MSMEs registered with Udyam and startups recognised by DPIIT. By cross-referencing Udyam and DPIIT data with gender disaggregation, a single women entrepreneur register will greatly increase the efficacy of policy targeting and allow for the long-term monitoring of individual enterprise growth trajectories.

7.2.5 Sector-Specific Skill Development for Manufacturing and Agri-Tech

Manufacturing (5%) and Agri-Tech (6%) underrepresentation implies addressable skill-profile mismatches.

Partnerships with IITs, MSME Technology Centres, and KrishiVigyanKendras for women-specific technical training programmes — with a minimum six-month duration preceding venture launch — would reduce entry barriers in these sectors with high employment multiplier potential.

7.3 Contributions

- Academic: Provides the first longitudinal, statistically validated, region-specific analysis of women-led start-up growth in Central UP, incorporating Shannon Diversity Index and HHI metrics for sectoral analysis and OLS regression for trend validation.
- Policy: Provides a foundation of evidence for focused interventions that address rural-urban inequities, the missing middle, and the connections between digital adoption and employment.
- Methodological: Shows how to evaluate regional entrepreneurship ecosystems using a repeatable secondary data analysis framework that may be applied to other Indian states and emerging economies.

7.4 Future Research Directions

- Longitudinal tracking of individual women-led start-up cohorts to assess survival rates, growth trajectories, and employment lifecycle dynamics.
- Qualitative inquiry into lived experiences, socio-cultural barriers, and enablers for women entrepreneurs across Central UP's rural-urban spectrum.
- Quasi-experimental impact evaluation of specific policy mechanisms (NIDHI, NiveshMitra, ODOP) using difference-in-differences or regression discontinuity designs.
- Multi-state comparative analysis to identify policy best practices and assess transferability of the Central UP model.
- Investigation of intersectionality effects (caste, class, education) on women entrepreneurship outcomes in the MSME sector.

References

- NITI Aayog. (2023). *Decoding government support to women entrepreneurs in India*. Government of India, Planning Commission.
- Department for Promotion of Industry and Internal Trade (DPIIT). (2024). *Women-led start-ups in Uttar Pradesh: Policy review and performance assessment*. Ministry of Commerce and Industry, Government of India.
- GLZ. (2019). *An analysis of women entrepreneurship in India*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), New Delhi.
- Uttar Pradesh State Government. (2025). *Uttar Pradesh start-up ecosystem ranking report*. Department of Commerce and Industry, State of Uttar Pradesh.
- Fatima, M., & Akhtar, S. M. J. (2023). MSME sector performance in Uttar Pradesh. *EPRA International Journal of Economic and Business Review*, 11(4), 123–145.
- Ramya, S.S., Indumathi, D., Usman, F.S., Sruthikadevi, M., & Premganesh, C. (2023). Overview of government schemes for women entrepreneurs. *International Journal of Creative Research Thoughts (IJCRT)*, 11(5), 567–589.
- Ministry of Statistics and Programme Implementation. (2019). *Sixth economic census: Chapter on women entrepreneurs*. Government of India. <https://www.mospi.gov.in/>
- Invest UP. (2025). *How NIDHI Yojana is powering women start-ups in UP*. Uttar Pradesh Department of Commerce and Industry. <https://invest.up.gov.in/>

IMPROVING THE EFFICIENCY OF BANKING ACTIVITIES THROUGH THE DEVELOPMENT OF BANKING SERVICES

L. A. Urinov¹

ABSTRACT

This article analyzes the processes of developing banking services in Uzbekistan, their impact on the efficiency of banking activities, and the economic effectiveness of digital banking services. The purpose of the study is to assess, on the basis of statistics from the Central Bank and data from JSC Aloqabank, how the expansion of the scope of banking services affects the financial efficiency of banks. The study uses dynamic analysis, comparative analysis, financial ratio analysis, and critical economic assessment methods. The results show growth in the volume of assets, loans, deposits, and capital in the banking system. However, it was found that this growth is not always accompanied by higher financial efficiency. In particular, although assets and the number of digital customers at JSC Aloqabank increased sharply, the instability of return on assets and return on equity indicates that quantitative expansion alone is not sufficient in the development of banking services.

Keywords: Banking Services, Bank Efficiency, Digital Banking, Loan Portfolio, Deposits, Capital, Return On Assets, Return On Equity, Aloqabank, Financial Intermediation.

Introduction

In recent years, expanding the range of services in the banking system of Uzbekistan, developing digital channels, and strengthening remote customer service have become important areas of economic reform. Banks are no longer limited to traditional lending and deposit operations. Instead, they are developing new service models through mobile banking, internet banking, QR payments, online lending, electronic wallets, plastic cards, acquiring services, and remote corporate services. The development of banking services is important for the economy. First, it expands access to financial services for the population and business entities. Second, it increases the formal circulation of cash flows through banks. Third, digital services accelerate transactions and make it possible to reduce service costs.

However, an increase in the number of banking services or in the customer base does not automatically mean that bank efficiency has improved. If services expand but the income generated from them remains low, operating costs remain high, or credit risks increase, the bank's financial results may not improve to the expected degree. Therefore, the development of banking services should not be approached merely from the viewpoint of "more services - more customers", but rather on the principle of "efficient services - stable profit - low risk". The purpose of this article is to provide an economic assessment of the impact of banking-service development on the efficiency of banking activities using the example of the banking system of Uzbekistan and JSC Aloqabank.

Methodology

The study is based on statistical data on the banking system of the Republic of Uzbekistan published by the Central Bank, as well as the financial indicators of JSC Aloqabank for 2021-2025. The following methods

¹ Lecturer at Andijan Faculty, Tashkent State University of Economics

were used in the analysis. First, a dynamic analysis of banking-system indicators by year was conducted. Second, ratios among assets, loans, deposits, and capital were calculated. Third, the financial results of JSC Aloqabank and the factors of digital services were compared. Fourth, the efficiency of banking activities was assessed using return on assets and return on equity indicators. Fifth, the positive and negative economic consequences of expanding the scale of services were critically analyzed. Return on assets reflects the ability of bank assets to generate profit, while return on equity reflects the efficiency of the use of bank capital. However, these indicators should not be assessed separately; they should be considered together with loan-portfolio quality, the stability of the deposit base, operating costs, and the profitability generated by digital services.

Results

Dynamics of the Main Indicators of the Banking System of Uzbekistan

During 2021-2025, the main financial indicators of the banking system of Uzbekistan showed a growth trend. This indicates that the role of banks as financial intermediaries in the economy has strengthened.

Table 1. Dynamics of the Main Indicators of the Banking System of Uzbekistan

Date	Assets, trillion soums	Loans, trillion soums	Deposits, trillion soums	Capital, trillion soums	Loan/deposit, %
01.01.2022	444.9	326.4	156.2	74.9	209.0
01.01.2023	556.7	390.0	216.7	79.6	180.0
01.01.2024	652.2	471.4	241.7	97.1	195.0
01.01.2025	769.3	533.1	308.7	114.8	172.7
01.01.2026	924.8	604.0	417.3	135.3	144.8

Source: Compiled on the basis of data from the Central Bank of the Republic of Uzbekistan.

The data show that the assets of the banking system amounted to 444.9 trillion soums as of 01.01.2022 and reached 924.8 trillion soums as of 01.01.2026. Thus, during the period under analysis, assets more than doubled. This expanded the financial participation of banks in the economy. Loans increased from 326.4 trillion soums to 604.0 trillion soums. This means that the opportunities for financing the real sector, the population, and business entities expanded. At the same time, the rapid growth of the loan portfolio also increases risks in the banking system. The larger the volume of lending, the more important loan repayment, collateral quality, customers' solvency, and the probability of non-performing loans become.

Deposits increased from 156.2 trillion soums to 417.3 trillion soums. This is one of the most positive trends. The increase in deposits shows that trust in the banking system is rising and that the domestic resource base is expanding. However, if the structure and maturity of deposits are not analyzed separately, this growth cannot be assessed as absolutely positive. If deposits are mainly short-term or have high interest rates, the resource base becomes more expensive for banks. The ratio of loans to deposits was 209.0 percent as of 01.01.2022 and declined to 144.8 percent as of 01.01.2026. This is a positive change, because deposits grew faster than loans. Nevertheless, the fact that this indicator is still above 100 percent means that lending in the banking system is not fully covered by domestic deposits. This may keep banks dependent on external resources, government funds, or other borrowing sources.

Analysis of the Financial Indicators of JSC Aloqabank

The case of JSC Aloqabank makes it possible to observe more clearly the relationship between the development of banking services and financial efficiency. The bank's main indicators for 2021-2025 are presented in the following table.

Table 2. Main Financial Indicators of JSC Aloqabank

Year	Assets, billion soms	Loan portfolio, billion soms	Deposits, billion soms	Capital, billion soms	Net profit, billion soms	ROA, %	ROE, %
2021	12,638.5	7,754.3	6,796.1	1,673.5	107.6	1.5	8.6
2022	16,083.6	9,161.9	7,697.7	1,795.3	228.4	1.6	13.2
2023	16,044.7	10,293.9	9,227.0	2,643.2	607.7	3.8	27.4
2024	23,251.3	12,944.3	13,814.7	3,082.2	190.0	1.0	6.8
2025	31,527.5	18,810.0	15,529.9	3,846.9	251.5	0.9	7.1

Source: Compiled by the author on the basis of official financial indicators of JSC Aloqabank.

The table shows that the bank's assets amounted to 12.6 trillion soms in 2021 and reached 31.5 trillion soms in 2025. This indicates that the scale of the bank's activities expanded significantly. The loan portfolio also increased from 7.8 trillion soms to 18.8 trillion soms. Deposits increased from 6.8 trillion soms to 15.5 trillion soms. However, financial efficiency indicators are not proportional to this growth. In 2023, the bank's return on assets was 3.8 percent, while return on equity was 27.4 percent. This can be considered a high result. In 2024, however, return on assets fell to 1.0 percent and return on equity fell to 6.8 percent. In 2025, return on assets remained at 0.9 percent and return on equity at 7.1 percent.

Therefore, although the volume of the bank's assets and services increased, their ability to generate profit was not stable. The main economic problem is that the bank secured growth mainly through expansion in volume, while the mechanism for converting that volume into profit was not sufficiently strong. If assets increase but net profit does not grow proportionally, return on assets declines. If capital increases while profit grows slowly, return on equity declines. This is precisely the situation observed in the case of JSC Aloqabank.

Digital Services and Customer Base at JSC Aloqabank

Digital channels play an important role in the development of banking services. At JSC Aloqabank, the customer base expanded through Zoomrad, Aloqabusiness, internet banking, and other remote services.

Table 3. Dynamics of Digital Services and the Customer Base of JSC Aloqabank

Year	Total active customers, thousand	Corporate customers, thousand	Retail customers, thousand	Zoomrad users, thousand	Aloqabusiness, thousand	Internet banking, thousand
2021	1,299	35	1,264	314.4	13.6	7.5
2022	1,734	41	1,693	832.3	19.5	8.5
2023	1,850	50	1,800	2,049.1	28.9	7.0
2024	2,124	55	2,069	3,654.7	32.6	7.9
2025	2,804	68	2,736	4,925.3	37.0	9.0

Source: Compiled on the basis of open data of JSC Aloqabank and the author's calculations.

The table shows that the bank's digital services, especially through the Zoomrad application, sharply expanded the coverage of retail customers. In 2021, the number of Zoomrad users was 314.4 thousand, whereas in 2025 it exceeded 4.9 million. This means that the bank gained an active position in the digital retail banking market. However, growth in the number of digital customers does not automatically mean an increase in the bank's profit. If the number of digital users grew more than fifteenfold, commission income, revenues from online transactions, and operational savings should also have increased sharply. Yet the fact that return on assets remained at 0.9 percent and return on equity at 7.1 percent in 2025 indicates that the economic return from digital services is still insufficient.

The number of Aloqabusiness users increased from 13.6 thousand in 2021 to 37.0 thousand in 2025. This indicates growth. However, compared with Zoomrad, corporate digital services developed much more slowly. This is an important strategic signal for the bank, because corporate customers provide strong opportunities to generate stable non-interest income from cash management, payroll services, trade finance, online settlements, and corporate cards.

Discussion

The results of the analysis show that the greatest risk in the development of banking services is confusing quantitative growth with efficiency. Growth in assets, loans, deposits, or the number of digital customers does not fully reflect the real economic efficiency of a bank. Efficiency should be assessed through income generated by services, cost savings, risk reduction, and capital returns.

The growth of deposits in the banking system of Uzbekistan is a positive development. It enables banks to expand their domestic resource base. However, the fact that the loan-to-deposit ratio remains above 100 percent shows that a full resource balance has not yet been formed in the banking system. This situation makes banks dependent on additional sources of financing. In the case of JSC Aloqabank, an even clearer problem is observed. The bank's assets, loan portfolio, deposits, and digital customers have grown, but return on assets and return on equity have not remained consistently high. This means that digital transformation at the bank has not yet fully turned into financial transformation. In other words, digital infrastructure is expanding and the number of customers is increasing, but this growth has not yet had a sufficiently strong effect on profitability.

There may be several reasons for this. First, commission income generated from digital services may be low. Second, the costs of attracting customers and maintaining digital platforms may be high. Third, reserve expenses and credit risks may increase together with the expansion of the loan portfolio. Fourth, the potential of non-interest income from corporate digital services may not yet have been fully utilized. Therefore, I believe that assessing the development of banking services only by the number of services, application users, or the size of the loan portfolio is not scientifically sufficient. The economic return, marginal income, risk level, and cost impact of each service must be assessed separately.

Conclusion

The results of the study show that banking services in the banking system of Uzbekistan have developed significantly in recent years. The growth of assets, loans, deposits, and capital has strengthened the role of banks as financial intermediaries in the economy. In particular, the growth of deposits demonstrates increasing trust in the banking system. However, the quantitative expansion of banking services has not yet fully translated into financial efficiency. The persistence of a high loan-to-deposit ratio indicates the existence of problems related to resource balance. Banks can achieve efficiency not only by expanding the loan portfolio, but also by stabilizing the deposit base, increasing non-interest income, reducing costs, and obtaining real economic benefits from digital services.

The case of JSC Aloqabank clearly demonstrates the contradictory nature of banking-service development. The bank's assets, loans, deposits, and digital customer base increased sharply. However, the decline in return on assets and return on equity in 2024-2025 shows that the main problem in developing banking services lies not in the number of services, but in their economic return. Therefore, the strategy for developing banking services should not be based on the logic of "more services - more customers", but on the model of "efficient services - stable profit - low risk - high customer value". Only in this case can the development of banking services become a real economic factor that increases the efficiency of banking activities.

Practical Recommendations

First, banks should assess the economic return of each type of service separately. For digital services, the number of customers, transaction volume, commission income, service costs, and risk level should be regularly calculated. Second, the growth of the loan portfolio should be balanced with the deposit base and capital adequacy. Uncontrolled credit expansion may lead to future liquidity pressure and an increase in non-performing loans. Third, increasing non-interest income should become a priority for banks. Commission services, acquiring, plastic cards, mobile payments, corporate settlement services, and trade finance are important for diversifying bank income. Fourth, digital services should help reduce bank costs. If digitalization does not reduce costs, it may become an additional technological burden for the bank. Fifth, it is advisable for JSC Aloqabank to deepen its corporate digital services. While Zoomrad has shown strong growth in the retail segment, a more active strategy is required in Aloqabusiness and internet banking.

References

- *Central Bank of the Republic of Uzbekistan. Indicators of banking system activity.*
- *Central Bank of the Republic of Uzbekistan. Data on loans and deposits of commercial banks.*
- *JSC Aloqabank. Key financial indicators of Aloqabank, 2020-2025.*
- *JSC Aloqabank. Open data and financial statements.*

- Basel Committee on Banking Supervision. *Principles for sound risk management and banking supervision*.
- International Monetary Fund. *Financial Soundness Indicators Compilation Guide*.
- World Bank. *Digital Financial Services and Financial Inclusion reports*.
- Berger, A. N., Humphrey, D. B. *Efficiency of financial institutions: International survey and directions for future research*. *European Journal of Operational Research*, 1997, Vol. 98, Issue 2, pp. 175-212.
- Athanasoglou, P. P., Brissimis, S. N., Delis, M. D. *Bank-specific, industry-specific and macroeconomic determinants of bank profitability*. *Journal of International Financial Markets, Institutions and Money*, 2008, Vol. 18, Issue 2, pp. 121-136.
- DeYoung, R. *The Performance of Internet-Based Business Models: Evidence from the Banking Industry*. *The Journal of Business*, 2005, Vol. 78, No. 3, pp. 893-948. DOI: 10.1086/429648.
- Ozili, P. K. *Impact of digital finance on financial inclusion and stability*. *Borsa Istanbul Review*, 2018, Vol. 18, Issue 4, pp. 329-340.
- Shaikh, A. A., Karjaluoto, H. *Mobile banking adoption: A literature review*. *Telematics and Informatics*, 2015, Vol. 32, Issue 1, pp. 129-142. DOI: 10.1016/j.tele.2014.05.003.
- Zhao, J., Wang, C., Ibrahim, H., Chen, Y. *The impact of digital financial inclusion on bank performance: An exploration of mechanisms of action and heterogeneity*. *PLOS ONE*, 2024, Vol. 19, Issue 8, e0309099. DOI: 10.1371/journal.pone.0309099.
- Chhaidar, A., Abdelhedi, M., Abdelkafi, I. *The Effect of Financial Technology Investment Level on European Banks' Profitability*. *Journal of the Knowledge Economy*, 2022.
- Abbasi, T., Weigand, H. *The Impact of Digital Financial Services on Firm's Performance: A Literature Review*, 2017.
- Sarma, M. *Index of Financial Inclusion*. *Indian Council for Research on International Economic Relations, Working Paper No. 215*, 2008.
- Beck, T., Demircuc-Kunt, A., Levine, R. *Finance, Inequality, and Poverty: Cross-Country Evidence*. *World Bank Policy Research Working Paper No. 3338*, 2004.
- Mamadiyarov, Z. T., Akhmedova, D. Q. *The emergence of digital banks and the importance of digitalizing banking activities*. *Iqtisodiyot va innovatsion texnologiyalar*, 2023. DOI: 10.55439/EIT/vol11_iss2/i1.
- Rakhmatov, T. *Ways to develop the provision of banking services*. *Iqtisodiy taraqqiyot va tahlil*, 2024, Vol. 2, No. 6, pp. 149-157. DOI: 10.60078/2992-877X-2024-vol2-iss6-pp149-157.
- Azlarova, A. A., Abdurakhmonova, M. *Prospects for developing marketing activities in the banking system of Uzbekistan*. *Iqtisodiyot va innovatsion texnologiyalar*, 2018, No. 1.
- Azlarova, A., Rakhmatullaeva, M. *Transformation of the banking sector as an integral part of the development of the digital economy in the Republic of Uzbekistan*. *Nauka i nauchnyi potentsial: osnova ustoichivogo innovatsionnogo razvitiya obshchestva*, 2022, No. 1(1), pp. 34-37.
- Mamadiyarov, Z. T. *Managing risks related to remote banking services in the context of bank transformation*. *Economics and Finance*, 2021, No. 5(141).
- Central Bank of the Republic of Uzbekistan. *Indicators of banking system activity: statistical data for 2021-2026*.
- JSC Aloqabank. *Key financial indicators of Aloqabank: financial indicators for 2021-2025*.
- Basel Committee on Banking Supervision. *Principles for Sound Risk Management and Banking Supervision*. Basel: Bank for International Settlements.
- International Monetary Fund. *Financial Soundness Indicators Compilation Guide*. Washington, D.C.: IMF.
- World Bank. *Digital Financial Services and Financial Inclusion Reports*. Washington, D.C.: World Bank.

EMPIRICAL ANALYSIS OF THE INTERDEPENDENCE BETWEEN INCOME DIVERSIFICATION, CONSUMPTION PATTERNS, AND HOUSEHOLD BUDGET STABILITY

Sufiyeva Khusniya Sokhibjonovna¹

ABSTRACT

This article examines strategic approaches for improving household budget stability through income diversification, rational consumption planning, and the strengthening of saving and investment behavior. Using theoretical interpretation and empirical assessment of income composition, consumption patterns, inflation effects, and household financial practices, the study identifies core determinants of budget efficiency. The findings propose integrated mechanisms that enhance financial resilience, optimize expenditure structures, and support long-term household welfare.

Keywords: Household Budget, Income Diversification, Consumption Planning, Expenditure Optimization, Savings, Investment, Financial Stability, Inflation.

Introduction

Household budget stability has emerged as one of the most pressing socio-economic priorities in the era of increasing financial volatility, inflationary pressures, changing labor market structures, and widening income disparities. The sustainability of household finances is not only a determinant of individual well-being, but also a core component of national financial stability, aggregate demand, poverty reduction, and the resilience of social protection systems. From a macroeconomic perspective, household budget stability influences savings behavior, investment capacity, debt sustainability, and long-term welfare formation. From a microeconomic perspective, effective income generation and consumption management enable families to maintain living standards, accumulate capital, absorb economic shocks, and achieve financial independence. Therefore, systematic strategies that coordinate income formation, consumption behavior, saving decisions, and debt management are fundamental mechanisms for maintaining household financial equilibrium.

In many developing and transition economies, including those affected by structural reforms, households face multiple financial vulnerabilities: unstable employment, irregular income streams, rising consumer prices, currency fluctuations, credit dependence, and insufficient financial literacy. Such conditions make spontaneous household decision-making ineffective and expose families to income shocks, debt stress, and reduced welfare. Thus, the systematic organization of income and consumption strategies is not merely a personal financial choice-it becomes a socio-economic necessity. Modern financial science emphasizes that household budget stability should be guided by clearly defined decisions regarding income diversification, controlled consumption, risk management, insurance planning, and goal-oriented saving behavior. The interaction between these elements determines financial resilience and long-term household stability.

From a behavioral finance perspective, households frequently deviate from rational budgeting principles. Cognitive biases, short-term consumption impulses, informational gaps, and limited awareness of

¹ Lecturer of the Department of "Specialization, Social-Humanitarian and Exact Sciences," Andijan Faculty of Tashkent State University of Economics

opportunity costs reduce the effectiveness of personal financial decisions. Without a structured budgeting framework, households tend to under-save, over-consume, accumulate short-term debt, and fail to invest productively. Systematic budget strategies, therefore, require intentional planning that aligns current income, expected cash flows, consumption priorities, emergency reserves, saving rates, and credit behavior with the family's long-term financial objectives. This strategic alignment transforms household budgeting into a stable financial system rather than a reactive income-spending cycle.

Income stability is the first pillar of a sustainable household budget. However, in conditions of labor market informality, seasonal income, self-employment, or unstable wages, prioritizing income diversification becomes essential. Additional income channels - micro-business activities, part-time employment, digital labor market participation, household entrepreneurship, and skill monetization - enhance household resilience. Income diversification is especially crucial in economies where monetary policy, exchange rate movements, and inflation significantly reduce the real purchasing power of wages. A systematic income strategy involves balancing primary employment with supplementary income while ensuring that labor productivity and time allocation are optimized.

Alongside income generation, consumption rationalization is a core mechanism for enhancing budget stability. Consumption patterns are influenced by lifestyle preferences, social norms, emotional triggers, and credit availability. Excessive consumption not only reduces saving capacity but increases exposure to financial shocks and credit burdens. Systematic consumption strategies involve differentiating between essential expenditures and discretionary consumption, prioritizing long-term welfare over short-term utility, aligning spending with financial goals, and applying planned consumption mechanisms such as envelopes, zero-based budgeting, cost-benefit analysis, or consumption pacing. Such mechanisms encourage financial discipline, increase savings, and minimize unplanned spending.

The strategic interdependence between income diversification, consumption rationalization, saving formation, and debt avoidance represents the structural foundation of household budget stability. Savings behavior plays a mediating role: it converts income into financial reserves, allows investment in productive assets, and provides buffers against external shocks such as illness, unemployment, or market fluctuations. In the absence of savings, households become dependent on consumer loans or informal borrowing, leading to debt traps and declining economic mobility. Thus, policy-oriented research increasingly focuses on strengthening saving incentives, developing financial instruments accessible to low-income households, and improving financial literacy.

Literature review

The issue of household budget stability has been widely discussed in classical and modern economic literature. Early theoretical foundations are found in Keynesian consumption theory, where household financial behavior is largely determined by current income levels and psychological preferences toward saving and consumption [1]. According to Keynes, consumption rises with income, but not proportionally, leaving room for saving that contributes to long-term financial security. Later, Friedman's permanent income hypothesis expanded this view by suggesting that households base consumption decisions not on current income, but on expectations of long-term or "permanent" income flows [2]. This theoretical shift highlights that systematic consumption planning requires households to anticipate future earnings, allowing them to smooth expenditures over time, even in unstable labor market conditions.

Modigliani and Brumberg's life-cycle hypothesis further strengthened the understanding of household saving behavior by suggesting that economic agents strategically allocate consumption and saving across different phases of life [3]. Under this model, households accumulate capital during working years and spend accumulated savings during retirement. This demonstrates that consumption stability is closely tied not only to wage income but also to long-term financial planning and life-cycle budgeting. The model implies that social protection systems, pension arrangements, access to saving instruments, and financial literacy directly influence budget stability throughout the life span.

In contemporary literature, the emphasis increasingly shifts toward behavioral approaches. Kahneman and Tversky demonstrated that household financial decisions are shaped by cognitive biases, emotional triggers, and imperfect rationality rather than purely mathematical optimization [4]. These findings imply that budget instability can be caused not only by low income or inflation, but also by irrational spending, impulse purchasing, financial anxiety, and misperception of risk. Behavioral economics therefore recommends structured consumption systems, automated saving mechanisms, and spending constraints to counteract psychological and informational imperfections.

Household income diversification has been widely recognized as a key determinant of financial resilience, especially in economies characterized by informal labor markets, seasonal income, and limited social safety nets [5]. According to Chen and Ravallion, income diversification through microenterprise, self-employment, household entrepreneurship, or digital labor markets plays a stabilizing role against employment shocks and inflationary pressures [6]. Diversification mitigates dependency on a single volatile income source and promotes financial survivability. However, literature also notes that diversification requires time, skills, and access to credit, technological infrastructure, or business ecosystems, all of which may be unequally distributed among households.

Another important line of inquiry concerns consumption rationalization strategies. Thaler's work on mental accounting shows that households tend to categorize expenses into separate cognitive "budgets" and make spending decisions according to reference frames rather than global optimization [7]. As a result, systematic consumption rules-such as envelope budgeting, zero-based budgeting, forward purchasing, or spending prioritization-help structure household financial behavior, reduce emotional consumption, and improve saving outcomes. The literature suggests that consumption planning is as critical as income planning for long-term stability, because unregulated consumption often neutralizes the stabilizing effects of higher income or temporary saving growth.

Household saving behavior is another foundational topic. According to Carroll, saving performance is heavily influenced by precautionary motives, uncertainty, and expectations of future risk [8]. Households with stronger saving motives develop emergency reserves, lower credit dependency, and maintain higher budget stability. However, in low-income settings, saving capacity is constrained by subsistence-level consumption, inflation, lack of safe deposit instruments, and financial exclusion. Therefore, financial inclusion policies, deposit protection systems, micro-saving instruments, and interest-bearing small accounts are seen as crucial institutional supports that enhance household budget stability and reduce vulnerability to shocks [9].

Analysis and Results

The results of the study show that labor income currently constitutes the main share in the structure of household incomes, while opportunities to earn income from entrepreneurship and property are not sufficiently developed. This indicates a low level of income source diversification.

Strong dependence on a single income source increases households' sensitivity to economic changes. Therefore, expanding economic activity, developing the service sector, and obtaining additional income through digital labor opportunities enhance the financial stability of the population. In our country, in 2025, more than 50% of the structure of household consumption expenditures was allocated to food expenditures (Figure 1).

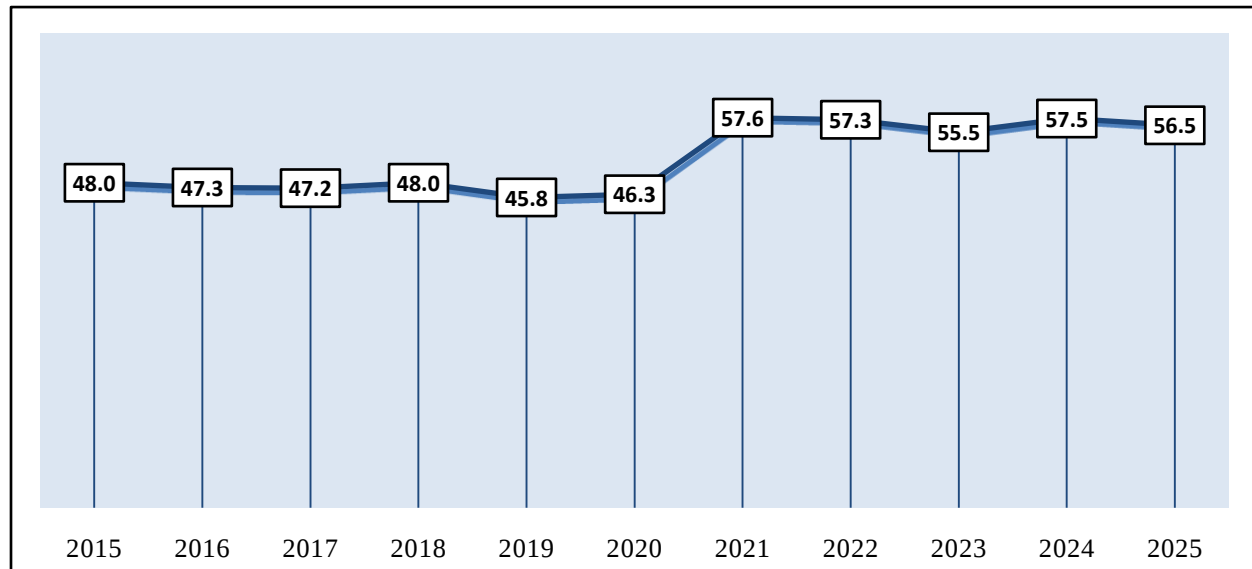


Figure 1. Dynamics of the Share of Food Expenditures in the Structure of Household Consumption Expenditures, %

Source: Prepared by the author based on data from the National Statistics Committee of the Republic of Uzbekistan.

The share of expenditures allocated to food products did not decline proportionally with the growth of real incomes. On the contrary, while this indicator was around **38.8% in 2019**, it exceeded **50% during 2021–2025**. This indicates that, despite the increase in household incomes, inflation-particularly in the food market-had a significant impact, limiting the positive effect of income growth on the structure of consumption.

As a result, it was found that there is no complete proportional relationship between the growth of real household incomes and changes in the structure of consumption expenditures. From the perspective of **Engel's Law**, although economic theory suggests that the share of food expenditures should decrease as household incomes increase, the observed trend demonstrates the opposite.

Therefore, when assessing the living standards of the population and formulating social policy, attention should be paid not only to the growth of real incomes but also to their impact on the structure of consumption expenditures. While overall household incomes and changes in the composition of consumption expenditures provide a general picture, further analysis of **per capita average consumption expenditures** will allow for a more comprehensive assessment of household welfare and consumption patterns.

The low level of savings and investment decisions limits households' financial reserves and weakens material stability during crisis periods. The expansion of digital financial services, micro-

investment platforms, and banking products provides the population with opportunities to actively manage their funds; however, the level of use of these instruments remains insufficient.

The analysis shows that improving household budget efficiency requires a comprehensive approach that involves not only reducing expenditures, but also expanding income sources, changing financial behavior, and utilizing investment opportunities.

Table 1. Systematic budget components and their contribution to household stability

Budget Component	Functional Mechanism	Outcome for Household Stability
Income Diversification	Multiple income streams through employment, entrepreneurship, digital work and skill monetization reduce dependency on a single wage source	Higher financial resilience, continuity of cash flow and lower vulnerability to employment shocks
Consumption Rationalization	Planned spending, prioritization of essential goods, substitution strategies, prevention of impulse purchases and forward cost planning	Increased saving capacity, disciplined expenditure and lower exposure to financial stress
Saving and Capital Formation	Emergency reserves, long-term deposits, asset accumulation and precautionary savings ensure financial buffers and improve welfare formation	Shock absorption, reduced credit dependency and enhanced long-term financial security
Debt Avoidance and Credit Discipline	Systematic avoidance of consumer loans, cost-of-credit assessment and responsible repayment planning	Reduced interest burden, prevention of debt traps and improved future financial flexibility

Source: Prepared by the author

Table 1 demonstrates that household budget stability is not determined by a single variable such as income level, but by a system of coordinated financial decisions. Income diversification reduces dependence on unstable wages, allowing smoother cash flow management and stronger recovery capacity after economic disruptions. However, diversified income must be accompanied by rational consumption, otherwise additional earnings are neutralized by higher discretionary spending. Planned consumption transforms household behavior from reactive to proactive, enabling resources to be allocated toward long-term welfare rather than temporary utility.

Savings and capital formation are central stabilizers: they connect income and consumption into a continuous financial system and provide resilience against shocks such as illness, job loss or inflation. Without savings, households depend on credit, decreasing financial autonomy and increasing vulnerability. By contrast, when savings are institutionalized as a permanent practice, households maintain independence from external borrowing and accumulate long-term prosperity.

Debt discipline is a third-level stabilizer: even households with adequate income and strong savings can experience financial instability if credit is used irresponsibly. When households systematically evaluate

repayment ability, interest cost, loan purpose and long-term credit burden, financial stress reduces and resources remain available for productive investment rather than interest payments.

Recommendations

Systematic household budgeting requires institutional support in addition to personal financial discipline. Policymakers should prioritize programs that expand income diversification opportunities through microenterprise development, digital labor platforms, home-based business incentives, and accessible vocational training. Improving labor formalization, digital employment ecosystems and entrepreneurship ecosystems increases the stability of household income and reduces vulnerability to wage volatility.

Consumption rationalization should be promoted through financial education campaigns, budgeting tools, behavioral nudges, and digital spending monitoring systems. Public institutions, banks and fintech companies can offer budgeting applications, expense tracking platforms, automatic saving features, and consumption alerts to help households implement real-time financial discipline. Retail regulation and consumer protection programs may further reduce impulsive spending and predatory practices within the commercial environment.

Savings should be strengthened through incentive mechanisms such as subsidized micro-saving products, interest-bearing emergency accounts, tax-advantaged household deposits and savings-linked insurance instruments. Households need convenient and safe saving formats-especially for low-income groups-enabling them to accumulate financial buffers without excessive administrative barriers. At the same time, public agencies and banks should expand financial inclusion, deposit protection and long-term saving literacy.

Debt management policies should promote responsible consumer finance through cost-of-credit transparency, stricter regulation of high-interest loans, and monitoring of household debt vulnerability. Financial institutions should be encouraged to shift household borrowing toward income-enhancing investments rather than short-term consumption. Discouraging unnecessary credit, monitoring repayment ability and promoting debt-free living reduces long-term vulnerability and improves intergenerational welfare accumulation.

Finally, comprehensive financial literacy must be a national priority. Curriculum-based financial education, adult financial coaching, training programs for entrepreneurs, and community-level awareness initiatives significantly improve household decision-making. Financial literacy transforms budgeting from a reactive survival activity into a strategic financial architecture, empowering households to control income flows, consumption choices and saving priorities in a structured, future-oriented manner.

Conclusion

Household budget stability is the cumulative outcome of income diversification, rational consumption behavior, long-term saving practices and disciplined debt management. Income growth alone does not create stability without systematic allocation, because unplanned consumption rapidly erodes financial gains and increases credit exposure. Therefore, budgeting must be conceptualized as a multidimensional financial system rather than simple expenditure tracking.

Savings are the core stabilizer converting income into financial resilience, emergency protection and long-term welfare. Precautionary savings reduce reliance on credit, cushion households from shocks, and allow capital accumulation over time. Budget discipline ensures that resources are allocated based on

priorities rather than emotions or short-term gratification, making consumption a strategic determinant of financial sustainability.

Debt avoidance is a further determinant of long-term well-being, since chronic consumer borrowing imposes interest burdens that limit mobility, slow capital formation and destabilize budget structures. Disciplined borrowing, careful contract evaluation and cost-benefit assessment transform debt from a risk factor into a managed financial instrument.

In sum, household financial stability emerges when income generation, expenditure planning, saving formation and debt control operate as an integrated decision framework supported by financial literacy and accessible saving instruments. Systematic strategies transform households from vulnerable reactive financial actors into resilient economic units capable of sustaining welfare, absorbing shocks, and building intergenerational capital. This paradigm strengthens household security and contributes to broader national financial stability and social well-being.

References:

- Keynes, J. M. *The General Theory of Employment, Interest and Money*. - London: Macmillan, 1936. - 403 p.
- Friedman, M. *A Theory of the Consumption Function*. - Princeton: Princeton University Press, 1957. - 267 p.
- Modigliani, F.; Brumberg, R. *Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data*. - New Brunswick: Rutgers University Press, 1954. - 124 p.
- Kahneman, D.; Tversky, A. *Prospect Theory: An Analysis of Decision Under Risk* // *Econometrica*. - 1979. - Vol. 47, No. 2. - P. 263-291.
- Ellis, F. *Household Strategies and Rural Livelihood Diversification* // *Journal of Development Studies*. - 1998. - Vol. 35, No. 2. - P. 1-38.
- Chen, S.; Ravallion, M. *Household Welfare and Poverty in Transition Economies*. - Washington, DC: World Bank Research Paper, 2001. - 54 p.
- Thaler, R. *Mental Accounting and Consumer Choice* // *Marketing Science*. - 1985. - Vol. 4, No. 3. - P. 199-214.
- Carroll, C. *Precautionary Saving and Consumption Smoothing* // *Journal of Monetary Economics*. - 1992. - Vol. 30, No. 2. - P. 233-255.
- Abdullaev, M. *Foundations of Social Economics*. - Tashkent: Iqtisodiyot, 2019. - 348 p.
- Makhmudov, N.; Rakhimov, Sh. *Theory of Economics*. - Tashkent: Universitet, 2020. - 412 p.
- Alimov, R. Kh. *Economic Growth and Dynamics of Household Incomes*. - Tashkent: Fan, 2018. - 276 p.
- Tozhiev, Sh.; Abdullaeva, D. *Economic Mechanisms for Increasing Household Income*. - Tashkent: Iqtisodiyot, 2021. - 231 p.
- Yarkulov, Sh. *Methodology for Assessing Household Living Standards*. - Tashkent: Ilm-Ziyo, 2022. - 198 p.
- Rastou, A.; Rumyantseva, E. *Socio-Economic Development of the Population*. - Moscow: Yurayt, 2019. - 289 p.
- Dolganova, N. *Household Income and Quality of Life: Methods of Evaluation*. - Moscow: Finance and Statistics, 2018. - 256 p.

DEVELOPMENT TRENDS OF SMALL ENTREPRENEURSHIP IN THE REPUBLIC OF UZBEKISTAN

Jurakhonov Muzaffar Eskandarovich¹

ABSTRACT

This article analyzes the current state of development of small business entities in the Republic of Uzbekistan. The study examines the volume and share of the sector in Gross Domestic Product (GDP), its contribution to employment, and its role across the major sectors of the economy. Based on the analysis, the position of small business within the national economy and its key development trends are evaluated. Furthermore, the study proposes policy directions aimed at promoting the sustainable development of small business in Uzbekistan.

Keywords: *Small Business, Economic Stability, Gross Domestic Product (GDP), Employment, Exports, Imports, Investment, Economic Diversification, Labor Productivity, Technological Modernization, Efficiency.*

Introduction.

In recent years, particular attention has been devoted in the Republic of Uzbekistan to strengthening macroeconomic stability and maintaining high rates of economic growth. As a result, both the quantitative and qualitative dimensions of production have expanded across various sectors of the economy. Simultaneously, the scale of economic activity has increased, accompanied by positive structural transformations within the national economy. In particular, the scale of small business has demonstrated consistent year-on-year growth.

As emphasized by the President of the Republic of Uzbekistan, Shavkat Mirziyoyev: *"Small business is the sector that adapts most rapidly to change, is not afraid of innovation and competition, and, most importantly, creates jobs and increases people's incomes. Therefore, supporting small business will continue to remain one of the priority directions of state policy"*².

Analysis of scientific literature.

Small business has a high place and importance in the country's economy and actively participates in solving a number of economic and social problems. It is appropriate to consider the opinions of foreign scientists and domestic specialists in this regard.

Li Baojian in his research recognizes the expediency of understanding the concept of small business as a set of independent medium and small enterprises that are economic entities of the market and operate for the purpose of making a profit, thereby ensuring the consistent development of the national economy.

L.Yu. Filobokova emphasizes that "small business is recognized as a set of such saving measures, through which the main social and economic problems are solved".

¹Andijan State Technical Institute. Associate Professor of the Department of "Economics", i.f.f.d. (PhD)

²"Supporting entrepreneurship is our strategic path." Speech by the President of the Republic of Uzbekistan Sh.M. Mirziyoyev at a meeting with representatives of small and medium-sized businesses on March 19, 2025, dedicated to increasing the role of the sector in the economy and bringing its development to a new level. <https://president.uz/uz/lists/view/7955>

According to K. Mamaev, in the conditions of globalization, that is, in the further intensification of economic relations between states, the role of small business and entrepreneurship acquires a new significance. These entities not only serve the growth of the economy at the national level, but also ensure the integration of the country into the world economy by creating conditions for the profitable exchange of technologies, products and services.

According to U. Gafurov, small business and private entrepreneurship have great potential in ensuring employment of the labor force and increasing the income of the population in the country, and its full and effective use constitutes a central link in economic policy.

In the opinion expressed by K. Karimova, K. Sharifkhodjaeva, small business and entrepreneurship are expressed as an integral part of the market economy, it is recognized that it is the fundamental basis of economic activity, one of the most important catalysts in the development of the state.

Summarizing the information provided, it is necessary to express the expediency of understanding the concept of small business and entrepreneurship as a set of independent small enterprises that are economic entities of the market and operate in order to make a profit, thereby ensuring the consistent development of the national economy.

The main part.

An analysis of the recent performance indicators of small business and entrepreneurship entities in Uzbekistan demonstrates that the sector exhibits varying dynamics with respect to its contribution to Gross Domestic Product (GDP), employment generation, and demographic characteristics, including its distribution across different sectors of the economy.

It is well established that Gross Domestic Product (GDP) is one of the principal indicators reflecting the stability and performance of a country's economy. Accordingly, assessing the share of small business entities in GDP represents an important measure for evaluating both the level of development of the sector and its contribution to national economic growth. Furthermore, this indicator provides valuable insights into structural transformations within the economy, the state of the entrepreneurial environment, and the effectiveness of government policies aimed at supporting private sector development. The analysis conducted during the study period indicates that a substantial proportion of Uzbekistan's GDP is generated by small business entities. This finding underscores the necessity of systematically examining the sector's industrial structure and evaluating its role in the national economy. The results demonstrate that the expansion of small business contributes significantly to increasing the scale of the national economy, expanding the process of economic reproduction, improving the efficient utilization of production factors, promoting employment, and ensuring sustainable economic development.

In 2025, the output of small business entities amounted to UZS 923,514.6 billion, representing an increase of UZS 810,098.6 billion compared with 2016 and an overall growth of 8.1 times (Figure 1). Throughout the study period, the contribution of small business entities to GDP exhibited a stable upward trend, reflecting the increasing strategic importance of this sector within the national economy. The more than eightfold increase in the sector's output confirms that small business has become one of the principal drivers of economic growth in Uzbekistan. Particularly since 2018, a significant acceleration in the sector's GDP contribution has been observed. This growth can be attributed to comprehensive institutional reforms, the simplification of licensing and permit procedures, the optimization of the tax burden, and the expansion

of access to financial resources for entrepreneurial entities. These developments clearly indicate the continuously strengthening role and significance of small business within the national economy.

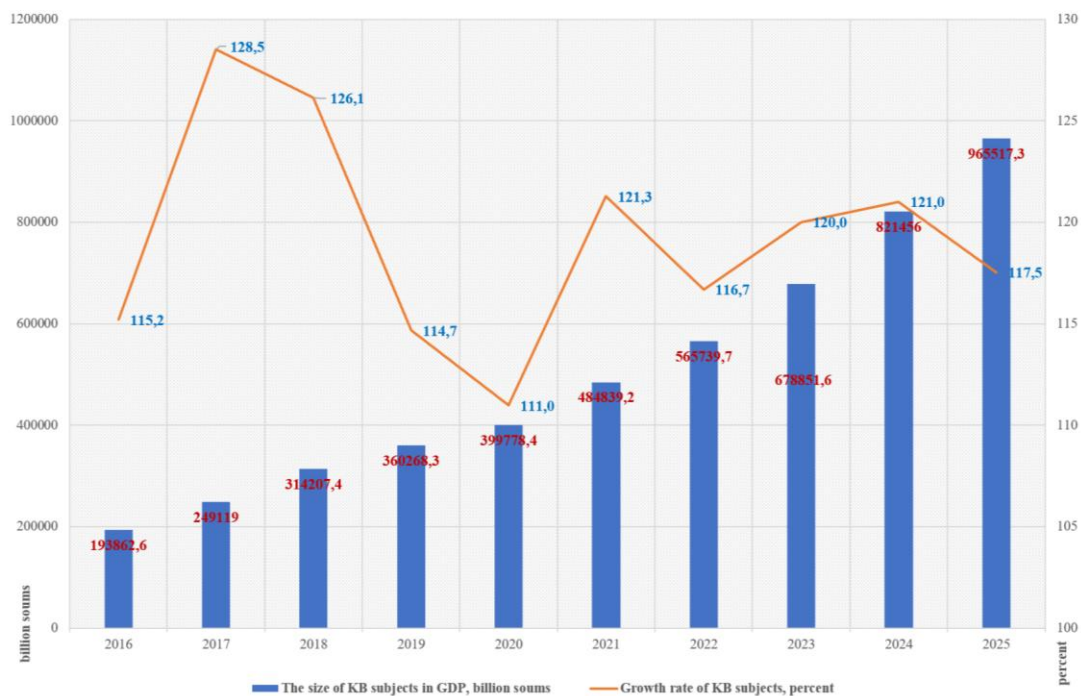


Figure 1. Dynamics of the volume of small business entities in GDP (UZS billion) and growth rate (percent) in the Republic of Uzbekistan.

Explanation: Author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan.

As illustrated in Figure 1, the dynamics of the volume and growth rate of small business entities' contribution to the Gross Domestic Product (GDP) of the Republic of Uzbekistan indicate that the growth rate of the sector has not followed a uniform pattern over the years but has instead exhibited a fluctuating trend. During the study period, the highest annual growth rate reached 128.5%, while the lowest was 111.0%, with an average annual growth rate of 119.2%.

In particular, a significant increase was observed in 2018 compared with 2017, when the growth rate reached 128.5%. This substantial growth can be attributed to the acceleration of economic reforms, the liberalization of the business environment, and the strengthening of financial support mechanisms for entrepreneurial activities during this period. Conversely, the growth rate declined to 111.0% in 2020 compared with 2019, primarily due to the adverse effects of the global COVID-19 pandemic, which led to a slowdown in overall economic activity.

During the period 2021-2024, the sector once again demonstrated relatively high growth rates, reaching 121.3% and 121.0%, respectively. These results reflect the post-pandemic economic recovery and the effectiveness of the government's consistent policies aimed at supporting the development of small businesses. By 2024–2025, growth rates had stabilized at 121.0% and 117.5%, respectively, indicating that the economy was entering a phase of more sustainable, quality-oriented growth.

The findings suggest that, although the volume of small business output within GDP has increased steadily in recent years, the annual growth rates have fluctuated due to macroeconomic changes and external shocks. The impact of the COVID-19 pandemic, followed by the subsequent economic recovery, demonstrates that government support measures produced broad and significant multiplier effects for the sector. The stabilization of growth rates during 2024–2025 further indicates that the role of small business in the national economy has become increasingly stable and resilient.

Despite the continuous increase in the absolute volume of small business output within GDP, the sector's share of GDP declined over the study period. In 2025, small business accounted for 52.2% of GDP, representing a decrease of 14.6 percentage points compared with 66.8% recorded in 2016 (Figure 2).

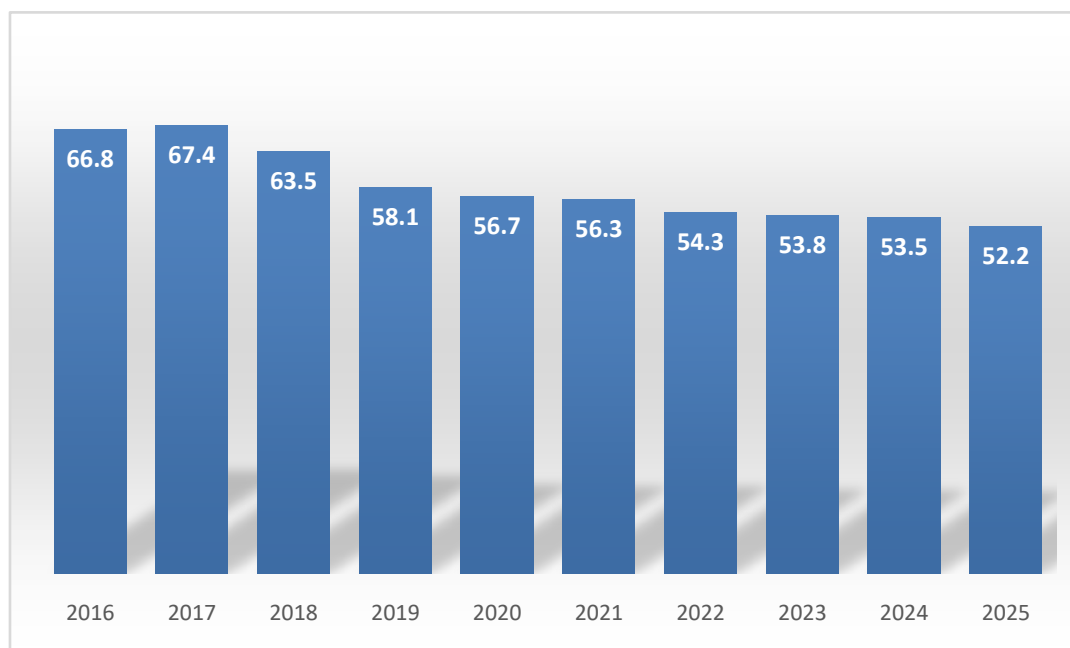


Figure 2. Share of Small Business Entities in the Gross Domestic Product (GDP) of the Republic of Uzbekistan (%)

Explanation: Author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan.

The analysis of the data presented in Figure 2 indicates that the share of small business in the Gross Domestic Product (GDP) of the Republic of Uzbekistan has generally exhibited a downward trend over the study period. This trend can be attributed to structural transformations within the economy, the expansion of large-scale investment projects, the increasing contribution of large industrial enterprises, and the reallocation of economic activity toward more capital-intensive sectors.

A year-by-year analysis reveals that the share of small business increased slightly from 66.8% in 2016 to 67.4% in 2017. However, beginning in 2018, the contribution of small business to GDP declined consistently. The decline became more pronounced after 2019, with the sector's share decreasing from 56.7% to 54.3% during 2020–2022. This downward trend continued throughout 2023–2025, reaching 52.2% by 2025.

The relative decline in the share of small business within GDP can primarily be explained by the increasing contribution of large industrial enterprises and major state-supported investment projects. Furthermore, the structural transformation of the economy, particularly the expansion of high value-added industrial sectors, has also affected the relative contribution of small business to GDP. Nevertheless, this decline should not be interpreted as evidence of stagnation in the development of the small business sector. Rather, it reflects the fact that other sectors of the economy expanded at a comparatively faster pace. Consequently, although the absolute output of small business increased steadily throughout the study period, its relative share in GDP declined.

Overall, the findings confirm that, despite the significant role of small business in the national economy, maintaining and increasing its contribution requires strengthening innovation activities, deepening economic diversification, expanding access to financial resources, and modernizing production processes. Accordingly, future policies aimed at developing the small business sector should be supported by comprehensive institutional measures designed to ensure sustainable growth, enhance resilience to external shocks, and stimulate innovation-driven development.

However, assessing the economic significance of small business solely on the basis of its share in GDP is insufficient. The socio-economic contribution of this sector is also reflected in its capacity to generate employment and ensure the efficient utilization of labor resources.

From this perspective, analyzing the share of small business entities in total employment provides a more comprehensive assessment of the sector's position and significance in the labor market. Such an approach makes it possible to identify regional development patterns, evaluate structural changes occurring within the economy, and scientifically assess the contribution of small business to employment generation and labor market development (Figure 3).

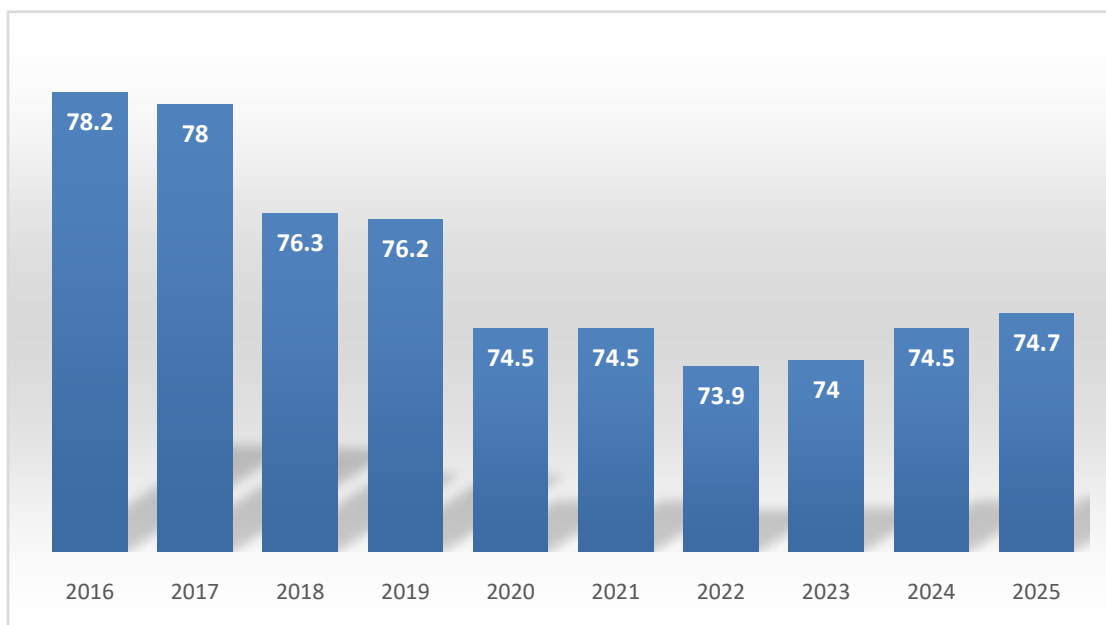


Figure 3. The share of small businesses in employment in the Republic of Uzbekistan, (percentage).

Explanation: Author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan.

Based on the data presented in Table 1, the dynamics of the share of small business across the sectors of the economy of the Republic of Uzbekistan can be examined.

In recent years, the economy of Uzbekistan has experienced sustained quantitative growth across major sectors and industries. However, qualitative performance indicators have exhibited heterogeneous trends. While the scale of economic activity has expanded and positive structural transformations have taken place, accompanied by the continuous expansion of small business, its relative contribution to Gross Domestic Product (GDP), employment, and sectoral output has declined over the study period.

Table 1 :Analysis of the share of small businesses in the economic sectors of the Republic of Uzbekistan¹

No	Sectors and industries	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Difference in 2025 compared to 2016
	GDP	66,8	67,4	63,5	58,1	56,7	56,3	54,3	53,8	53,5	52,2	-14,6
1	Industry	45,3	41,2	37,4	25,8	27,9	27,4	26	27	31,9	34,9	-10,4
2	Agriculture, forestry and fisheries	99,4	99	98,3	98,3	97	96,0	94,8	94,6	95,2	91,9	-4,1
3	Construction	66,9	64,8	73,2	75,8	72,5	72,5	71,5	78,5	75,4	73,6	6,7
4	Services	63,2	41,4	40,4	38,3	38,4	37,8	35,6	55,6	55,9	56,7	-6,5
5	Export	26	22	27,2	27	20,5	20	31,2	27,9	34,1	36,6	10,6
6	Import	46,8	53,6	56,2	61,6	51,7	45,2	49,5	50,5	49,8	53,6	6,8

A sectoral analysis indicates that the smallest contribution of small business is observed in the industrial sector. According to the latest available data, the share of small business in industry is approximately 2.1 times lower than its share in construction and 1.6 times lower than its share in the services sector. Despite this, the largest proportion of investment continues to be directed toward industry and services. This reflects a mismatch between the distribution of investment and the production generated by small business across economic sectors. Although industry receives the largest share of total investment, the contribution of small business to industrial output remains the lowest, indicating the capital-intensive nature of the sector and comparatively low efficiency in the utilization of invested resources. Conversely, agriculture, forestry, and fisheries attract relatively limited investment while maintaining the highest share of small business activity, reflecting the labor-intensive nature of the sector. Since labor-intensive activities generally rely more heavily on low-skilled labor, the pace of technological innovation and productivity growth tends to be relatively slow.

¹ Author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan

In the industrial sector, the share of small business amounted to 34.9% in 2025, representing a decline of 10.4 percentage points compared with 45.3% recorded in 2016. During the study period, this indicator exhibited a fluctuating pattern. Between 2016 and 2019, the share declined sharply from 45.3% to 25.8%, followed by a gradual recovery, reaching 34.9% in 2025. Nevertheless, the overall trend remained negative. This decline can be attributed to the government's prioritization of large-scale industrial investment projects, the expansion of industrial clustering, and the increasing role of state-owned and large enterprises within the industrial sector.

In contrast, the construction sector demonstrated a positive trend. Between 2016 and 2025, the share of small business increased from 66.9% to 73.6%, representing an increase of 6.7 percentage points. This improvement reflects the growing participation of the private sector in construction activities, the increasing number of small contracting firms, and the expansion of national housing development programs.

The contribution of small business within the services sectors also displayed a fluctuating pattern during 2016–2025. The indicator declined steadily from 63.2% in 2016 to 35.6% in 2022, after which a significant recovery was observed from 2023 onward, exceeding 55% and reaching 56.7% in 2025. Nevertheless, this level remained 6.5 percentage points below that of 2016. These changes can be explained by the reclassification of service industries, the rapid expansion of digital services and online platforms, and institutional reforms associated with economic modernization.

Although the share of small business in agriculture, forestry, and fisheries remained exceptionally high throughout the study period, a gradual decline was also observed. Specifically, the indicator decreased from 99.4% in 2016 to 91.9% in 2025. This trend reflects the establishment of larger agricultural enterprises, the expansion of cluster-based production systems, the strengthening of agro-industrial integration, and the increasing concentration of agricultural production. Nevertheless, the consistently high participation of small business confirms its continued strategic importance in ensuring food security, supporting agricultural production, and promoting balanced regional economic development.

The performance of small business in foreign economic activity exhibited a positive trend. In 2025, small business entities accounted for 36.6% of total exports and 53.6% of total imports, representing increases of 10.6 and 6.8 percentage points, respectively, compared with 2016. These results demonstrate the steadily increasing integration of small business entities into international trade and foreign economic activity.

The findings indicate that the participation of small business in the industrial sector has weakened over recent years. Given that industrial development plays a critical role in expanding production capacity and strengthening value-added chains, increasing the participation of small business within manufacturing industries should be regarded as a strategic priority. Furthermore, since industrial sectors are the primary source of technological innovation, strengthening the position of small enterprises in manufacturing would substantially enhance innovation capacity and long-term economic competitiveness.

Although the share of small business in the services sector declined over the study period, the sector has demonstrated a positive recovery in recent years and continues to account for the largest share of small business activity. The analysis further indicates that passenger and freight transportation, together with wholesale and retail trade, constitute the dominant components of the services sector in Uzbekistan¹. In

¹Author's calculations based on data from the National Statistics Committee of the Republic of Uzbekistan

contrast, developed economies are characterized by a greater contribution from financial services, tourism, and capital market activities. Since well-developed securities markets facilitate investment expansion and capital mobilization, the relatively limited scale of Uzbekistan's capital market represents an important constraint on future economic development.

Evaluating the performance of small business across individual sectors provides a basis for identifying priority areas for policy intervention. However, the regions of the Republic of Uzbekistan possess distinct economic and demographic characteristics. Therefore, it is essential to examine the distribution, density, and performance of small business entities at the regional level. Such analysis enables the identification of regions with sustainable entrepreneurial development, facilitates a systematic assessment of the determinants of regional performance, and supports comparative evaluations of regional competitive advantages. In this context, the density of small business entities represents an important indicator for assessing the spatial distribution and effectiveness of entrepreneurial activity.

Based on the results of the empirical analysis, several policy recommendations can be proposed. The declining share of small business in GDP highlights the necessity of strengthening its role within the national economy. Although the sector continues to expand in absolute terms, its declining relative contribution indicates that large, high-value-added industries are growing at a faster pace. Accordingly, policy measures should focus on increasing the participation of small business in industrial cooperation, expanding its involvement in cluster-based production systems, and promoting innovation-oriented manufacturing. These measures would contribute to stabilizing and increasing the sector's contribution to GDP. Particular emphasis should be placed on supporting small enterprises engaged in high-technology and export-oriented production, thereby facilitating their transition to a new stage of qualitative development.

Similarly, although small business remains a major source of employment, its relative share in total employment has declined compared with the beginning of the study period, reflecting structural changes in the labor market. Consequently, future policy should focus not only on quantitative expansion but also on qualitative improvements, including the creation of high-productivity jobs, the enhancement of workforce skills, and the alignment of vocational education with labor market requirements. In addition, the formalization of informal employment and the strengthening of institutional support mechanisms for entrepreneurship are essential for ensuring sustainable employment growth.

Sector-specific development strategies should also account for the distinctive characteristics of individual industries. The declining participation of small business in manufacturing highlights the need to strengthen linkages between large and small enterprises through industrial integration, outsourcing, subcontracting, and technological modernization. In construction, where small business already occupies a significant position, greater emphasis should be placed on improving project management practices, strengthening competition, and promoting the adoption of innovative construction technologies.

The recent dynamics observed in the services sector demonstrate the growing importance of digital transformation. The expansion of e-commerce, information technology services, financial technologies (FinTech), and logistics services offers substantial new growth opportunities for small business. Moreover, the increasing share of exports confirms the sector's deepening integration into international markets. Therefore, policies aimed at improving export-support infrastructure, strengthening certification and

standardization systems, and eliminating institutional barriers to international market access should remain strategic priorities.

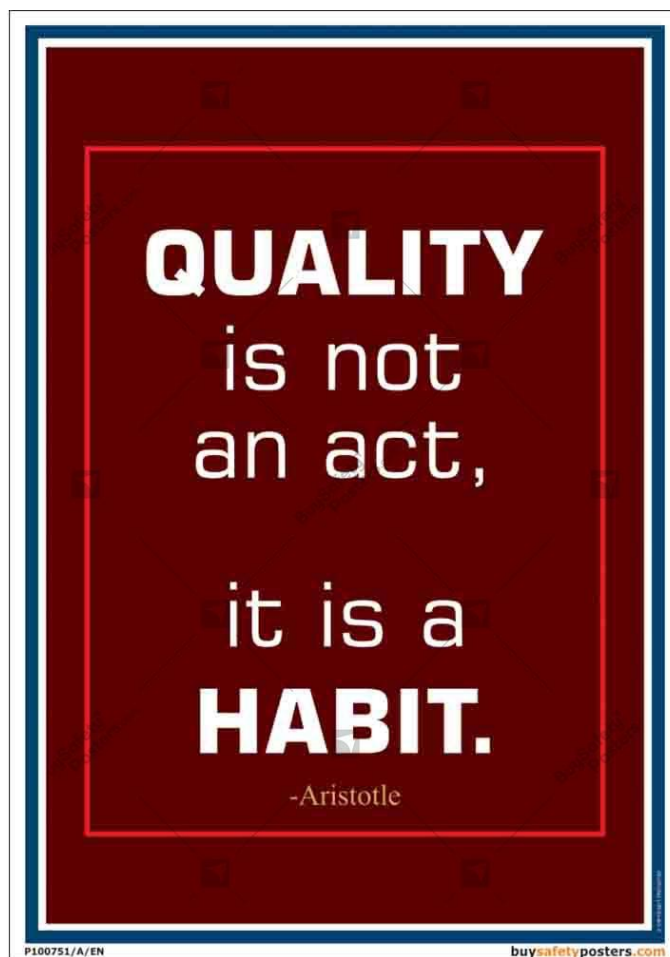
Overall, the findings indicate that strengthening the contribution of small business to GDP, employment, and sectoral development represents not only a prerequisite for sustainable economic growth but also an essential condition for enhancing the stability and international competitiveness of the national economy. Consequently, continuous improvement of policies supporting small business, together with deeper institutional and innovation-oriented reforms, should remain among the country's foremost strategic priorities.

In conclusion, the empirical evidence demonstrates that small business occupies a strategically important position within the economy of Uzbekistan. Nevertheless, enhancing its efficiency and stabilizing its contribution to economic development require a comprehensive policy approach. Priority should therefore be given to innovation-driven entrepreneurship, expanding the participation of small enterprises in manufacturing, accelerating digital transformation, improving access to financial resources, strengthening export capacity, and deepening institutional reforms that promote sustainable and competitive entrepreneurial development.

References

- Mirziyoyev Sh.M. "Supporting entrepreneurship is our strategic path." Speech by the President of the Republic of Uzbekistan Sh.M. Mirziyoyev at a meeting with representatives of small and medium-sized businesses on March 19, 2025, dedicated to increasing the role of the sector in the economy and bringing its development to a new level. <https://president.uz/uz/lists/view/7955>
- *Environment and Sustainable Development* / edited by M. Kļaviņš, W. Leal Filho, Jānis Zaļoksnis. – Riga: Academic Press of University of Latvia, 2010. – 300 p. – URL: <https://issuu.com/janisbrizga/docs/e-sd-druka>.
- Fayzieva, A.A., "Foreign Experience in Small Business and Entrepreneurship Development and Directions for Its Application in Uzbekistan." *International Conference on Analysis of Mathematics and Exact Sciences*, No. 4. 2024.
- Gafurov U.V. "Encouraging the participation of small businesses in providing employment". *Scientific electronic journal "Economics and Innovative Technologies"*. No. 2, March-April, 2018.
- Jurakhonov M. E. "Factors affecting the sustainable development of small businesses" - *European Journal of Interdisciplinary Research and Development* 2023. № 16 C. 189-195. <http://ejird.journalspark.org/index.php/ejird/article/view/644>
- Jurakhonov M.E. "Research analysis of small business and its sustainable development" *British Journal of Global Ecology and Sustainable Development* Volume-22, November, 2023 <https://journalzone.org/index.php/bjgesd/article/view/418>
- Mamaev K. "The Role of Small and Medium-Sized Entrepreneurship in the Global Economy". *Current Research*, No. 32 (162). 2023.
- Mukhtarov M.M. «Ways to increase the economic efficiency of textile clusters» *Journal of Management Value & Ethics* (A quarterly Publication of GMA) July-Sept. 2022 Vol. 12 No.03 102-107 p. (08.00.00 6). <http://www.jmveindia.com/journal/JULY-SEPT>.
- Mukhtarov, M. (2023). WAYS TO INCREASE THE ECONOMIC EFFICIENCY OF TEXTILE INDUSTRY ENTERPRISES BASED ON PRODUCT DIVERSIFICATION. *Economics and Education*, 24(5), 274-278.

- Marifovich, M. M. (2022). MEANS TO INCREASE EFFICIENCY IN INDUSTRIAL PRODUCTION. *Confrencea*, 6(6), 104-107.
- Rogulenko T.M., Matveeva N.S., Abramov R.A. "The Role of the State in the Development of Entrepreneurship: Management Models and Support Mechanisms". *Russian journal of management*. Vol. 13 No. 3, 2025.
- Shodieva G.M. "Small Business Development in Uzbekistan: Support Strategies and Growth Prospects". "Economic development and analysis", No. 1. 2025. www.e-itt.uz.
- The Global Sustainability Competitiveness Index 2020 URL: <https://solability.com/the-global-sustainable-competitiveness-index/the-index>.
- Data of the National Statistics Committee of the Republic of Uzbekistan.



ASSESSING THE IMPACT OF INVESTMENT ON EXPORT CAPACITY: EVIDENCE FROM ANDIJAN PROVINCE, UZBEKISTAN

Olchinbayev Otabek Abdusamad ugli¹

ABSTRACT

This article analyzes the theoretical and practical relationship between investments and export potential. It evaluates the impact of investments on export capacity using modern analytical approaches and presents scientific conclusions aimed at improving economic efficiency.

Keywords: *Export Potential, Investment, Financial Instruments, Competitiveness, Foreign Markets, Sustainable Growth, Production Output, Efficiency, Product Quality, Business Entities, Export Operations.*

Introduction

The acceleration of globalization processes in the world economy, the expansion of international trade relations, and the intensification of global competition have made the enhancement of countries' export potential one of the key priorities of economic development. Sustainable growth in exports not only improves the balance of foreign trade but also promotes the modernization of production, creates new employment opportunities, and strengthens the integration of the national economy into the global economic system. In this context, investment is considered one of the most important factors in the formation and development of export potential. Investments contribute to the expansion of production capacity, the adoption of modern technologies, the improvement of product quality, and the promotion of export-oriented production, thereby enhancing the competitiveness of enterprises in international markets.

Currently, Uzbekistan is implementing comprehensive reforms aimed at supporting export activities, increasing the share of value-added products, and strengthening the country's investment attractiveness². Under these circumstances, the scientific assessment of the impact of investments on export potential, the evaluation of investment efficiency, and the analysis of investment factors that contribute to export development have become issues of significant scientific and practical importance. Accordingly, this study examines the theoretical and practical relationship between investments and export potential, evaluates the impact of investments using modern analytical approaches, and presents scientific conclusions aimed at improving economic efficiency and enhancing export capacity³.

Literature Review

The impact of investments and financial instruments on export potential has been extensively examined by both domestic and foreign researchers. In particular, T.L.Khalikov and R.H.Hojiyev investigated the

¹ PhD Researcher at Andijan State Technical Institute

² Olchinboyev Otabek Abdusamadugli, "Impact of industrial development on macroeconomic indicators", Vol. 3 No. 4 (2025): *Journal of Green Economy and Development*, <https://doi.org/10.5281/zenodo.15396782>;

³ Otabek Olchinboyev Abdusamado'g'li, "Eksportalohiyatinibaholashdaqiyoysiyustunlik (Balassa) indeksidanfoydalanish", Vol. 4 No. 7 (2026): «MuhandislikvaIqtisodiyot» jurnali 7-son.

influence of financial support mechanisms on export potential¹. T.L.Ikramova analyzed the impact of financial opportunities on export potential², while N.R.Yadgarova examined the role of access to credit and the development of financial infrastructure³.

In her research, M.I.Rakhimova emphasized that financial support for business entities, compliance with international quality standards, and production capacity have a positive impact on export potential⁴. Therefore, effective financial opportunities, well-developed financial infrastructure, and efficient support mechanisms create favorable conditions for expanding export activities. However, previous studies have not directly evaluated the impact of foreign investment, as a component of financial resources, on export potential. In practice, attracting foreign investment to industrial enterprises facilitates the adoption of new technologies and innovations, thereby improving export performance.

K. Logozar, J. Rogelj, and S. Bojnec examined the impact of foreign direct investment on export volume and concluded that foreign direct investment is one of the key factors stimulating export activity⁵. They argued that foreign investment provides opportunities to expand the range of export products and services.

The influence of foreign direct investment on export potential was also investigated by P. Kumar, A. Moridian, M. Radulescu, and I. Margaritas, who proposed the following econometric model:

$$\text{Export}_{it} = \alpha_i + \zeta_t + \beta_1 \text{Exch}_{it} + \beta_2 \text{GDP} + \beta_3 \text{FDI}_{it} + \beta_4 \text{Inflation}_{it} + \beta_5 \text{Domestic} + \beta_6 \text{HDI} + \vartheta_{it} \quad (1)$$

In this model, Export is the dependent variable, while Exch, GDP, FDI, Inflation, Domestic, and HDI represent the independent variables. The coefficients β_1 – β_6 measure the effect of each explanatory variable on exports, whereas ϑ_{it} denotes the error term. This econometric model demonstrates the complex relationship between exports and their determining factors, providing a useful analytical framework for developing policies aimed at promoting exports and supporting sustainable economic growth⁶.

This econometric model provides a comprehensive framework for assessing the impact of foreign direct investment and other macroeconomic factors on export potential. The model quantitatively evaluates the effects of investments, exchange rates, gross domestic product (GDP), inflation, domestic credit, and the Human Development Index (HDI) on export performance. Therefore, this approach serves as an important econometric tool for identifying the key priorities of economic policy aimed at promoting exports and enhancing national export capacity.

¹T.L.Khalikov, "Increasing the export potential of cotton and textile clusters", "Экономика и социум" №6(109)-2 2023, www.iupr.ru, pages 228-231.

²T.L.Ikramova, "Ways to increase the export potential of production in light industrial enterprises", Journal of marketing, business and management (JMBM)/SJIF FACTOR: 5.57, Volume 3, ISSUE 7 (December 2024) ISSN: 2181-3000, www.jmbm.uz, Pages 138-145.

³N.R.Yadgarova, "Tashqi iqtisodiy faoliyatdagi kichik biznes subyektlari o'rinini statistika baholash (O'zbekiston Respublikasida)", "Raqamli iqtisodiyot" ilmiy-elektron jurnali, 11-son, 2025, WWW.INFOCOM.UZ, 625-636-betlar.

⁴M.I.Rakhimova, "Tadbirkorlik subyektlarining eksportsalohiyatini xalqaro sifat standartlariga solishtirish", Iqtisodiyot fanlari bo'yicha falsafadoktori (PhD) dissertatsiyasi Avtoreferati, Namangan – 2024, 65 bet.

⁵Klavdij Logozar, Janez Rogelj, Stefan Bojnec, "The impact of investment intensity in research and development on export activities in business services in Slovenia", Social Sciences & Humanities Open, (2026), <https://doi.org/10.1016/j.ssaho.2025.102361>.

⁶Kumar, P., Moridian, A., Radulescu, M., & Margarita, I. (2025). The Impact of Foreign Direct Investment on Exports: A Study of Selected Countries in the CESEE Region. *Economies*, 13(6), 150. <https://doi.org/10.3390/economies13060150>.

Analysis. In recent years, Andijan Province has demonstrated a steady increase in its export potential. The growth in export volumes over the last decade clearly reflects this positive trend, as presented in Table 1.

Table 1 : Export, Fixed Capital Investment, and Number of Industrial Enterprises in Andijan Region¹.

Year	Industry export volume (million dollars)	fixed capital investment (billion sums)	The number of operating industrial enterprises (pcs)
2016	208.5	2188.5	4944
2017	322.4	2986	4886
2018	273.5	4711.9	4828
2019	394.5	7452.1	5548
2020	530.7	9622.6	6551
2021	931.6	11176.6	8342
2022	1193.1	14339.8	9344
2023	1106.4	18639.1	9887
2024	1097.0	28668.0	5511.0
2025	1164.6	32909.9	4355

During the period 2016-2025, investments in fixed capital in Andijan Province exhibited a consistent upward trend. Specifically, the volume of investments increased from UZS 2,188.5 billion in 2016 to UZS 32,909.9 billion in 2025, representing an almost fifteenfold increase. During the same period, industrial exports also expanded significantly, rising from USD 208.5 million to USD 1,164.6 million. Although export volumes declined slightly during 2023–2024, a recovery trend was observed in 2025. The number of operating industrial enterprises increased steadily until 2023, reaching 9,887 enterprises, but declined sharply during 2024-2025.

Overall, the data presented in Table 1 indicate that the growth in fixed capital investment has had a positive impact on the development of industrial exports. In particular, the parallel growth of investments and exports during 2016-2022 suggests the existence of a strong positive relationship between these indicators. However, in the subsequent years, export growth did not increase proportionally to the rapid growth in investments, indicating the need to improve investment efficiency by directing financial resources toward the production of export-oriented, high value-added products. Furthermore, despite the decline in the number of industrial enterprises during 2024-2025, export volumes remained relatively high, suggesting improved production efficiency, greater industrial concentration, and enhanced export capacity among the remaining enterprises.

¹Uzbekistan Republic national statistics committee open information based on author development.

To examine the factors affecting industrial exports, a correlation analysis was conducted using two explanatory variables: fixed capital investment and the number of operating industrial enterprises. The results indicate that industrial exports have a strong positive correlation with fixed capital investment ($r = 0.93$) and a moderate positive correlation with the number of operating industrial enterprises ($r = 0.55$). (Table 2.).

Table 2 : Main Factors Affecting Industrial Export¹.

	Industry export size	Home to capital mastered investments	Activity showing industry enterprises number
Industry export size	1		
Home to capital mastered investments	0.930237684	1	
Activity showing industry enterprises number	0.558023	0.317196848	1

According to the results of the correlation analysis, the correlation coefficient between industrial export volume and fixed capital investment is 0.930, indicating a very strong positive relationship between these variables. This finding suggests that an increase in investment contributes to the expansion of production capacity, the adoption of modern technologies, and the development of export-oriented production, thereby promoting the growth of industrial exports. Therefore, fixed capital investment can be considered one of the most important determinants of industrial export growth.

The correlation coefficient between industrial export volume and the number of operating industrial enterprises is 0.558, indicating a moderate positive relationship. This result implies that an increase in the number of enterprises has a positive effect on export performance. However, this relationship is considerably weaker than that observed for fixed capital investment, suggesting that export growth depends not only on the number of enterprises but also on factors such as production efficiency, technological advancement, product quality, and access to international markets.

Furthermore, the correlation coefficient between fixed capital investment and the number of operating industrial enterprises is 0.317, indicating a weak positive relationship. This finding suggests that higher investment does not necessarily lead to an increase in the number of enterprises. Instead, investment is primarily directed toward the modernization of existing enterprises and the improvement of their technical and technological capacities.

Overall, the results of the correlation analysis confirm that fixed capital investment is the most influential factor affecting industrial export performance. Therefore, policies aimed at increasing investment activity, promoting high-technology production, and accelerating the modernization of industrial enterprises should be considered key priorities for achieving sustainable growth in industrial exports.

¹Uzbekistan Republic national statistics committee information based on author calculation .

Table 3 : Regression Analysis Results of the Factors Affecting Industrial Export¹.

<i>Regression statistics</i>	
Multiple R	0.970681441
R-squared	0.942222461
Normalized R-squared	0.925714592
Standard error	0.185193602
Observations	10

Dispersion analysis

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	2	3.91511397	1.957556985	57.07717304
Remainder	7	0.240076692	0.03429667	
Total	9	4.155190662		

	<i>Coefficients</i>	Standard error	<i>t-statistic</i>	<i>P-Value</i>
Y-intersection	-5.151161143	1.810330715	-2.84542548	0.024850704
Variable X 1	0.625076314	0.071500061	8.742318598	5.15082E-05
Variable X 2	0.667079213	0.218574925	3.051947578	0.018532317

Regression Analysis Results

The regression analysis results indicate that the estimated model is statistically reliable. In particular, the multiple correlation coefficient (Multiple R = 0.971) demonstrates a very strong relationship between the independent variables included in the model and the dependent variable. The coefficient of determination ($R^2 = 0.942$) indicates that 94.2% of the variation in the dependent variable is explained by the explanatory variables included in the model, while the remaining 5.8% is attributable to factors not included in the model. The adjusted coefficient of determination (Adjusted $R^2 = 0.926$) further confirms the high explanatory power and goodness of fit of the regression model.

According to the analysis of variance (ANOVA), the calculated F-statistic ($F = 57.08$) is statistically significant, with a Significance F value of 0.000046, which is well below the 0.05 significance level. This result confirms that the regression model is statistically significant and appropriate for empirical analysis.

The estimated regression coefficients show that the coefficient of x_1 (investment in fixed capital) is 0.625, indicating that, holding all other variables constant, a one-unit increase in investment in fixed capital

¹Above information based on author calculation .

leads to an average increase of 0.625 units in the dependent variable. Similarly, the coefficient of x_2 (the number of operating industrial enterprises) is 0.667, implying that a one-unit increase in the number of industrial enterprises increases the dependent variable by an average of 0.667 units, *ceteris paribus*. The p-values associated with both variables (0.00005 and 0.0185, respectively) are below the conventional significance level of 0.05, confirming that both explanatory variables are statistically significant determinants of industrial exports. Although the intercept has a negative value (-5.151), it primarily represents a mathematical parameter of the regression equation and has limited economic interpretation.

Overall, the correlation and regression analyses demonstrate that investment in fixed capital is one of the most influential factors affecting industrial export performance. The correlation analysis revealed a very strong positive relationship between investment and exports ($r = 0.930$), while the regression results statistically confirmed this relationship. Furthermore, the high coefficient of determination ($R^2 = 0.942$) indicates that the selected explanatory variables account for a substantial proportion of the variation in industrial export performance, confirming the robustness and explanatory power of the estimated regression model.

As a result of the multiple regression analysis, the following econometric model was developed to explain the industrial export volume of the region:

$$Y = -5,151 + 0,625x_1 + 0,667x_2$$

According to the estimated model, holding all other factors constant, a one-unit increase in investment in fixed capital (x_1) leads to an average increase of 0.625 units in industrial exports. Likewise, a one-unit increase in the number of operating industrial enterprises (x_2) increases industrial exports by an average of 0.667 units. The coefficient of determination ($R^2 = 0.942$) indicates that 94.2% of the variation in industrial export volume is explained by these two explanatory variables. This high explanatory power demonstrates that the estimated regression model is statistically reliable and suitable for forecasting and economic analysis.

Conclusion and Recommendations

The findings indicate that increasing investment and improving the operational efficiency of industrial enterprises contribute significantly to the sustainable growth of industrial exports.

Based on the empirical results, the following recommendations are proposed:

- Increase the volume of investment directed to industrial enterprises and prioritize high-technology production projects to expand the production of export-oriented goods.
- Accelerate the modernization of industrial enterprises and promote the adoption of advanced digital technologies in order to improve product quality and enhance competitiveness in international markets.
- Strengthen financial and institutional support for exporting enterprises by expanding access to export financing, improving logistics infrastructure, subsidizing certification costs, and developing effective mechanisms for entering new foreign markets.

References:

- T.L.Khalikov, *Increasing the export potential of cotton and textile clusters*, "Экономика Узбекистана" №6(109)-2 2023, www.iupr.ru, pages 228-231.
- T.L.Ikramova, "Ways to increase the export potential of production in light industrial enterprises", *Journal of marketing, business and management (JMBM)/SJIF FACTOR: 5.57, Volume 3, ISSUE 7 (December 2024) ISSN: 2181-3000*, www.jmbm.uz, Pages 138-145.
- N.R.Yadgarova, "Tashqiqtisodiy faoliyatdagi kichik biznes subyektlari o'rinini statistika baholash (O'zbekiston Respublikasi misolida)", *Scientific electronic journal "Digital Economy"*, issue 11, 2025, WWW.INFOCOM.UZ, pp. 625-636.
- M.I.Raximova, "Tadbirkorlik subyektlarining eksportsalohiyatini xalqaro sifat standartlariga solishtirish", *Abstract of the dissertation for the degree of Doctor of Philosophy (PhD) in Economics*, Namangan – 2024, 65 pages.
- Mukhtarov M.M. «Ways to increase the economic efficiency of textile clusters» *Journal of Management Value & Ethics (A quarterly Publication of GMA) July-Sept. 2022 Vol. 12 No.03 102-107 p. (08.00.00 6)*. <http://www.jmveindia.com/journal/JULY-SEPT>.
- Mukhtarov, M. (2023). WAYS TO INCREASE THE ECONOMIC EFFICIENCY OF TEXTILE INDUSTRY ENTERPRISES BASED ON PRODUCT DIVERSIFICATION. *Economics and Education*, 24(5), 274-278.
- Marifovich, M. M. (2022). MEANS TO INCREASE EFFICIENCY IN INDUSTRIAL PRODUCTION. *Conference*, 6(6), 104-107.
- Klavdij Logožar, Janez Rogelj, Stefan Bojnec, "The impact of investment intensity in research and development on export activities in business services in Slovenia", *Social Sciences & Humanities Open*, (2026), <https://doi.org/10.1016/j.ssaho.2025.102361>.
- Kumar, P., Moridian, A., Radulescu, M., & Margarita, I. (2025). The Impact of Foreign Direct Investment on Exports: A Study of Selected Countries in the CESEE Region. *Economies*, 13(6), 150. <https://doi.org/10.3390/economies13060150>
- Olchinboyev Otabek Abdusamadugli, "Impact of industrial development on macroeconomic indicators", Vol. 3 No. 4 (2025): "Green Economy and Development" journal, <https://doi.org/10.5281/zenodo.15396782>;
- Otabek Olchinboyev Abdusamadug'li, "Eksportsalohiyatini baholashda qiyosiy ustunlik (Balassa) indeksidan foydalanish", Vol. 4 No. 7 (2026): "Engineering and Economics" journal;
- Open data of the National Statistics Committee of the Republic of Uzbekistan, www.stat.uz.

BUILDING FRANCHISE ECOSYSTEMS FOR SME MODERNIZATION: INSTITUTIONAL DETERMINANTS AND EVIDENCE FROM UZBEKISTAN

Malika Rustamovna Azimova¹

ABSTRACT

Franchising is an effective mechanism for fostering small and medium-sized enterprise (SME) development, facilitating technology transfer, reducing entrepreneurial risk, and enhancing economic competitiveness. Despite its widespread adoption in developed economies, its potential in Uzbekistan remains underutilized. This study examines the institutional, legal, and economic factors shaping franchising development in a transition economy. The research applies an integrated methodological framework combining institutional and comparative legal analysis, benchmarking, scenario forecasting, and secondary data analysis. The findings reveal that the absence of dedicated franchising legislation, limited access to finance, insufficient institutional support, and weak commercialization of domestic brands are the principal barriers to sustainable franchise development. Comparative analysis shows that countries with well-developed franchising ecosystems achieve higher levels of entrepreneurial activity, employment, and SME productivity. The study proposes the Integrated Institutional Franchising Ecosystem Model (IIFEM), integrating six key components of an enabling institutional environment. Scenario analysis indicates that comprehensive institutional reforms could significantly increase franchising's contribution to economic growth, promote job creation, accelerate the internationalization of domestic brands, and strengthen SME competitiveness. The proposed framework advances the literature on franchising in transition economies and provides practical guidance for policymakers seeking to promote sustainable entrepreneurial development.

Keywords: *Franchising; Small And Medium-Sized Enterprises; Institutional Economics; Entrepreneurship; Modernization; Intellectual Property; Franchise Ecosystem; Uzbekistan; Economic Development; Transition Economy.*

1. Introduction

Small and medium-sized enterprises (SMEs) play a central role in economic growth, innovation, employment, and regional development. In transition economies, however, their performance is often constrained by limited access to finance, managerial deficiencies, technological gaps, and weak institutional support. These constraints increase business risks, reduce competitiveness, and limit long-term growth.

Franchising offers an effective mechanism for overcoming many of these challenges. By combining established brands, standardized business processes, managerial expertise, and continuous support, franchise systems reduce entrepreneurial risk, facilitate knowledge and technology transfer, and improve business performance. International evidence shows that countries with mature franchise sectors achieve higher SME survival rates, stronger employment growth, and greater innovation capacity.

In transition economies, franchising performs not only a commercial but also an institutional function. Standardized contractual arrangements, operating procedures, and business support reduce transaction

¹ Master of International Relations Independent Researcher, Singapore Institute of Management in Tashkent

costs and information asymmetries, making market entry less risky and contributing to private sector modernization.

During the past decade, Uzbekistan has implemented extensive market reforms to improve the business environment, promote entrepreneurship, and strengthen the private sector. Although these reforms have encouraged investment and SME activity, franchising remains at an early stage. The market is dominated by foreign brands, domestic franchise networks remain limited, institutional support is fragmented, and specialized franchising legislation has yet to be introduced. As a result, the sector's economic contribution remains modest.

Previous studies on franchising in Uzbekistan have focused mainly on legal regulation and market characteristics, while little attention has been given to its broader institutional role. In particular, the combined influence of regulatory quality, financial infrastructure, intellectual property protection, entrepreneurial competencies, and digital technologies has not been examined within a single analytical framework.

This study addresses this gap by analyzing franchising through the perspectives of institutional economics and entrepreneurship. It examines franchising as an institutional ecosystem shaping SME modernization, innovation, investment attractiveness, and sustainable economic growth. The objectives are to identify the institutional determinants of franchising development in Uzbekistan, assess its potential for SME modernization, and formulate evidence-based policy recommendations.

The study addresses four research questions: (1) Which institutional factors have the greatest influence on franchising development in Uzbekistan? (2) How does franchising enhance SME modernization and competitiveness? (3) Which institutional barriers limit sustainable franchise market expansion? (4) Which policy measures can foster a competitive national franchising ecosystem?

Three hypotheses are tested. H1: Institutional quality is the primary determinant of franchising development in transition economies. H2: Comprehensive franchise ecosystems produce stronger modernization effects than isolated legal reforms. H3: Coordinated improvements in regulation, financial support, digital infrastructure, entrepreneurial competencies, and intellectual property protection generate significant multiplier effects on economic growth through franchising.

This article makes three contributions. First, it integrates institutional economics, entrepreneurship, and franchising into a unified analytical framework for transition economies. Second, it introduces the Integrated Institutional Franchising Ecosystem Model (IIFEM) to explain how institutional quality influences franchise development. Third, it develops alternative scenarios for Uzbekistan through 2035 and proposes policy measures to strengthen the national franchising ecosystem and improve SME competitiveness.

2. Literature Review

2.1. Evolution of Franchising Theory

Franchising has evolved from a contractual business arrangement into a governance model supporting entrepreneurial expansion, knowledge transfer, and business modernization. Contemporary research increasingly views franchise systems as institutional networks that integrate governance, organizational learning, and innovation diffusion.

Early studies interpreted franchising primarily as a response to capital constraints. The ownership redirection hypothesis of Oxenfeldt and Kelly (1969) suggested that firms initially franchise to finance expansion and later repurchase outlets as internal resources increase. However, Lafontaine (1992) demonstrated that many mature franchise systems successfully maintain hybrid ownership structures, indicating that franchising is an efficient long-term governance mechanism rather than a temporary financing strategy.

Rubin (1978) explained franchising through incentive alignment, arguing that franchisees have stronger performance incentives because they invest their own capital and retain residual profits. Shane (1996, 1998) further emphasized organizational learning, showing that franchising enables the transfer of tacit knowledge through standardized operating procedures, training, and managerial support. Current studies therefore regard franchise systems as knowledge ecosystems that combine operational standardization with local entrepreneurial flexibility.

2.2. Agency Theory and Transaction Cost Economics

Agency theory explains franchising as a mechanism for aligning incentives

between franchisors and franchisees (Jensen & Meckling, 1976). Because franchisees invest their own resources, they have stronger incentives to improve efficiency, service quality, and financial performance than salaried managers, reducing monitoring and supervision costs.

Agency conflicts nevertheless remain. Franchisees may deviate from operating standards, while franchisors may impose excessive contractual control. Effective franchise governance therefore requires balancing centralized quality control with entrepreneurial autonomy. Digital technologies increasingly facilitate this balance through real-time monitoring, performance analytics, and integrated information systems.

Transaction Cost Economics (Williamson, 1975, 1985) provides a complementary explanation. Franchising represents an intermediate governance structure combining market flexibility with organizational coordination. It enables expansion while limiting the costs associated with vertical integration. Franchise contracts protect specialized assets—including brands, proprietary technologies, and business know-how—through clearly defined operating standards and intellectual property rights. Recent studies show that digital platforms and artificial intelligence further reduce coordination and transaction costs within franchise networks.

2.3. Institutional Economics and Entrepreneurial Ecosystems

While agency theory and transaction cost economics explain organizational efficiency, institutional economics addresses the broader environment shaping franchise development. According to North (1990), institutions reduce uncertainty through formal rules, property rights, and contract enforcement. Their quality directly influences investment, access to finance, intellectual property protection, and contractual stability.

Acemoglu and Robinson (2012) distinguish inclusive institutions, which promote entrepreneurship and innovation, from extractive institutions that discourage long-term investment through regulatory uncertainty and weak legal enforcement. In transition economies, franchising may partially compensate for institutional weaknesses by providing standardized business practices and managerial support, although its development ultimately depends on institutional quality.

Recent research increasingly adopts the concept of entrepreneurial ecosystems, emphasizing interactions among regulation, finance, education, innovation networks, digital infrastructure, and government policy. Within this perspective, franchising represents one component of a broader entrepreneurial ecosystem rather than an isolated contractual relationship.

2.4. Franchising in Emerging and Transition Economies

Research on emerging economies demonstrates that successful franchise development depends on supportive institutional environments. Poland, the Czech Republic, and Hungary expanded domestic franchise sectors following market reforms, stronger intellectual property protection, and entrepreneurship support policies. Kazakhstan has become the leading franchise market in Central Asia, although domestic franchise brands remain relatively limited. Turkey illustrates how strong domestic brands can support international franchise expansion, while Malaysia and South Korea demonstrate the importance of specialized legislation, entrepreneur training, and preferential financing.

Comparative evidence consistently indicates that sustainable franchise development depends on coordinated institutions rather than private entrepreneurial initiative alone. Effective ecosystems integrate legislation, finance, education, intellectual property protection, digital infrastructure, and government coordination.

2.5. Research Gap and Conceptual Framework

Despite extensive franchising research, several gaps remain. First, empirical studies largely focus on mature markets, while transition economies—particularly Central Asia—remain underexplored. Second, most studies examine legal, organizational, or financial aspects separately rather than within a unified institutional framework. Third, limited attention has been given to franchising as a mechanism for SME modernization, innovation diffusion, and digital transformation.

To address these gaps, this study proposes the Integrated Institutional Franchising Ecosystem Model (IIFEM). Unlike traditional approaches centered on contractual relationships, IIFEM conceptualizes franchising as a multidimensional institutional ecosystem in which regulatory quality, financial infrastructure, entrepreneurial competencies, intellectual property protection, digital technologies, and international integration jointly determine sustainable franchise development. The model provides the theoretical foundation for the empirical analysis of franchising in Uzbekistan and the development of long-term policy recommendations.

3. Research Methodology

3.1. Research Design

This study employs a mixed-methods design combining qualitative institutional analysis with quantitative analysis of secondary economic data. The interdisciplinary framework integrates institutional economics, comparative legal analysis, strategic management, and scenario forecasting to examine franchising as an institutional ecosystem rather than solely a contractual arrangement.

The research consists of five stages: (1) review of the theoretical foundations of franchising; (2) assessment of Uzbekistan's legal and institutional environment; (3) analysis of national and international market indicators; (4) identification of institutional barriers; and (5) development of alternative scenarios and policy recommendations. This design provides both explanatory and forward-looking analysis.

3.2. Conceptual Framework: Integrated Institutional Franchising Ecosystem Model (IIFEM)

The study introduces the Integrated Institutional Franchising Ecosystem Model (IIFEM), which conceptualizes franchising as an institutional ecosystem shaped by six interdependent pillars:

- Regulatory environment (legislation, contract enforcement, judicial effectiveness, competition policy);
- Financial infrastructure (banks, development finance, guarantee funds, franchise financing);
- Intellectual property protection (trademarks, patents, copyrights, commercial know-how);
- Entrepreneurial competencies (managerial education, consulting, digital and entrepreneurial skills);
- Digital infrastructure (CRM systems, e-payments, cloud platforms, data analytics, artificial intelligence);
- International integration (FDI, export promotion, international partnerships, global business standards).

The model assumes that sustainable franchise development depends on the simultaneous advancement of all six pillars, reflecting strong complementarities among institutional factors.

3.3. Research Methods

Six complementary methods were applied:

- Institutional analysis to evaluate legislation, public institutions, intellectual property protection, and business support mechanisms.
- Comparative legal analysis of franchising regulation in the United States, South Korea, Malaysia, Turkey, Kazakhstan, and Poland to identify transferable institutional practices.
- Benchmarking using indicators such as franchise density, GDP contribution, employment, domestic franchise brands, international expansion, and institutional support.
- SWOT analysis to assess institutional strengths, weaknesses, opportunities, and threats.
- PEST analysis to examine political, economic, social, and technological factors influencing franchising.
- Scenario forecasting, including conservative, moderate reform, and accelerated ecosystem scenarios, to assess alternative institutional development pathways through 2035.

3.4. Data Sources

The analysis relies exclusively on secondary data from official national and international sources, including the legislation of Uzbekistan, the Statistics Agency, the Central Bank, the Ministry of Economy and Finance, the Ministry of Justice, the World Bank, OECD, ILO, WIPO, IFA, EFF, ADB, and peer-reviewed studies indexed in Scopus and Web of Science. Combining multiple independent sources strengthens analytical reliability through data triangulation.

3.5. Research Limitations

The study is constrained by the limited availability of detailed national franchise statistics, the rapidly evolving institutional environment in Uzbekistan, and differences in legal definitions and statistical methodologies across countries. These limitations are mitigated through triangulation of legal documents, official statistics, international databases, and academic literature.

3.6. Reliability and Scientific Contribution

Research reliability is ensured through methodological triangulation, international benchmarking, and scenario analysis. The principal methodological contribution is the development and application of the Integrated Institutional Franchising Ecosystem Model (IIFEM), which integrates institutional quality, entrepreneurial ecosystems, digital transformation, and SME modernization into a unified analytical framework for transition economies. The model provides a foundation for both comparative academic research and evidence-based policymaking.

4. Results and Discussion

4.1. Current State of Franchising in Uzbekistan

During the past decade, Uzbekistan has improved its business environment through market liberalization, digital public services, and entrepreneurship reforms. These changes have created favorable conditions for franchising, although the sector remains at an early stage of development.

Franchise activity is concentrated in food services, retail, education, healthcare, logistics, hospitality, and beauty services. Approximately 380 franchise brands operate through nearly 10,000 outlets, more than 80% of which are foreign. Domestic franchise systems remain limited, reflecting insufficient business standardization, weak brand management, and restricted financial resources.

Table 1 : Current Characteristics of the Franchising Market in Uzbekistan

Indicator	Current Situation	Institutional Implication
Number of franchise brands	Approximately 380	Growing market activity
Foreign brands	Over 80%	High external dependence
Franchise outlets	Approximately 10,000	Expanding business networks
Contribution to GDP	Below 0.5%	Significant untapped potential
National franchise brands	Limited	Weak commercialization capacity
Specialized franchise legislation	Absent	Institutional uncertainty

These results indicate that market growth is driven mainly by foreign franchise systems, while domestic institutional capacity remains underdeveloped.

4.2. Institutional Assessment Using IIFEM

Application of the Integrated Institutional Franchising Ecosystem Model (IIFEM) reveals uneven development across its six institutional pillars.

The regulatory environment provides a legal basis for franchising through the Civil Code and intellectual property legislation, but the absence of a dedicated franchising law limits legal certainty.

Financial infrastructure remains one of the main constraints. Commercial loans are costly, and specialized franchise financing is largely unavailable, restricting entrepreneurs' access to proven business models.

Uzbekistan has strengthened intellectual property protection, particularly trademark registration, although enforcement of commercial know-how and confidential business information remains inconsistent.

Entrepreneurial competencies represent another major bottleneck. Many firms have commercially successful business models but lack expertise in franchise design, operational standards, quality management, and contractual governance.

Although digitalization has expanded electronic payments, tax administration, and e-commerce, digital franchise management systems, CRM platforms, data analytics, and AI-based monitoring remain uncommon.

Finally, international integration has improved through growing participation in regional and international business networks, yet the international expansion of Uzbek franchise brands remains limited.

4.3. Institutional Constraints

The empirical analysis identifies five interrelated institutional constraints.

These barriers reinforce one another. Weak entrepreneurial capacity reduces bankable franchise projects, limited financing slows digital investment, and low digitalization weakens productivity and international competitiveness.

Table 2 : Classification of Institutional Constraints Affecting Franchising Development

Institutional Constraint	Current Impact	Long-Term Consequence
Regulatory fragmentation	High	Reduced legal certainty
Limited financial access	High	Slower market expansion
Weak entrepreneurial competencies	High	Limited domestic franchises
Incomplete digital integration	Medium	Lower operational efficiency
Insufficient internationalization	Medium	Weak export competitiveness

4.4. International Comparison

Benchmark countries, including South Korea, Malaysia, and Poland, have developed integrated franchise ecosystems combining specialized legislation, financing mechanisms, entrepreneur training, intellectual property protection, and active franchise associations. These institutional arrangements support higher SME productivity, stronger domestic franchise development, international expansion, and employment growth.

Compared with these economies, Uzbekistan has achieved substantial macroeconomic reforms but lacks institutional coordination across the six IIFEM pillars. Further franchise development depends primarily on strengthening these institutional complementarities.

4.5. Franchising as an Instrument of SME Modernization

The analysis shows that franchising contributes to SME modernization by accelerating technology transfer, promoting organizational learning, improving quality management, reducing entrepreneurial risk, and encouraging compliance with accounting, taxation, labor, and intellectual property standards. Beyond firm-level effects, franchise systems enhance market efficiency by reducing transaction costs and strengthening institutional trust.

4.6. Discussion

The findings support all three research hypotheses. H1 is confirmed, as institutional quality remains the key determinant of franchise development. H2 is supported because isolated legal reforms produce weaker outcomes than coordinated improvements in finance, digital infrastructure, entrepreneurial competencies, and intellectual property protection. H3 is also confirmed: complementary institutional reforms generate multiplier effects that strengthen productivity, investment attractiveness, innovation, and SME competitiveness.

These findings extend institutional economics and franchising research by demonstrating that franchise development in transition economies depends on the quality of the entire institutional ecosystem rather than on individual regulatory measures. Accordingly, franchising should be incorporated into national SME development strategies as an integrated instrument of entrepreneurship, innovation, and economic modernization.

5. Scenario Forecast and Policy Implications

5.1. Scenario Development

Future franchising development depends on institutional reforms, macroeconomic conditions, technological progress, entrepreneurial capacity, and international integration. To evaluate alternative development paths, this study applies scenario analysis based on the Integrated Institutional Franchising Ecosystem Model (IIFEM). Three scenarios for 2026–2035 reflect different levels of institutional reform and ecosystem maturity.

5.2. Scenario I: Conservative Development

This scenario assumes gradual reforms without dedicated franchising legislation or targeted government support. Market growth is driven mainly by private initiative and foreign franchise brands, while institutional constraints persist. As a result, franchise expansion remains concentrated in major cities and service industries, and domestic franchise creation develops slowly.

Table 3 : Conservative Development Scenario (2035)

No	Indicator	Estimated Value
1	Franchise outlets	18,000–22,000
2	Domestic franchise brands	80–100
3	Employment	45,000–60,000 jobs
4	Contribution to GDP	0.8–1.0%
5	Export-oriented franchises	Limited

5.3. Scenario II: Moderate Institutional Reform

This scenario assumes the adoption of franchising legislation, creation of a National Franchising Association, preferential financing, expanded entrepreneurial education, and stronger intellectual property protection. These reforms improve institutional coordination, facilitate access to finance, and encourage domestic franchise development.

Table 4 : Moderate Reform Scenario (2035)

No	Indicator	Estimated Value
1	Franchise outlets	40,000–50,000
2	Domestic franchise brands	180–220
3	Employment	180,000–250,000 jobs
4	Contribution to GDP	2.0–2.5%
5	International franchise expansion	Moderate

Compared with the conservative scenario, this pathway substantially strengthens SME competitiveness and economic diversification.

5.4. Scenario III: Accelerated Franchise Ecosystem Development

The accelerated scenario assumes full implementation of the IIFEM through coordinated institutional reforms. Key measures include adoption of a comprehensive Law on Franchising, establishment of a National Franchising Development Agency and a Franchise Development Fund, preferential financing, digital franchise management platforms, national certification standards, university training programs, export promotion, participation in international franchise exhibitions, and AI-based support systems.

Simultaneous progress across all institutional pillars generates strong multiplier effects. Better regulation stimulates investment, investment supports domestic brand development, and digitalization and managerial capacity further improve productivity and international competitiveness.

Table 5 : Accelerated Development Scenario (2035)

No	Indicator	Estimated Value
1	Franchise outlets	90,000–110,000
2	Domestic franchise brands	450–600
3	Employment	700,000–1,000,000 jobs
4	Contribution to GDP	3.5–4.0%
5	Annual tax revenues	Significant increase
6	Franchise exports	Rapid growth

Under this scenario, Uzbekistan could approach the institutional characteristics of mature franchise markets.

5.5. Comparative Assessment

The comparison confirms that coordinated institutional reforms produce substantially greater economic benefits than isolated policy measures, supporting the assumptions of the IIFEM.

Table 6 : Comparison of Alternative Development Scenarios

Indicator	Conservative	Moderate	Accelerated
Specialized legislation	No	Yes	Yes
National franchise association	No	Yes	Yes
Franchise financing	Limited	Partial	Comprehensive
Digital ecosystem	Moderate	High	Very High
Domestic franchise brands	Low	Medium	High
GDP contribution	~1%	~2.5%	~4%
International competitiveness	Limited	Moderate	High

5.6. Policy Implications

The findings suggest that franchising should become an integral component of Uzbekistan's SME modernization strategy. Priority measures include:

- Adoption of a dedicated Law on Franchising to improve legal certainty and investor confidence;
- Establishment of a National Franchising Development Agency to coordinate policy, certification, statistics, training, and international cooperation;
- Introduction of concessional loans, state guarantees, co-financing mechanisms, and preferential taxation for franchise development;
- Expansion of university and professional training in franchise management, intellectual property, digital business systems, and international marketing;
- Development of digital franchise platforms, AI-based analytics, cloud management systems, and standardized software;
- Support for international expansion of Uzbek franchise brands through export promotion and participation in international franchise networks.

5.7. Long-Term Economic Effects

The scenario analysis indicates that franchising has broader economic effects than business expansion alone. A mature franchise ecosystem promotes technology transfer, managerial innovation, productivity growth, formal employment, regional development, export diversification, higher tax revenues, and stronger institutional trust. These benefits extend to suppliers, financial institutions, educational organizations, logistics providers, and digital service companies. Accordingly, franchising should be regarded as an institutional instrument for SME modernization and long-term economic transformation rather than solely as a contractual business model.

6. Conclusion

This study demonstrates that franchising should be viewed not merely as a contractual business model but as an institutional mechanism supporting SME development, innovation, technology transfer, and economic modernization. The findings show that franchising in Uzbekistan depends primarily on the quality and coordination of the institutional environment rather than on market demand or entrepreneurial initiative alone.

Although recent economic reforms have improved the business climate, the national franchising ecosystem remains constrained by fragmented regulation, the absence of dedicated franchising legislation, limited access to finance, insufficient entrepreneurial competencies, weak commercialization of domestic brands, and incomplete digital integration. These factors continue to restrict the expansion of domestic franchise systems.

The proposed Integrated Institutional Franchising Ecosystem Model (IIFEM) represents the principal theoretical contribution of this research. The model identifies six interdependent institutional pillars—regulatory quality, financial infrastructure, intellectual property protection, entrepreneurial competencies, digital infrastructure, and international integration—that jointly determine franchise development. The analysis confirms that coordinated reforms across these pillars generate stronger and more sustainable outcomes than isolated policy measures.

International experience demonstrates that countries with integrated franchise ecosystems achieve higher productivity, employment, innovation, and export competitiveness. Consistent with these findings, scenario analysis suggests that comprehensive institutional reforms could substantially increase franchising's contribution to GDP, accelerate domestic brand development, expand employment, and strengthen the international competitiveness of Uzbek SMEs.

The study also has important policy implications. Priority measures include adopting a dedicated Law on Franchising, establishing a National Franchising Development Agency, expanding specialized financial instruments, strengthening entrepreneurial education, improving intellectual property protection, and accelerating digital transformation. Together, these measures would create favorable conditions for sustainable franchise development and private sector modernization.

The study is limited by its reliance on secondary data and the restricted availability of detailed national franchise statistics. Future research should incorporate survey data, econometric analysis, and cross-country comparisons to further validate the IIFEM framework. Additional research may also examine the role of artificial intelligence, digital platforms, sustainability, and global value chains in shaping franchise competitiveness.

Overall, the findings indicate that franchising has significant untapped potential to strengthen SME competitiveness and support long-term economic transformation in Uzbekistan. An integrated institutional approach provides a practical foundation for expanding domestic franchise systems and increasing their contribution to sustainable national development.

References

A. Franchising Theory and Business Models

- Blair, R. D., & Lafontaine, F. (2005). *The Economics of Franchising*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511753879>
- Bradach, J. L. (1997). Using the plural form in the management of restaurant chains. *Administrative Science Quarterly*, 42(2), 276–303. <https://doi.org/10.2307/2393920>
- Brickley, J. A., & Dark, F. H. (1987). The choice of organizational form: The case of franchising. *Journal of Financial Economics*, 18(2), 401–420.
- Caves, R. E., & Murphy, W. F. (1976). Franchising: Firms, markets, and intangible assets. *Southern Economic Journal*, 42(4), 572–586. <https://doi.org/10.2307/1056258>
- Combs, J. G., Ketchen, D. J., Jr., & Short, J. C. (2011). Franchising research: Major milestones, new directions, and its future within entrepreneurship. *Entrepreneurship Theory and Practice*, 35(3), 413–425. <https://doi.org/10.1111/j.1540-6520.2011.00443.x>
- Dant, R. P., Grünhagen, M., & Windsperger, J. (2011). Franchising research frontiers for the twenty-first century. *Journal of Retailing*, 87(3), 253–268. <https://doi.org/10.1016/j.jretai.2011.08.002>
- Dant, R. P., Perrigot, R., & Cliquet, G. (2008). A cross-cultural comparison of the plural forms in franchise networks. *Journal of Small Business Management*, 46(2), 286–311. <https://doi.org/10.1111/j.1540-627X.2008.00244.x>
- Kaufmann, P. J., & Dant, R. P. (1996). Multi-unit franchising: Growth and management issues. *Journal of Business Venturing*, 11(5), 343–358. [https://doi.org/10.1016/0883-9026\(95\)00119-0](https://doi.org/10.1016/0883-9026(95)00119-0)
- Lafontaine, F. (1992). Agency theory and franchising: Some empirical results. *RAND Journal of Economics*, 23(2), 263–283. <https://doi.org/10.2307/2555988>
- Lafontaine, F., & Shaw, K. L. (1999). The dynamics of franchising: Evidence from panel data. *Journal of Political Economy*, 107(5), 1041–1080. <https://doi.org/10.1086/250091>
- Lafontaine, F., & Shaw, K. L. (2005). Targeting managerial control: Evidence from franchising. *RAND Journal of Economics*, 36(1), 131–150.
- Michael, S. C. (2003). First mover advantage through franchising. *Journal of Business Venturing*, 18(1), 61–80. [https://doi.org/10.1016/S0883-9026\(01\)00082-5](https://doi.org/10.1016/S0883-9026(01)00082-5)
- Rubin, P. H. (1978). The theory of the firm and the structure of the franchise contract. *Journal of Law and Economics*, 21(1), 223–233. <https://doi.org/10.1086/466918>
- Shane, S. (1996). Hybrid organizational arrangements and their implications for firm growth and survival. *Academy of Management Journal*, 39(4), 1035–1055. <https://doi.org/10.2307/256995>
- Shane, S. (1998). Making new franchise systems work. *Strategic Management Journal*, 19(7), 697–707. [https://doi.org/10.1002/\(SICI\)1097-0266\(199807\)19:7<697::AID-SMJ985>3.0.CO;2-O](https://doi.org/10.1002/(SICI)1097-0266(199807)19:7<697::AID-SMJ985>3.0.CO;2-O)

B. Institutional Economics, Entrepreneurship and Entrepreneurial Ecosystems

- Acemoglu, D., & Robinson, J. A. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Crown Business.

- Acs, Z. J., Autio, E., & Szerb, L. (2014). National systems of entrepreneurship: Measurement issues and policy implications. *Research Policy*, 43(3), 476–494. <https://doi.org/10.1016/j.respol.2013.08.016>
- Audretsch, D. B. (2007). *The Entrepreneurial Society*. Oxford University Press.
- Audretsch, D. B., & Keilbach, M. (2004). Entrepreneurship capital and economic performance. *Regional Studies*, 38(8), 949–959. <https://doi.org/10.1080/0034340042000280956>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Baumol, W. J. (1990). Entrepreneurship: Productive, unproductive, and destructive. *Journal of Political Economy*, 98(5), 893–921. <https://doi.org/10.1086/261712>
- Bruton, G. D., Ahlstrom, D., & Li, H.-L. (2010). Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future? *Entrepreneurship Theory and Practice*, 34(3), 421–440. <https://doi.org/10.1111/j.1540-6520.2010.00390.x>
- Cohen, B. (2006). Sustainable valley entrepreneurial ecosystems. *Business Strategy and the Environment*, 15(1), 1–14. <https://doi.org/10.1002/bse.428>
- Isenberg, D. J. (2010). How to start an entrepreneurial revolution. *Harvard Business Review*, 88(6), 40–50.
- Mason, C., & Brown, R. (2014). *Entrepreneurial Ecosystems and Growth-Oriented Entrepreneurship. Final Report to OECD*.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511808678>
- North, D. C. (1991). Institutions. *Journal of Economic Perspectives*, 5(1), 97–112. <https://doi.org/10.1257/jep.5.1.97>
- Stam, E., & van de Ven, A. (2021). Entrepreneurial ecosystem elements. *Small Business Economics*, 56(2), 809–832. <https://doi.org/10.1007/s11187-019-00270-6>
- Williamson, O. E. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. Free Press.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press.
- Williamson, O. E. (2000). The new institutional economics: Taking stock, looking ahead. *Journal of Economic Literature*, 38(3), 595–613. <https://doi.org/10.1257/jel.38.3.595>
- OECD. (2024). *Entrepreneurial Ecosystem Diagnostics*. OECD Publishing. <https://doi.org/10.1787/7096961f-en>

C. Digital Transformation, Artificial Intelligence, SME Development and Business Ecosystems

- Bharadwaj, A., El Sawy, O. A., Pavlou, P. A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471–482. <https://doi.org/10.25300/MISQ/2013/37:2.3>
- Nambisan, S. (2017). Digital entrepreneurship: Toward a digital technology perspective. *Entrepreneurship Theory and Practice*, 41(6), 1029–1055. <https://doi.org/10.1111/etap.12254>
- Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research*, 122, 889–901. <https://doi.org/10.1016/j.jbusres.2019.09.022>

- Vial, G. (2019). *Understanding digital transformation: A review and a research agenda*. *The Journal of Strategic Information Systems*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Warner, K. S. R., & Wäger, M. (2019). *Building dynamic capabilities for digital transformation: An ongoing process of strategic renewal*. *Long Range Planning*, 52(3), 326–349. <https://doi.org/10.1016/j.lrp.2018.12.001>
- OECD. (2023). *OECD SME and Entrepreneurship Outlook 2023*. OECD Publishing. <https://doi.org/10.1787/342b8564-en>
- World Bank. (2021). *World Development Report 2021: Data for Better Lives*. World Bank. <https://doi.org/10.1596/978-1-4648-1600-0>
- OECD. (2024). *Going Digital Toolkit 2024*. OECD Publishing.
- Brynjolfsson, E., Li, D., & Raymond, L. R. (2023). *Generative AI at Work*. National Bureau of Economic Research Working Paper No. 31161. <https://doi.org/10.3386/w31161>
- WIPO. (2024). *World Intellectual Property Indicators 2024*. World Intellectual Property Organization.
- World Economic Forum. (2023). *The Future of Jobs Report 2023*. World Economic Forum.
- UNCTAD. (2024). *Digital Economy Report 2024*. United Nations Conference on Trade and Development.
- OECD. (2024). *Artificial Intelligence, Productivity and SMEs*. OECD Publishing.
- International Telecommunication Union (ITU). (2024). *Measuring Digital Development: Facts and Figures 2024*. ITU.

D. International Organizations and Uzbekistan Context

- Asian Development Bank. (2024). *Asian Development Outlook 2024: Innovation for Sustainable Development*. Asian Development Bank.
- International Monetary Fund. (2024). *Republic of Uzbekistan: 2024 Article IV Consultation—Press Release; Staff Report; and Statement by the Executive Director for the Republic of Uzbekistan*. International Monetary Fund.
- International Finance Corporation. (2020). *Uzbekistan: Improving the Business Environment for Private Sector Development*. IFC.
- Organisation for Economic Co-operation and Development (OECD). (2023). *Digital Skills for Private Sector Competitiveness in Uzbekistan*. OECD Publishing.
- Organisation for Economic Co-operation and Development (OECD). (2024). *SME Digitalisation to Manage Shocks and Transitions: OECD SME and Entrepreneurship Papers, No. 62*. OECD Publishing. <https://doi.org/10.1787/eb4ec9ac-en>
- Organisation for Economic Co-operation and Development (OECD). (2024). *Entrepreneurial Ecosystem Diagnostics*. OECD Publishing. <https://doi.org/10.1787/7096961f-en>
- United Nations Conference on Trade and Development (UNCTAD). (2024). *World Investment Report 2024: Investment Facilitation and Digital Transformation*. United Nations.
- World Bank. (2024). *At Your Service? The Promise of Services-Led Growth in Uzbekistan*. World Bank.
- World Bank. (2025). *Uzbekistan Country Economic Memorandum: Fostering Private Sector-Led Growth and Global Integration*. World Bank.

- World Bank. (2025). *Improved Access to Finance to Help Businesses in Uzbekistan Grow and Create Jobs*. World Bank.
- World Intellectual Property Organization (WIPO). (2024). *World Intellectual Property Indicators 2024*. WIPO.
- World Economic Forum. (2025). *The Future of Jobs Report 2025*. World Economic Forum.

E. Legislation of the Republic of Uzbekistan

- *Civil Code of the Republic of Uzbekistan*. (1996). Chapter 50. *Comprehensive Business License Agreement (Commercial Concession)*.
- *Law of the Republic of Uzbekistan No. ZRU-267-II*. (2001). *On Trademarks, Service Marks and Appellations of Origin of Goods*.
- *Law of the Republic of Uzbekistan No. ZRU-374*. (2014). *On Commercial Secrets*.
- *Law of the Republic of Uzbekistan No. ZRU-730*. (2021). *On Insurance Activity*.
- *Law of the Republic of Uzbekistan No. ZRU-850*. (2023). *On Competition*.
- *Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 346*. (2022). *Administrative Regulation for State Registration of Comprehensive Business License Agreements*.
- *Decree of the President of the Republic of Uzbekistan No. PF-60*. (2022). *Development Strategy of New Uzbekistan for 2022–2026*.

**To make a decision, all
you need is authority.
To make a good decision,
you also need knowledge,
experience, and insight.**

Denise Moreland

MEASURING ESG IN UZBEKISTAN'S CONSTRUCTION INDUSTRY: DEVELOPMENT OF A SIMPLIFIED ESG INDEX

Valentina Ablaeva¹

ABSTRACT

ESG practices are gaining momentum worldwide, particularly in emerging markets. Yet, little is known about ESG practices in Uzbek construction companies. Therefore, this study addresses this gap by developing a simplified ESG index based on 18 indicators grouped into environmental, social, and governance dimensions using national legislation and international ESG frameworks. The index was tested for reliability using Cronbach's alpha, after which panel regression was employed to examine the relationship between ESG performance and return on assets (ROA). The results show a positive but statistically insignificant relationship between ESG performance and ROA. This finding is consistent with previous studies suggesting that the financial effects of ESG may take time to materialize and may be difficult to detect in small samples. The proposed index provides a practical tool for assessing ESG performance in construction companies in the context of emerging economies.

Keywords: *ESG; ESG Index; Construction Companies; Uzbekistan; Return On Assets (ROA); Panel Regression.*

INTRODUCTION

Uzbekistan is actively promoting the transition to a green economy by encouraging companies to adopt ESG practices. However, companies need a measurable indicator to evaluate their ESG performance and assess its potential impact on financial performance, long-term sustainability, and investment attractiveness. One of the most widely used tools for this purpose is an ESG index.

The construction of ESG indices has changed considerably over the past few years. Initially, ESG indices were mainly based on generic sustainability or corporate responsibility ratings that used the same approach for different companies and industries (Liu, 2023). More recently, ESG index construction has shifted towards developing transparent, context-specific, and multidimensional indices that better reflect the characteristics of particular industries and countries (Liu, 2023; Jiang et al., 2024; Ongan et al., 2025).

Researchers have also introduced more transparent methods for selecting indicators and assigning weights. Recent studies use approaches such as principal component analysis, entropy weighting, text mining, and multi-criteria decision-making methods to improve the reliability of ESG measurement (Gu et al., 2023; Jiang et al., 2024; Ongan et al., 2025). As a result, ESG indices are now widely used to examine not only financial performance but also firm value, market valuation, organizational efficiency, and broader sustainability outcomes (Christine et al., 2025; Kraievskyi et al., 2025; Bannikov et al., 2025; Ongan et al., 2025).

Despite these developments, ESG research in Uzbekistan mainly discusses national ESG policies and ESG implementation rather than industry-specific ESG assessment. Very few papers focus on construction companies. Also, it is worth noting that ESG reporting in Uzbekistan is not yet mandatory for most firms (Esanboevna, 2026; Rajabova, 2025; Tursunkhodjayeva, 2026). Although ESG reporting is not yet

¹ PhD Candidate, Senior Lecturer Tashkent University of Architecture and Civil Engineering,

mandatory for most firms in Uzbekistan, the country's transition toward sustainable business practices and the increasing adoption of international management standards suggest that ESG implementation is likely to expand in the coming years. Establishing a practical ESG assessment framework at this stage can help companies lay the groundwork for future ESG implementation by providing a structured tool for measuring and improving ESG performance. To address this need, this study develops an ESG index tailored to construction joint-stock companies in Uzbekistan and examines its effect on firms' financial performance, measured by ROA.

LITERATURE REVIEW

Two separate research streams can be observed in the literature. When it comes to research conducted in Uzbekistan, the main focus is on ESG integration, national ESG policy, corporate governance, and the need for a clear ESG methodology (Esanboevna, 2026; Rajabova, 2025; Tursunkhodjayeva, 2026). In contrast, international researchers focus on developing ESG assessment systems for companies across various industries, including construction companies, using methods such as entropy weighting (an objective method that assigns weights based on the variability of indicators), TOPSIS (a multi-criteria decision-making method that ranks alternatives according to their distance from the ideal solution), materiality matrices (a tool used to identify and prioritize the most important ESG issues), and ESG risk assessment (Lei, 2024; Gomes, 2022; Gong, 2024; Ermilova, 2024). These studies also highlight the lack of standardized industry-specific ESG indicators and transparent ESG reporting (Gong, 2024; Hua, 2024; Bezerra, 2024). Given the limited availability of ESG disclosures in Uzbekistan, this paper develops a simplified ESG index for joint-stock construction companies, designed for environments with low corporate transparency and limited information disclosure.

RESEARCH METHODOLOGY

ESG indices are usually developed based on internationally recognized frameworks, such as the Global Reporting Initiative (GRI) and the Global Real Estate Sustainability Benchmark (GRESB), together with the relevant legislation of the country where the companies operate (Santana Tovar et al., 2025; Kim, 2022). Following this approach, the ESG index in this study was developed based on the GRI and GRESB frameworks and the legislation of the Republic of Uzbekistan. Specifically, the governance indicators were derived from the Law of the Republic of Uzbekistan On Joint-Stock Companies and Protection of Shareholders' Rights (Law No. ZRU-370, 2014) and the Corporate Governance Code (2015). The environmental indicators were derived from the Law of the Republic of Uzbekistan On Nature Protection, while the social indicators were derived from the Labour Code of the Republic of Uzbekistan and the Law of the Republic of Uzbekistan On Labour Protection. Since ESG disclosure by construction companies in Uzbekistan is still limited, a simplified set of indicators was selected.

Our ESG index includes three dimensions: Environmental (5 indicators), Social (5 indicators), and Governance (8 indicators), totaling 18 binary indicators. Only publicly available information from company websites, business plans, and the Unified Corporate Information Portal was used to construct the index.

The sample consisted of six construction companies, including both listed and non-listed firms, observed over the period from 2021 to 2025. The final sample consisted of 30 firm-year observations.

Once the ESG index is constructed, its impact on the financial performance of the sample companies is examined using panel regression analysis. Financial performance is measured by Return on Assets (ROA), one of the most widely used indicators in ESG research (Aydoğmuş et al., 2022). ROA shows how efficiently

a company uses its assets to generate profit. This is important in the construction industry, where companies invest heavily in buildings, machinery, and equipment.

To reduce potential bias, the model includes several control variables, namely firm size, financial leverage, and firm age, which are commonly used in studies examining the relationship between ESG and financial performance. Therefore, the following hypotheses are tested:

H1: A higher ESG index has a positive effect on ROA in construction companies.

H2: Firm characteristics (firm size, firm age, and financial leverage) significantly affect ROA.

ANALYSIS AND RESULTS

The descriptive statistics presented in Table 1 show that the governance block achieved the highest average score (0.588), compared to the environmental (0.373) and social (0.360) blocks.

Table 1 : Descriptive Statistics of the ESG index and its components

	<i>E-block</i>	<i>S-block</i>	<i>G-block</i>	<i>ESG</i>
Mean	0.3733333	0.36	0.5875	0.433583
Standard Error	0.0476899	0.063173	0.019094	0.039621
Median	0.2	0.3	0.625	0.3575
Mode	0.2	0	0.625	0.29
Standard Deviation	0.2612085	0.346012	0.104583	0.217012
Sample Variance	0.0682299	0.119724	0.010938	0.047094
Kurtosis	1.1468473	-0.65078	2.886297	-0.27311
Skewness	1.4570467	0.715765	-1.25663	0.884498
Range	0.8	1	0.5	0.7325
Minimum	0.2	0	0.25	0.155
Maximum	1	1	0.75	0.8875
Sum	11.2	10.8	17.625	13.0075
Count	30	30	30	30
Confidence Level(95.0%)	0.0975369	0.129203	0.039052	0.081034

However, none of the sampled companies disclosed the existence of an audit committee. Although several companies have revision committees, these cannot be considered equivalent to audit committees. In addition, formal risk management practices are rarely disclosed. Only one of the six companies disclosed elements of a formal risk management system in its 2026 business plan.

The reliability of the ESG index was assessed using Cronbach's alpha and McDonald's omega. The results are presented in Table 2. Cronbach's alpha (0.859) and McDonald's omega (0.867) indicate good

internal consistency. The warning related to the “Board independence” indicator is likely caused by the limited variation in the data and the small sample size. Therefore, the original coding was retained.

Table 2 : Output of reliability analysis

Scale Reliability Statistics				
	Mean	SD	Cronbach's α	McDonald's ω
scale	0.410	0.259	0.859	0.867
Note. item 'Board independence' correlates negatively with the total scale and probably should be reversed				

Item Reliability Statistics					
				If item dropped	
	Mean	SD	Item-rest correlation	Cronbach's α	McDonald's ω
Board independence	0.833	0.379	-0.0942	0.881	0.883
Shareholder rights protection	0.700	0.466	0.5434	0.848	0.858
ISO 37001	0.167	0.379	0.3147	0.860	0.870
Community engagement / CSR activities	0.167	0.379	0.6173	0.844	0.853
Annual report disclosure	0.967	0.183	0.2487	0.862	0.873
Environmental policy	0.267	0.450	0.7489	0.834	0.843
Environmental initiatives	0.167	0.379	0.4937	0.851	0.861
ISO 14001	0.333	0.479	0.8262	0.827	0.837
Energy efficiency initiatives	0.100	0.305	0.6168	0.846	0.854
Occupational health and safety policy	0.400	0.498	0.4395	0.856	0.862
Employee training and development	0.467	0.507	0.6259	0.842	0.853
Employee welfare and benefits	0.367	0.490	0.6091	0.843	0.854
ISO 45001	0.400	0.498	0.7642	0.832	0.842

Three panel regression models were tested: pooled OLS, fixed effects, and random effects. The Breusch–Pagan test did not support the random-effects model ($p = 0.665$). The Hausman test showed that the fixed-effects model was a better choice ($p < 0.001$). The test for different company effects was also significant ($p = 0.024$). The White test and Wooldridge test showed heteroskedasticity and first-order

autocorrelation. Therefore, the final fixed-effects model was estimated with robust standard errors. The panel model selection procedure is presented in Table 3.

Table 3 : Panel model selection

<i>Test</i>	<i>p-value</i>	<i>Decision</i>
Hausman test	<0.001	Fixed effects selected
Robust test for group effects	0.024	Firm effects exist
Breusch–Pagan LM test	0.665	Random effects not supported

The results of diagnostic tests are summarized in Table 4.

Table 4 : Panel regression diagnostic tests

<i>Test</i>	<i>p-value</i>	<i>Conclusion</i>
VIF	2.17–3.28	No multicollinearity
White test	0.011	Heteroskedasticity detected
Wooldridge test	0.008	First-order autocorrelation detected

Table 5 reports the results of the fixed-effects panel regression. The ESG index has a positive coefficient, suggesting that better ESG performance is associated with higher return on assets. Yet, this relationship is not statistically significant. Interestingly, the control variables, including firm size, firm age, and financial leverage, are also not significantly associated with ROA. The model explains only 22.9% of the variation in ROA. This means that the ESG index and the selected firm characteristics explain part of the differences in financial performance, but not all of them.

The positive but non-significant ESG coefficient may be explained by the early stage of ESG adoption among construction companies in Uzbekistan. As noted earlier, ESG disclosure is still limited. Therefore, ESG practices are still developing, and their effect on financial performance may not yet be fully reflected in accounting indicators such as ROA.

Table 5 : Panel Regression with fixed-effects, using 30 observations. Included 6 cross-sectional units. Time-series length = 5

	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-ratio</i>	<i>p-value</i>
const	−0.195770	0.462649	−0.4231	0.6898
ESG	0.268301	0.135115	1.986	0.1038
Size	0.00749690	0.0173052	0.4332	0.6829
Age	−0.00232853	0.00694890	−0.3351	0.7512
Fin. leverage	0.00119263	0.00228758	0.5214	0.6244
Mean dependent var	−0.004757		S.D. dependent var	0.048554
Sum squared resid	0.034688		S.E. of regression	0.041646
LSDV R-squared	0.492631		Within R-squared	0.229417
Log-likelihood	58.87035		Akaike criterion	−97.74070
Schwarz criterion	−83.72872		Hannan-Quinn	−93.25815
rho	−0.148591		Durbin-Watson	2.007450

DISCUSSIONS

The average ESG score was 0.43, showing that ESG disclosure is still low among the sampled construction companies. The regression results did not support the study hypothesis that ESG disclosure has a positive effect on ROA. Although the ESG coefficient was positive, it was not statistically significant. This means that companies with higher ESG disclosure tend to have higher ROA, but the evidence is not strong enough to confirm this relationship.

There are several possible reasons for this result. First, the sample is small and includes only six companies over five years. Second, ESG practices in the Uzbek construction industry are still at an early stage, and many companies disclose only limited ESG information. Finally, the financial benefits of ESG usually appear over a longer period, while this study covers only the years 2021–2025. Therefore, the positive effect of ESG on financial performance may become clearer in the future.

CONCLUSION

Our findings, despite several limitations, suggest that ESG disclosure in the Uzbek construction industry is still at an early stage and has not yet translated into measurable improvements in financial performance, as measured by ROA. Nevertheless, ESG remains an important direction for the long-term sustainable development of construction companies. Therefore, construction companies should continue improving ESG disclosure and integrating ESG practices into their strategic decision-making. Although the short-term financial impact was not statistically significant, stronger ESG practices may improve operational efficiency, strengthen stakeholder confidence, and enhance investment attractiveness over the long term. This is also consistent with the Government of Uzbekistan's policy of promoting sustainable economic development and attracting investment. Policymakers should support ESG adoption by providing clearer reporting guidelines and encouraging more consistent ESG disclosure across the construction industry.

REFERENCES

- Abdioğlu, N., & Aytakin, S. (2025). An analysis of the determinants of environmental, social and governance (ESG) scores at the firm level on Borsa Istanbul companies. *Journal of Economics and Administrative Sciences*, 26(1), 95–104. <https://doi.org/10.37880/cumuiibf.1550128>
- Aydoğmuş, M., Gülay, G., & Ergun, K. (2022). Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review*, 22(Suppl. 2), S119–S127. <https://doi.org/10.1016/j.bir.2022.11.006>
- Bannikov, P., & Grishnova, O. (2025). Methodology and practice of assessing the impact of ESG measures on the efficiency of corporate activities of companies. *Social and Labour Relations: Theory and Practice*, 15(2), 1–10. [https://doi.org/10.21511/slrrp.15\(2\).2025.01](https://doi.org/10.21511/slrrp.15(2).2025.01)
- Bezerra, R. R. R., Martins, V. W. B., & Macedo, A. N. (2024). Validation of challenges for implementing ESG in the construction industry considering the context of an emerging economy country. *Applied Sciences*, 14(14), 6024. <https://doi.org/10.3390/app14146024>
- Christine, A., Hakam, D., Nainggolan, Y., Wiryono, S. K., & Hakam, L. I. (2025). Environmental, social, and governance (ESG) impact on corporate financial strategy of energy and utilities companies worldwide. *Energy Strategy Reviews*. Advance online publication. <https://doi.org/10.1016/j.esr.2025.101916>
- Esanboevna, J. N., & Alimkhonova, G. (2026). The development of ESG practices in Uzbekistan: Challenges and future directions. *Journal of Management and Economics*, 6(4), 47–53.
- Ermilova, M., Rebeka, E., & Rodiontsev, R. (2024). Approach to ESG risk assessment of construction companies considering financial data. *Journal of Ecohumanism*, 3(8), 34–45. <https://doi.org/10.62754/joe.v3i8.4709>

- Gu, W., Mo, W., & Wang, M. (2024). Enterprise-level sustainable entrepreneurship index construction and its applications. *International Entrepreneurship and Management Journal*, 20, 867–900.
- Garrido-Ruso, M., Otero-González, L., López-Penabad, M.-C., & Durán Santomil, P. (2024). Does ESG implementation influence performance and risk in SMEs? *Corporate Social Responsibility and Environmental Management*, 31(5), 4227–4247. <https://doi.org/10.1002/csr.2783>
- Gomes Soares, G. G., & Pereira, F. H. (2022). Study of ESG criteria and metrics for the construction industry. *Annals of Civil and Environmental Engineering*, 6(1), 62–63. <https://doi.org/10.29328/journal.acee.1001042>
- Gong, X., Tao, X., Zhang, M., Xu, Y., Kwok, H. H. L., Dai, J., & Cheng, J. C. P. (2024). Secure environmental, social, and governance (ESG) data management for construction projects using blockchain. *Sustainable Cities and Society*, 114, 105582. <https://doi.org/10.1016/j.scs.2024.105582>
- Jiang, P.-C., Feng, G.-F., Wang, H.-J., & Chang, C.-P. (2024). CSR from different perspectives: The global ESG indexes updated. *Corporate Social Responsibility and Environmental Management*, 31(5), 4694–4714. <https://doi.org/10.1002/csr.2814>
- Krambia-Kapardis, M., Savva, C. S., & Stylianou, I. (2023). Socio-economic factors affecting ESG reporting call for globally agreed standards. *Sustainability*, 15(20), 14927. <https://doi.org/10.3390/su152014927>
- Kraievskiy, V., Skoryk, M., Martynenko, V., & Savchenko, A. (2025). Sustainable development as a factor in shaping the long-term value of an energy company. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, 2025(6), 202–210. <https://doi.org/10.33271/nvngu/2025-6/202>
- Liu, Y., Osterrieder, J., Hadji Misheva, B., Koenigstein, N., & Baals, L. (2023). Navigating the Environmental, Social, and Governance (ESG) landscape: Constructing a robust and reliable scoring engine—Insights into data source selection, indicator determination, weighting and aggregation techniques, and validation processes for comprehensive ESG scoring systems. *Open Research Europe*, 3, 119. <https://doi.org/10.12688/openreseurope.16278.1>
- Lei, X., & Zhao, K. (2024). Exploring and assessing construction companies' ESG performance in sustainability. *Global NEST Journal*, 26(3), 05698. <https://doi.org/10.30955/gnj.005698>
- Parikh, A., Kumari, D., Johann, M., & Mladenović, D. (2023). The impact of environmental, social and governance score on shareholder wealth: A new dimension in investment philosophy. *Cleaner and Responsible Consumption*, 8, 100101. <https://doi.org/10.1016/j.clrc.2023.100101>
- Ongan, S., Işık, C., Aydın, R., İmamoğlu, İ. K., Alvarado, R., & Ahmad, M. (2026). Measuring sustainability under uncertainty: Introducing Net ESG (N-ESG) performance. *Business Strategy and the Environment*, 35(2), 1735–1755. <https://doi.org/10.1002/bse.70246>
- Santana Tovar, D., Torabi Moghadam, S., & Lombardi, P. (2025). Shaping sustainable practices in Italy's construction industry: An ESG indicator framework. *Sustainability*, 17(3), 1341. <https://doi.org/10.3390/su17031341>
- Şerban, R.-A., Mihaiu, D. M., & Ţichindelean, M. (2022). Environment, social, and governance score and value added impacts on market capitalization: A sectoral-based approach. *Sustainability*, 14(4), 2069. <https://doi.org/10.3390/su14042069>
- Tursunkhodjayeva, S. (2026). Implementation of ESG management in joint-stock companies of Uzbekistan. *Journal of Management and Economics*, 6(3), 16–23.

WAYS TO IMPROVE THE USE OF NATURAL RESOURCES IN THE DEVELOPMENT OF HEALTH SERVICES

Sobirov Kayum Xamraevich¹

ABSTRACT

This article focuses on the fact that the economy of health services is being formed on the basis of the integration of medicine, tourism, ecology, innovative technologies and services. In particular, wellness centers, SPA complexes, rehabilitation centers and health clusters established on the basis of mineral water sources, thermal areas, healing climatic zones, phytotherapeutic resources, mountain and forest landscapes are an important factor in increasing the economic competitiveness of regions, creating new jobs and improving the quality of life of the population, and proposals and recommendations are made on the need for rational use of natural resources, maintaining ecological balance and developing health services for the population.

Keywords - Medical Services, Health Services, Medicine, Tourism, Ecology, Innovative Technology, Mineral Water Sources, Healing Climatic Zones, Mountains, Recreational Zones, Phytotherapeutic Resources, Biodiversity.

I. INTRODUCTION

The demand for medical services has been increasing for the past five years and is gradually gaining a stable position in the world. This development can be seen in the fact that in the world rankings for medical services, Taiwan was ranked among the countries with the strongest health care system in 2024 with a rating index of 78.7, South Korea - 77.7, Australia - 74.1, and Canada - 71.3. Today, the medical services sector, as one of the main sectors of the world economy, makes a significant contribution to the socio-economic development of individual countries and regions. Uzbekistan, on the other hand, has a rating index of 36.26 in the strongest health care system in 2024 and ranks 64th out of 110 countries in the world.

In developed countries, the share of the service sector in the GDP is 60-80 percent, and the funds spent on investing in science and innovative activities are 3.0 percent of GDP, with 2/3 of the total funds falling on the business sector. Today, the development of the medical services sector of the service sector economy and the improvement of its organizational and economic mechanisms are of urgent importance. According to the results of sociological research, 39 percent of day patient clients in our country visit medical clinics and 61 percent of outpatient clients visit rehabilitation and wellness centers. Statistical analysis showed that in 2023, more than 5,000 patients went abroad to receive cheaper medical services, with the most popular type of medical services being cosmetic surgeries. It also showed that healthcare consumers (patients) spent more than \$1 million on foreign medical services. The most popular international clinical destinations among patients undergoing treatment abroad are India, Turkey, and Russia.

II. LITERATURE REVIEW

Medical services in the field own in turn again one how much to groups are divided. These medical economy services, transportation services, as well as medical services to the composition current at the

¹ Independent Researcher of the Samarkand Institute of Economics and Service. A member of Uzbekistan writers association. Uzbekistan.

time to patients morning breakfast organization to do services included and their price to the hospital placement at the price is added .

Medical services sector in the republic were studied, and the scientific views of a number of scientists on the development of medical services, along with "medical services", were studied. For example, B. Mamatkulov, D. Kasimova - the health care system of Uzbekistan, the basic principles of health care, the nomenclature of health care institutions, information and communication in health care, and health care economics were widely covered in their research works [1].

A.I.Ikromov - conducted research on priority areas of healthcare reform [2]. Developed proposals and recommendations on the tasks of local khokimiyats and management organizations in providing modern medical services to the population.

A.V.Alimov - studied the practical aspects of promising areas of reforming the healthcare system of the Republic of Uzbekistan [3].

Economist M.K. Pardaev analyzed theoretical issues of the medical services sector, the main directions and prospects for the development of the sector by sector, and its specific features [4].

III. RESEARCH METHODOLOGY

This research work used methods such as the logical approach to the theory of knowledge, induction and deduction, comparative and factor analysis, time and space, comparison, and monographic observation.

IV. ANALYSIS AND RESULTS

Today, in developed countries, the economy of health services is being formed on the basis of the integration of medicine, tourism, ecology, innovative technologies and services. In particular, wellness centers, SPA complexes, rehabilitation centers and health clusters established on the basis of mineral water sources, thermal areas, healing climatic zones, phytotherapeutic resources, mountain and forest landscapes are emerging as an important factor in increasing the economic competitiveness of regions, creating new jobs and improving the quality of life of the population.

Strengthening the health of the population, developing a healthy lifestyle, expanding the market for health services, and improving tourism and recreation infrastructure are among the priorities of state policy in the Republic of Uzbekistan. The mineral water sources, healing climatic zones, mountain and recreational zones, phytotherapeutic resources, and biodiversity available in our country have great economic potential for the development of health services.

As the President of the Republic of Uzbekistan Sh.M. Mirziyoyev noted, "Issues related to the shortage of water resources, environmental and atmospheric pollution, soil erosion and desertification remain at the center of state policy in our country." These tasks require the interrelated study of the rational use of natural resources, maintaining ecological balance, and developing health services for the population.

Despite the reforms being implemented in our country to develop health services, scientific and methodological issues related to assessing the efficiency of natural resource use, identifying the health potential of regions, introducing innovative management mechanisms, increasing investment attractiveness, forming digital monitoring systems, and ensuring environmental sustainability have not been sufficiently researched.

In this context, the development of health services for the population is of great scientific and practical importance in improving the theoretical and methodological foundations of the effective use of natural resources, assessing regional potential, increasing the efficiency of health services, integrating environmental and economic factors, and conducting scientific research aimed at developing innovative development mechanisms.

The development trends of the population health services market in Uzbekistan were studied, and the growth rates of the market of sanatorium-resort institutions, rehabilitation centers, SPA and wellness services were assessed. The analysis revealed that health services are one of the steadily developing areas in the country's service sector.

Regional analyses have shown that the level of development of health services is directly related to natural resource potential, transport infrastructure, environmental conditions, and investment attractiveness. The dynamics of the development of the health services market in Uzbekistan and the Samarkand region have been analyzed and the main economic indicators of the sector have been assessed (Table 1).

Table 1 : In Uzbekistan the population health improvement services market change dynamics (2020–2024)

Indicators	2020	2021	2022	2023	2024
Sanatorium and health promotion objects number (pcs)	164	178	201	236	284
Wellness and preventive centers share (%)	18	22	28	35	43
Health promotion services market size (million \$)	310	365	452	590	740
Medical tourism share (%)	72	68	62	56	49
Wellness & prevention services share (%)	28	32	38	44	51
Innovation services (VR, smart-hydro, telehealth) share (%)	6	9	14	21	29
Smart- sanatoriums number (pcs)	4	9	18	31	47
Wearable & health-app users (million person)	0.6	1.1	2.3	3.8	5.2
Average one to the customer right incoming service value (\$)	95	112	145	185	230
Preventive from services users share (%)	21	27	34	41	48

The analysis showed that the effective use of natural resource potential will increase the competitiveness of health services, create new jobs, and enhance the investment attractiveness of regions. On this basis, investment and economic mechanisms for the development of health services have been developed.

Table 2 : Samarkand eco - healthcare cluster management model

Management subject	Ministries / agencies	Home function
State policy	Tourism Committee , Ecology Ministry of Health storage ministry	Licensing , regulatory and legal order , territorial status , standards designation
Innovation and technology	IT Park, Innovations ministry	VR rehabilitation , digital monitoring systems current to grow
Public-private partnership and finance	ADB, UNDP, Ipoteka Bank, ITFC	Investment , PPP , grants , leasing through financing
Private operators	Urgut thermal-healing zone , Bulung'ur Agro- healing valley , Kongil Eco-Rehabilitation Park (Silk Eco-Rehab Park)	Sanatorium , Eco-Spa, Wellness Center, service show and management

The analysis showed that innovative solutions for using natural water resources include rainwater and snow collection, gray water reuse, the introduction of energy-saving technologies, and the development of the “Smart Sanatorium” concept. These technologies are considered an important factor in increasing the environmental and economic efficiency of health infrastructure.

Re-Creation Environment Model (REM), which assesses the interrelationships between health services, natural resources, and the ecological environment . This model allows for a systematic representation of the interrelationships between natural resources, ecological status, health services, and economic outcomes.

Regions health promotion potential to evaluate aimed at Eco-Wellness Resource Efficiency Index (EWREI) working This is a index natural from resources use efficiency, ecological condition, health services quality and economic the results complex assessment opportunity Based on EWREI of the regions health promotion potential determination and develop priorities designation according to methodological approach offer done .

This to the model naturally resources basically healer environment is formed . Healing environment health promotion of services to develop service does . As a result population health improve, work hard productivity increases, tourism income increases, new work places is created and of the regions stable to develop is achieved .

Regions health promotion potential and natural from resources use efficiency complex assessment The Eco-Wellness Resource Efficiency Index (EWREI) was developed to was released .

This index health promotion in services natural water from resources of use ecological , economic and social single integrated indicator of efficiency based on assessment opportunity gives .

EWREI index mineral and natural water from resources use efficiency , climate and natural environment sustainability, environmental situation and sanitation safety , human to capital impact and health promotion services market development level own inside received five structural block based on shaped .

$$EWREI = \sum (a_i \times W_i), i=1...5$$

this on the ground :

W_i – structural blocks according to normalized values;

a_i – expert assessment based on determined weight coefficients.

This index regions each other comparison , investment priorities designation , health infrastructure planning and innovative water technologies current to grow efficiency assessment opportunity giver new methodological approach as offer was done.

V. CONCLUSION/RECOMMENDATIONS

Based on the calculations and analyses conducted, a promising model for the development of health services in the Samarkand region was developed, and the concept of the “Zarafshan Health Corridor” was formulated.

This concept is based on the integrated use of the natural resource potential of Urgut, Nurabad, Pastdargam, Kattakurgan and other regions, and serves to develop health tourism, create new jobs, and ensure regional economic growth.

REFERENCES

- B. Mamatkulov, D. Kasimova. “Public health and health care management” Tashkent. Ilm ziya, 2013;
- A.I. Ikromov. Priority areas of reforming the health care system. Tashkent, 2012;
- A.V. Alimov. Promising areas of reforming the health care system of the Republic of Uzbekistan. Handouts for participants of training seminars for deputy mayors of Tashkent, assistants for spiritual and educational work, district and city mayors. Tashkent, 2013;
- M.K. Pardayev, Q.J. Mirzayev. Economics of the service sector. Textbook. T.: “Economics-Finance”, 2014. P. 256-263;
- Akhmedov Z.A. Development trends, structural classification and marketing segments of medical services in Uzbekistan // Green Economy and Development, 2025, No. 3, P. 244-249;
- Akhmedov Z.A. The role of medical insurance in the development of medical services and analysis of the experience of foreign countries // Collection of materials of the international scientific and practical conference "Modern technologies for implementing structural changes in the service sector", Part II, March 25, 2025, P. 86-89;
- Abdurakhmonov K.Kh., Kholmuminov Sh.R. "Labor economics and sociology". Textbook - T.: Publishing house of the Literary Fund of the Writers' Union of Uzbekistan, 2004;
- Ricardo, David (1817) On the Principles of Political Economy and Taxation. Piero Sraffa (Ed.) Works and Correspondence of David Ricardo, Volume I, Cambridge University Press, 1951, p. 135.

INVESTMENT SOURCE DIVERSIFICATION, FARM PERFORMANCE, AND HORTICULTURAL DEVELOPMENT: EVIDENCE FROM UZBEKISTAN

Jalilov Shohruh Zafar O'g'li¹

ABSTRACT

This study examines the relationship between investment source diversification and the economic performance of horticultural farms in Uzbekistan. Using survey data from 280 producers, an Investment Source Diversification Index (ISDI) was developed through Principal Component Factor Analysis, while Latent Class Analysis identified heterogeneous financing patterns. The results reveal two distinct financing groups and demonstrate that farms with more diversified financing structures achieve significantly higher income and profitability. The findings highlight investment source diversification as an important driver of farm performance and economic efficiency. This study contributes new empirical evidence to the agricultural finance literature and provides policy implications for strengthening sustainable investment in Uzbekistan's horticultural sector.

Keywords: Financing Diversification; Horticultural Farms; Farm Performance; Investment Efficiency; Agricultural Finance; Latent Class Analysis.

Introduction

Horticulture is a strategically important agricultural subsector that contributes to food security, rural employment, export diversification, and income generation. Its sustainable development increasingly relies on investments that foster technological modernization, productivity growth, and efficient resource utilization [19;21]. While agricultural investment and credit access have been extensively studied, limited attention has been given to investment source diversification and its implications for farm performance, particularly in developing and transition economies.

Investment source diversification involves the use of multiple financing channels, including own funds, commercial loans, government support, grants, private capital, and partnership-based investments. Consistent with Portfolio Theory, diversified financing structures can enhance financial resilience, mitigate investment risks, and improve farms' capacity to cope with economic uncertainty [2]. This issue is particularly relevant in Uzbekistan, where agricultural modernization and investment-led growth constitute key policy priorities. The Agricultural Development Strategy of the Republic of Uzbekistan for 2020–2030 (Presidential Decree No. PF–5853) emphasizes investment expansion, innovation adoption, resource efficiency, and export-oriented production as fundamental drivers of sustainable agricultural development [1].

Studies conducted in Uzbekistan have highlighted the importance of investment for agricultural transformation and horticultural development. Yangiboev [2] emphasized the role of investment policy in strengthening agricultural competitiveness, while Makhmudov and Dadaboev [24] demonstrated the contribution of investment-based integration mechanisms to horticultural development. However, empirical evidence on investment source diversification and its impact on horticultural farm performance remains limited.

¹ PhD Researcher (Doctoral Candidate), Samarkand Agroinnovations and Research University, Samarkand, Uzbekistan

Using survey data from 280 horticultural farms in the Urgut and Taylaq districts of the Samarkand region, this study develops an Investment Source Diversification Index (ISDI) through Principal Component Factor Analysis and identifies heterogeneous financing patterns using Latent Class Analysis (LCA). The findings provide new empirical evidence on the role of financing diversification in enhancing farm profitability, investment efficiency, and the sustainable development of Uzbekistan's horticultural sector

Literature Review

Investment source diversification has received increasing attention in agricultural economics because financing structures influence farms' investment capacity, technological modernization, and economic performance. Existing theoretical and empirical studies emphasize the importance of financial resources, credit accessibility, and investment activities for agricultural development (Markowitz, 1952[2]; Penrose, 1959[3]; Barney, 1991[5]; Stiglitz & Weiss, 1981[4]; Feder et al., 1990[6]; Latruffe, 2010[8]; Schimmelpfennig, 2016[11]).

Table 1. : Gap-Oriented Summary of Previous Studies on Agricultural Investment, Financing, and Farm Performance

Authors	Research Focus	Key Findings	Research Gap
Markowitz (1952)	Portfolio diversification	Diversification reduces financial risk.	Agricultural financing diversification not examined.
Penrose (1959); Barney (1991)	Resource-based advantage	Strategic resources enhance performance.	Financial diversification not explicitly addressed.
Stiglitz & Weiss (1981)	Credit constraints	Financial constraints limit investment.	Multiple financing sources not considered.
Feder et al. (1990)	Agricultural credit	Credit promotes investment and productivity.	Focuses on credit rather than financing diversification.
Latruffe (2010)	Agricultural investment	Investment improves competitiveness and productivity.	Financing structure remains underexplored.
Schimmelpfennig (2016)	Technology adoption	Investment supports technological modernization.	Financing-source diversity not examined.
Present study	Investment source diversification	Develops ISDI and identifies latent investment groups.	Addresses financing diversification and producer heterogeneity.

As shown in Table 1, previous studies have primarily focused on agricultural credit, investment intensity, and technology adoption. Despite extensive evidence on the positive role of investment in agricultural development, limited attention has been devoted to financing-source diversification, particularly as a multidimensional strategy combining internal funds, bank credit, government support, grants, and private investment. Furthermore, existing research generally treats agricultural producers as a homogeneous group and rarely investigates heterogeneity in financing behavior. Empirical evidence on how diversified financing

structures affect farm income and profitability remains particularly scarce in horticultural systems of developing and transition economies.

To address these gaps, this study develops an Investment Source Diversification Index (ISDI) using Factor Analysis and applies Latent Class Analysis (LCA) to identify heterogeneous investment groups among horticultural producers. By linking financing diversification to farm economic performance, the study provides new evidence from Uzbekistan's horticultural sector.

Materials and Methods

This study employed a quantitative research design based on survey data collected in 2026 from 280 horticultural farms in the Urgut and Taylaq districts of Samarkand Region, Uzbekistan. Data were obtained through structured interviews with farm owners and supplemented by field observations. The analysis was conducted in three stages. First, investment source diversification was measured using eight indicators representing the main financing sources of horticultural farms. Second, Principal Component Factor Analysis (PCFA) was applied to construct the Investment Source Diversification Index (ISDI) [9;12]:

$$X_i = \lambda_i F + \epsilon_i$$

where X_i denotes the observed variables, F represents the latent factor, λ_i is the factor loading, and ϵ_i is the error term. Data adequacy was assessed using the Kaiser–Meyer–Olkin (KMO) statistic and Bartlett's Test of Sphericity[13;14]. Third, Latent Class Analysis (LCA) was employed to identify heterogeneous investment patterns among farms[10;17]. The optimal model was selected using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC). All analyses were performed using Stata software[15;16]. The combined application of PCFA and LCA enabled the construction of a composite investment diversification index and the identification of latent investment groups among horticultural producers. Participation was voluntary, and respondent confidentiality was maintained throughout the study.

Results and Discussion

Table 2. : Descriptive Statistics of Investment Financing Sources among Horticultural Farms (n = 280)[22]

Investment Financing Source	Mean	Standard Deviation	Minimum	Maximum
Self-financing (Own financial resources)	4.350	0.733	1	5
Commercial bank loans	1.514	0.656	1	5
Government budget support	1.582	0.581	1	5
Government grants and subsidies	1.936	1.010	1	5
Borrowed funds	2.046	1.062	1	5
Private sector investment	2.100	1.011	1	5
Foreign investment	2.089	1.003	1	4
Partnership investment	1.596	0.579	1	4

Table 2 indicates that self-financing is the dominant source of investment funding among horticultural farms, recording the highest mean value (4.35). In contrast, commercial bank loans, government support, partnership financing, and grants remain relatively underutilized. The comparatively higher standard deviations for borrowed funds, private-sector investment, and foreign investment suggest considerable heterogeneity in financing behavior across farms. Overall, the results reveal a strong dependence on internal financial resources and a relatively low level of financing-source diversification. At the same time, the observed variability across external financing channels indicates the presence of underlying latent financing structures. These findings provide empirical support for applying Principal Component Factor Analysis (PCFA) to identify common latent dimensions and construct the Investment Source Diversification Index (ISDI).

To formally assess the suitability of the dataset for multivariate reduction, the intercorrelation structure of variables was examined prior to Factor Analysis. The diagnostic results are presented in Table 3.

Table 3. : Diagnostic Measures for Factor Analysis Adequacy[22]

Test / Indicator	Value	Interpretation
Determinant of correlation matrix	0.001	Indicates sufficient inter-variable correlations
Bartlett's Test (p-value)	0.000	Rejects null hypothesis of identity matrix
Kaiser–Meyer–Olkin (KMO)	0.864	Meritorious sampling adequacy

The diagnostic results confirm the suitability of the dataset for factor analysis. The KMO statistic (0.864) indicates a high level of sampling adequacy, while Bartlett's Test ($p < 0.001$) confirms statistically significant correlations among the financing variables. Furthermore, the low determinant value (0.001) suggests substantial shared variance across the indicators.

Collectively, these findings support the existence of a common latent structure underlying investment financing behavior and justify the application of Principal Component Factor Analysis (PCFA). Consequently, PCFA was employed to construct the Investment Source Diversification Index (ISDI), which serves as the basis for the subsequent latent class analysis. The results are presented in Table 4.

Table 4 : Results of Principal Component Factor Analysis[22]

Factors	Eigenvalue	Proportion	Cumulative Proportion	Difference
Factor 1	5.46455	0.6831	0.6831	4.56110
Factor 2	0.90345	0.1129	0.7960	0.38684
Factor 3	0.51662	0.0646	0.8606	0.10702
Factor 4	0.40960	0.0512	0.9118	0.13815

Factor 5	0.27145	0.0339	0.9457	0.04951
Factor 6	0.22195	0.0277	0.9735	0.06258
Factor 7	0.15937	0.0199	0.9934	0.10636
Factor 8	0.05301	0.0066	1.0000	—

Table 4 indicates that the first principal component had an eigenvalue of 5.46 and explained 68.31% of the total variance, demonstrating strong explanatory capacity. Based on the Kaiser criterion (eigenvalue > 1), only the first factor was retained, confirming that the investment indicators are primarily driven by a single latent dimension related to investment source diversification. The substantial gap between the first and second eigenvalues further supports the unidimensional structure of the data. These results indicate a high level of internal consistency among the financing variables and provide a solid statistical foundation for constructing the Investment Source Diversification Index (ISDI). Accordingly, factor scores from the first principal component were used to generate the ISDI, which served as the key variable in subsequent latent class and economic performance analyses.

The Scree Plot (Figure 1) provides additional confirmation of the one-factor solution, as the eigenvalue curve declines sharply after the first component and stabilizes thereafter.

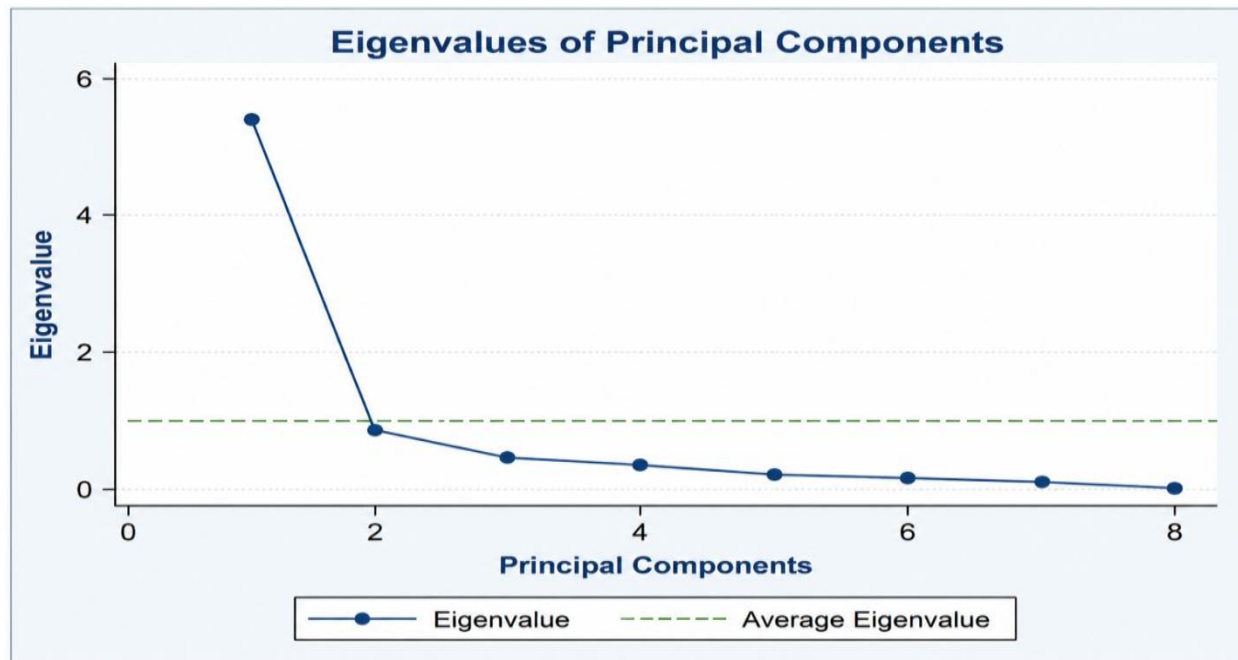


Figure 1. Scree Plot of Factor Eigenvalues[22]

The Scree Plot confirms a dominant latent factor underlying the investment activity indicators. The first principal component is the only factor exceeding the Kaiser criterion (eigenvalue > 1), indicating that investment source diversification can be represented by a single latent construct. The pronounced elbow point further supports the unidimensional structure of the data and justifies the construction of the

Investment Source Diversification Index (ISDI). The validity of the factor model was further confirmed by the likelihood-ratio test ($\chi^2(28) = 2084.65$, $p < 0.001$), demonstrating significant correlations among the variables and supporting the application of factor analysis. Overall, these results provide a robust empirical basis for constructing the ISDI and examining heterogeneity in investment behavior among horticultural producers.

Table 5 : Factor Loadings and Uniqueness Estimates of Investment Financing Sources[22]

Investment Financing Sources	Factor 1	Uniqueness
Self-financing (Own financial resources)	-0.7358	0.4587
Commercial bank loans	-0.5832	0.6598
Borrowed funds	-0.8506	0.2765
Government budget support	0.7862	0.3818
Private sector investment	0.9210	0.1517
Foreign investment	0.9459	0.1052
Partnership investment	0.8857	0.2156
Government grants and subsidies	0.8449	0.2861

Note: Absolute factor loadings above 0.50 indicate a strong relationship with the latent factor, while lower uniqueness values imply that a greater share of variance is explained by the common factor.

The factor loading results provide strong evidence of a unidimensional latent structure underlying investment financing sources. All variables exceeded the recommended loading threshold ($|\lambda| > 0.50$), confirming their substantial contribution to the extracted factor. The highest loadings were observed for foreign investment (0.9459), private sector investment (0.9210), and partnership investment (0.8857), highlighting their central role in explaining investment source diversification. Although several indicators exhibited negative loadings, the sign reflects only the direction of association and does not affect explanatory relevance. Therefore, interpretation is based on loading magnitude rather than polarity.

The generally low uniqueness values, particularly for foreign investment (0.1052), private sector investment (0.1517), and partnership investment (0.2156), indicate that most of their variance is captured by the common latent factor. Overall, the results confirm strong internal consistency among the financing indicators and support the construction of a composite Investment Source Diversification Index (ISDI). The derived factor scores were subsequently used for latent class segmentation and economic performance analysis. Factor analysis further demonstrated that investment financing indicators were highly concentrated around a single latent dimension, providing econometric justification for aggregating them into the ISDI. The descriptive properties of the index are presented in Table 6.

Table 6 : Descriptive Statistics of the Investment Source Diversification Index (ISDI)[22]

Variable	Mean	Standard Deviation	Minimum	Maximum
Investment Source Diversification Index (ISDI)	0.352	0.280	0.000	1.000

Note: ISDI is a composite index constructed from multiple investment financing sources.

The average ISDI value (0.352) indicates a moderate level of financing-source diversification among horticultural farms. The relatively high standard deviation (0.280) reveals considerable heterogeneity in investment capacity and financing strategies across producers. These results suggest that the index

effectively captures variations in investment behavior and provides a reliable basis for identifying latent financing groups. Accordingly, Latent Class Analysis (LCA) was applied, and the optimal number of classes was determined using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) (Table 7).

Table 7 : Comparative Fit Statistics of Latent Class Models[22]

Model	AIC	BIC
One-class model	5406.596	5464.752
Two-class model	3116.337	3207.206

Note: The optimal model was selected based on the lowest AIC and BIC values.

The two-class model exhibited substantially lower AIC and BIC values than the one-class specification, indicating superior model fit and confirming the presence of statistically distinct latent groups among horticultural farms. This result highlights significant heterogeneity in investment capacity and financing strategies across producers. Accordingly, the two-class solution was retained as the optimal specification, and posterior membership probabilities were estimated for each respondent. The findings suggest that investment source diversification is characterized by differentiated financing patterns rather than a homogeneous structure. To further examine these differences, predictive margins analysis was performed based on the selected latent class model (Table 8).

Table 8 : Predicted Class Membership Probabilities Based on the Latent Class Model (Predictive Margins) [22]

Class	Probability	Standard Error	z-statistic	p-value	95% Confidence Interval
Class 1	0.4625	0.0299	15.45	0.000	0.4039–0.5212
Class 2	0.5375	0.0299	17.96	0.000	0.4788–0.5961

Note: Predicted class membership probabilities were estimated from the optimal two-class latent class model.

Table 8 confirms significant heterogeneity in investment financing behavior among horticultural farms. The predictive margins estimates indicate that **46.25%** of respondents belong to **Class 1**, while **53.75%** are assigned to **Class 2**, demonstrating the existence of two distinct financing segments. Class 1 is characterized by relatively limited financing diversification, whereas Class 2 exhibits greater diversification and stronger participation in institutional financing mechanisms. The low standard errors, high z-statistics, and statistically significant coefficients ($p < 0.001$) confirm the robustness of the classification results. Moreover, entropy statistics indicate high classification accuracy, supporting the use of latent class membership probabilities for further analysis of investment behavior heterogeneity (Figure 2).

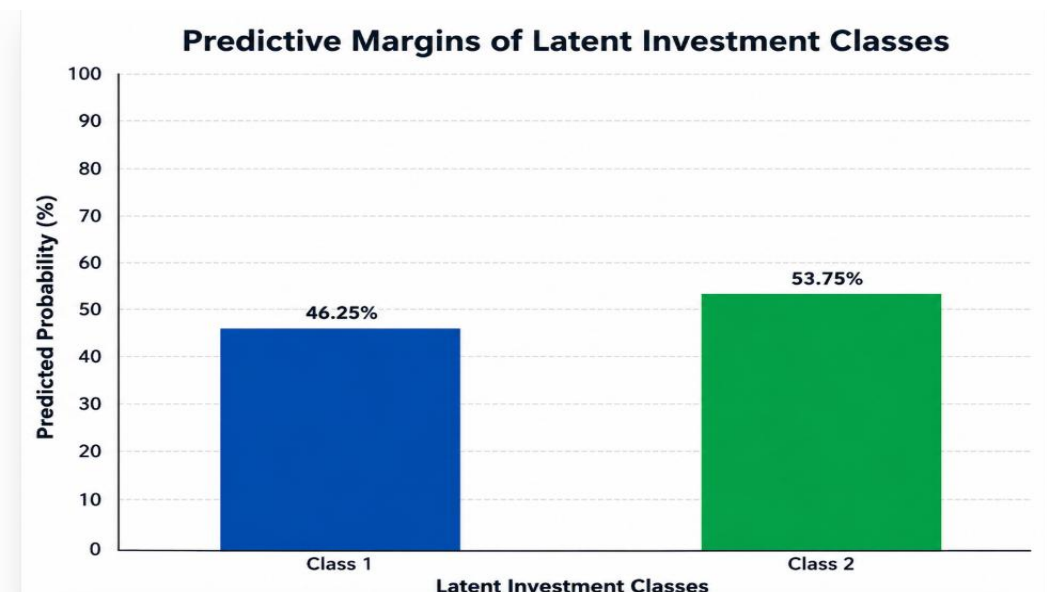


Figure 2. Predictive Margins of Respondents across Latent Classes[22]

The results in **Figure 1.3.2** confirm significant heterogeneity in investment activity among horticultural farms. Predictive margins estimates show that **46.25%** of respondents belong to the first latent class and **53.75%** to the second, indicating distinct financing patterns across producers. The first class is characterized by a stronger reliance on internal financing, whereas the second exhibits greater investment source diversification and stronger integration into institutional financing channels. The predominance of the second class suggests increasing financial diversification within the horticultural sector. The low standard errors and highly significant estimates ($p < 0.001$) confirm the robustness of the classification.

Overall, the findings demonstrate that investment source diversification is an important determinant of farm investment activity and economic performance. The latent class framework effectively captures heterogeneity in financing behavior and investment structures among horticultural producers.

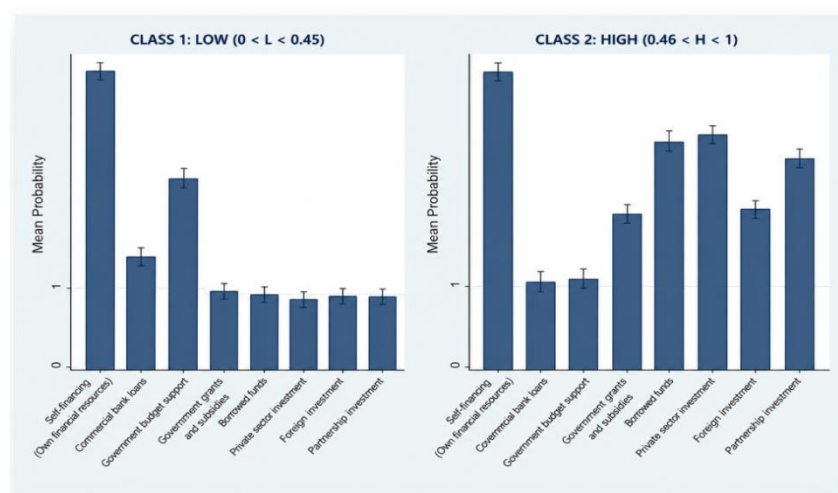


Figure 3. Predicted Values of Investment Sources across Latent Classes[22]

The results in Figure 3 reveal two statistically distinct investment segments among horticultural farms. The first latent class is characterized by a strong dependence on self-financing and limited access to external funding, whereas the second exhibits greater financing diversification through increased use of private investment, foreign capital, and government support mechanisms. Although self-financing remains the primary funding source in both groups, the high-investment class demonstrates stronger integration into external financing channels. This pattern reflects ongoing financial diversification and the growing institutionalization of investment activities within the horticultural sector.

Overall, the findings corroborate the factor and latent class analyses, highlighting significant heterogeneity in investment capacity and financing access among producers. The results further identify investment source diversification as a key determinant of investment activity and economic performance. The descriptive statistics of the Investment Source Diversification Index (ISDI) and latent class distribution are presented in Table 9.

Table 9 : Descriptive Statistics of the Investment Source Diversification Index and Latent Classes[22]

Variable	Mean	Std. Dev.	Minimum	Maximum
Investment Source Diversification Index (ISDI)	0.352	0.280	0	1
Latent Investment Group	0.536	0.500	0	1

The results in Table 9 indicate considerable heterogeneity in investment source diversification among horticultural farms. The mean ISDI value (0.352) and its standard deviation (0.280) reflect substantial variation in financing structures and investment capacity across producers. The average value of the latent group variable (0.536) suggests a relatively balanced distribution between the two investment segments, confirming the presence of distinct financing strategies. The first group is primarily dependent on internal funding, whereas the second exhibits greater financing diversification and stronger utilization of external resources.

These findings underscore the importance of investment source diversification in shaping farm investment behavior. To further assess its economic implications, income and profitability indicators were compared across latent classes (Figure 4).

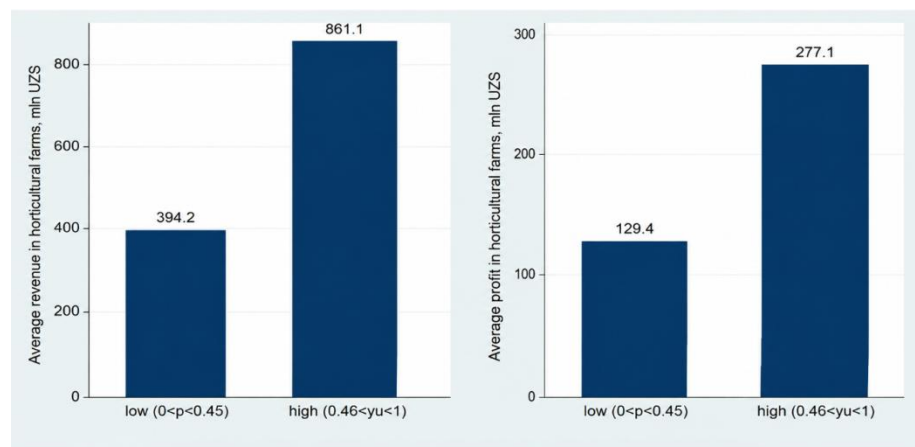


Figure 4. Average Farm Income and Profit by Investment Activity Class[22]

The results in Figure 4 demonstrate a strong positive relationship between investment source diversification and farm economic performance. Farms in the high-investment group achieved substantially higher average income (UZS 861.1 million) and profit (UZS 277.1 million) than those in the low-investment group (UZS 394.2 million and UZS 129.4 million, respectively). This finding suggests that broader access to diversified financing sources, including private investment, foreign capital, and government support, contributes significantly to improved economic outcomes. Factor and latent class analyses further identified two statistically distinct investment segments among horticultural producers. The AIC, BIC, entropy, and predictive margins statistics confirmed satisfactory model fit and classification accuracy, highlighting investment source diversification as a key determinant of farm profitability and economic efficiency.

Accordingly, the principal contribution of this study is the empirical evidence that diversified financing structures significantly enhance the profitability and economic performance of horticultural farms.

Conclusions and Policy Implications

This study examined the relationship between investment source diversification and the economic performance of horticultural farms in the Urgut and Taylaq districts of the Samarkand region. Using Principal Component Factor Analysis (PCFA) and Latent Class Analysis (LCA), an Investment Source Diversification Index (ISDI) was developed and two statistically distinct financing groups were identified. The results indicate that investment financing indicators are largely explained by a single latent factor, while the latent class model reveals substantial heterogeneity in financing behavior among producers. Farms with more diversified financing structures achieved significantly higher income and profit levels, highlighting the positive role of financing diversification in enhancing investment capacity, technological modernization, and competitiveness.

From a policy perspective, expanding access to commercial credit, government support programs, private capital, and foreign investment should be prioritized to strengthen financing diversification. In addition, improving institutional support and promoting public–private partnerships can facilitate sustainable investment and long-term development in the horticultural sector. Overall, the findings provide robust empirical evidence that investment source diversification is a key driver of farm profitability and economic efficiency, offering important implications for agricultural investment policy and rural development in Uzbekistan.

References

- *Presidential Decree of the Republic of Uzbekistan No. PF-5853. (2019). On Approval of the Agricultural Development Strategy of the Republic of Uzbekistan for 2020–2030. Tashkent, Uzbekistan.*
- Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, 7(1), 77–91. <https://doi.org/10.2307/2975974>
- Penrose, E. T. (1959). *The Theory of the Growth of the Firm*. Oxford University Press.
- Stiglitz, J. E., & Weiss, A. (1981). Credit Rationing in Markets with Imperfect Information. *American Economic Review*, 71(3), 393–410.
- Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Feder, G., Lau, L. J., Lin, J. Y., & Luo, X. (1990). The Relationship Between Credit and Productivity in Chinese Agriculture. *American Journal of Agricultural Economics*, 72(5), 1151–1157. <https://doi.org/10.2307/1242524>

- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. New York: Free Press.
- Latruffe, L. (2010). *Competitiveness, Productivity and Efficiency in the Agricultural and Agri-Food Sectors*. OECD Food, Agriculture and Fisheries Papers, No. 30. OECD Publishing.
- Jolliffe, I. T. (2002). *Principal Component Analysis* (2nd ed.). New York: Springer.
- Collins, L. M., & Lanza, S. T. (2010). *Latent Class and Latent Transition Analysis*. Hoboken, NJ: Wiley.
- Schimmelpfennig, D. (2016). *Farm Profits and Adoption of Precision Agriculture*. Economic Research Report No. 217. United States Department of Agriculture (USDA).
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2022). *Multivariate Data Analysis* (9th ed.). Cengage Learning.
- Kaiser, H. F. (1974). An Index of Factorial Simplicity. *Psychometrika*, 39(1), 31–36. <https://doi.org/10.1007/BF02291575>
- Bartlett, M. S. (1954). A Note on the Multiplying Factors for Various Chi-Square Approximations. *Journal of the Royal Statistical Society: Series B*, 16(2), 296–298.
- Akaike, H. (1974). A New Look at the Statistical Model Identification. *IEEE Transactions on Automatic Control*, 19(6), 716–723. <https://doi.org/10.1109/TAC.1974.1100705>
- Schwarz, G. (1978). Estimating the Dimension of a Model. *The Annals of Statistics*, 6(2), 461–464. <https://doi.org/10.1214/AOS/1176344136>
- Vermunt, J. K., & Magidson, J. (2002). *Latent Class Cluster Analysis*. In J. Hagenaars & A. McCutcheon (Eds.), *Applied Latent Class Analysis* (pp. 89–106). Cambridge University Press.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method* (4th ed.). Wiley.
- Food and Agriculture Organization (FAO). (2023). *The State of Food and Agriculture 2023*. Rome: FAO.
- World Bank. (2022). *Uzbekistan Agriculture Modernization Project*. Washington, DC: World Bank.
- World Bank. (2023). *Transforming Agrifood Systems for Economic Growth and Rural Development*. Washington, DC: World Bank.
- Authors' calculations based on survey data (2026).
- Yangiboev, S.J. (2023). The Role and Significance of Investment Policy in Agriculture Development of the Republic of Uzbekistan. *Economics and Innovative Technologies*, 11(6), 57–63. https://DOI:10.55439/EIT/vol11_iss6/a7
- Makhmudov, N.M., & Dadaboev, T.Y. (2019). Development of Integrated Horticulture based on Investments (In the Case of Uzbekistan). *International Journal of Recent Technology and Engineering (IJRTE)*, 8(3S), 417–423. <https://DOI:10.35940/IJRTE.C1088.1083S19>

POLITICAL LEADERSHIP, GOVERNANCE AND ORGANIZATIONAL PERFORMANCE IN PUBLIC SECTOR INSTITUTIONS: A MANAGEMENT PERSPECTIVE – AN EMPIRICAL STUDY OF GWALIOR CITY, MADHYA PRADESH

Meenakshi Yadav¹

ABSTRACT

Political leadership and public-sector management are closely connected with the effective functioning of government institutions. Political leadership provides policy direction and democratic accountability, whereas management is concerned with organizational efficiency, decision-making, human resources and performance. The present study examines the relationship between political leadership, governance quality, managerial autonomy, accountability and organizational performance in public-sector institutions in Gwalior City, Madhya Pradesh. The study adopts a quantitative and analytical approach and proposes the collection of primary data through a structured questionnaire using a five-point Likert scale. For demonstrating the proposed statistical framework, an illustrative dataset of 200 respondents is used in this draft. Descriptive statistics, reliability analysis, correlation and multiple regression are employed. The illustrative results indicate positive relationships between governance quality, managerial autonomy, accountability and organizational performance, while perceived political interference shows a negative relationship with managerial decision-making and organizational performance. The study argues that effective public-sector management requires a balance between democratic political direction and professional managerial autonomy. The findings have implications for public administration, organizational management and local governance in Gwalior City.

Keywords: *Political Leadership, Governance, Public Sector Management, Organizational Performance, Managerial Autonomy, Accountability, Political Interference, Gwalior*

Introduction

Public-sector organizations play an essential role in implementing government policies and providing services to citizens. Their effectiveness depends not only on financial and human resources but also on leadership, governance, decision-making and organizational management.

Political leadership determines public priorities and provides democratic direction, while administrators and managers are responsible for translating policies into programmes and services. The relationship between these two dimensions is therefore important for understanding public-sector performance.

From the perspective of Political Science, leadership, power, institutions and governance are central concepts. From the Management perspective, organizational performance, managerial autonomy, accountability, decision-making and efficiency are equally important. The intersection of these dimensions provides an important interdisciplinary area of research.

¹ Research Scholar, Political Science

Good governance can improve institutional effectiveness by strengthening transparency, accountability, policy implementation and public-service delivery. However, excessive political interference in routine administrative decisions may reduce managerial autonomy and affect organizational performance.

The present study therefore attempts to examine the relationship between political leadership and management within public-sector institutions, with particular reference to Gwalior City, Madhya Pradesh.

Review of Literature

Kaufmann, Kraay and Mastruzzi (2010) examined governance through the World Bank's Worldwide Governance Indicators and highlighted dimensions such as Government Effectiveness, Rule of Law, Regulatory Quality, Political Stability, Voice and Accountability, and Control of Corruption. Their work provides an important foundation for assessing governance and institutional effectiveness.

Osborne (2010) discussed the concept of New Public Governance and emphasized that public-sector performance depends on relationships among government, organizations and citizens. The study provides a useful link between governance and public management.

Pollitt and Bouckaert (2017) examined public management reforms and demonstrated that administrative management is strongly influenced by political and institutional contexts. Their work supports the importance of studying political leadership and management together.

Although these studies establish important relationships between governance, politics and public management, limited research examines their combined effect on organizational performance at the city level in India. The present study addresses this gap by focusing on public-sector institutions in Gwalior City, Madhya Pradesh.

Research Gap and Problem Statement

Existing research frequently examines political leadership, governance and public management as separate areas. Political science studies generally focus on political institutions and governance, whereas management studies emphasize organizational effectiveness, leadership and performance.

There is a need for an integrated framework that explains how political leadership affects governance and how governance subsequently influences managerial autonomy and organizational performance.

The problem addressed by this study is therefore: **Whether political leadership, governance quality, managerial autonomy and accountability significantly influence organizational performance in public-sector institutions in Gwalior City.**

The study also examines whether perceived political interference negatively affects managerial decision-making.

Objectives of the Study

The study has the following objectives:

1. To examine the relationship between political leadership and governance quality.
2. To assess the influence of governance quality on organizational performance.
3. To examine the effect of managerial autonomy on organizational performance.

4. To examine the relationship between accountability and organizational performance.
5. To assess the influence of political interference on managerial decision-making.
6. To examine the relationship between decision-making effectiveness and public-service delivery.
7. To develop an integrated Political Science–Management framework for public-sector performance.

Hypotheses of the Study

- H1:** Political leadership has a significant positive relationship with governance quality.
- H2:** Governance quality has a significant positive relationship with organizational performance.
- H3:** Managerial autonomy has a significant positive relationship with organizational performance.
- H4:** Accountability has a significant positive relationship with organizational performance.
- H5:** Political interference has a significant negative relationship with managerial decision-making effectiveness.
- H6:** Managerial decision-making effectiveness has a significant positive relationship with public-service delivery.
- H7:** Governance quality, managerial autonomy and accountability significantly predict organizational performance.

Conceptual Framework

The conceptual framework integrates political science and management perspectives.



Accountability strengthens the governance-performance relationship, whereas political interference is expected to negatively affect managerial autonomy and decision-making.

The framework emphasizes that political leadership can have a positive organizational effect when it provides strategic direction and democratic accountability without unnecessarily interfering with routine professional management.

Political Leadership and Management

Political leadership provides direction to public institutions and establishes priorities for public policy. Effective political leadership can facilitate coordination, responsiveness and accountability.

From a management perspective, however, political leadership should be distinguished from political interference. Political authorities have a legitimate role in establishing policy priorities and monitoring performance, but routine operational decisions should generally be based on professional expertise and institutional rules.

An effective public-sector organization therefore requires a balance between **political accountability and managerial autonomy**.

Governance and Organizational Performance

Governance provides the institutional environment within which public organizations function. Transparent procedures, accountability, effective policy implementation and rule-based administration can improve organizational performance.

Organizational performance may be assessed through factors such as:

- Achievement of institutional objectives;
- Efficient use of resources;
- Employee effectiveness;
- Responsiveness;
- Service quality; and
- Citizen satisfaction.

Good governance therefore has both a political and managerial dimension.

Political Interference and Managerial Autonomy

Political participation is an essential component of democratic governance. However, inappropriate political intervention in routine administrative matters may negatively affect organizational functioning.

Political interference may influence decisions related to:

- Transfers and postings;
- Allocation of resources;
- Implementation priorities;
- Procurement;
- Personnel decisions; and
- Routine administration.

Managerial autonomy refers to the ability of managers to make professional decisions within established institutional and legal boundaries.

The study proposes that greater managerial autonomy will contribute positively to organizational performance, whereas excessive political interference will have a negative effect.

Indian Context

India's democratic administrative system involves continuous interaction among elected representatives, government officials, public institutions and citizens.

At the local level, citizens directly experience government performance through municipal services, education, health, infrastructure, documentation, welfare and other public services.

Gwalior City provides a useful context for examining these relationships because it contains a variety of public institutions and public-service organizations. The city-level approach also makes it possible to examine governance and management from the perspective of employees and stakeholders.

Research Methodology

Research Design

The study adopts a **descriptive and analytical research design** using a quantitative approach.

Study Area

The study is proposed to be conducted in **Gwalior City, Madhya Pradesh**.

Population

The population includes employees, administrative personnel, managers and selected stakeholders associated with public-sector institutions.

Sample Size

For demonstrating the analytical framework, an **illustrative sample of 200 respondents** is used.

Sampling

Purposive and convenience sampling may be used depending upon access to public institutions. A stratified approach can be adopted where institutional categories are sufficiently available.

Research Instrument

A structured questionnaire based on a five-point Likert scale is proposed:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree

Statistical Techniques

The following techniques are proposed:

- Frequency and percentage
- Mean and standard deviation
- Cronbach's Alpha
- Pearson correlation
- Multiple regression
- Hypothesis testing

Data Collection and Sources

Primary data are proposed to be collected through a structured questionnaire from respondents associated with public-sector institutions in Gwalior City.

Secondary information may be obtained from government reports, academic literature, policy documents, institutional reports and recognized governance databases.

For the present draft, the numerical results below are **illustrative/model results based on N=200** and are provided to demonstrate the proposed analytical structure. They should be replaced with actual field-survey results before journal submission.

Data Analysis and Interpretation

Table 1. Demographic Profile of Respondents

Category	Frequency	Percentage
Male	118	59.0
Female	82	41.0
18–30 years	44	22.0
31–40 years	58	29.0
41–50 years	56	28.0
Above 50 years	42	21.0
Graduate	74	37.0
Postgraduate	92	46.0
Professional/Other	34	17.0
Total	200	100.0

The illustrative sample represents respondents from different age and educational groups, providing diversity in perceptions regarding governance and organizational management.

Table 2. Descriptive Statistics

Variable	Mean	SD
Political Leadership	3.48	0.79
Governance Quality	3.57	0.74
Managerial Autonomy	3.31	0.86
Accountability	3.69	0.71

Political Interference	2.91	0.91
Decision-Making Effectiveness	3.45	0.77
Organizational Performance	3.61	0.73
Public-Service Delivery	3.54	0.76

The illustrative means indicate relatively favorable perceptions of accountability, governance and organizational performance. Political interference records a comparatively lower mean, although responses demonstrate variation.

Table 3. Reliability Analysis

Construct	Items	Cronbach's Alpha
Political Leadership	5	0.82
Governance Quality	6	0.86
Managerial Autonomy	5	0.81
Accountability	5	0.84
Political Interference	5	0.79
Decision-Making Effectiveness	5	0.83
Organizational Performance	6	0.88
Public-Service Delivery	5	0.85

All illustrative reliability coefficients are above 0.70, suggesting satisfactory internal consistency of the proposed measurement scales.

Table 4. Correlation Matrix

Variables	PL	GQ	MA	AC	PI	DM	OP	PSD
PL	1	.52**	.38**	.44**	-.21**	.35**	.41**	.37**
GQ	.52**	1	.56**	.61**	-.34**	.53**	.62**	.58**
MA	.38**	.56**	1	.48**	-.42**	.59**	.65**	.55**
AC	.44**	.61**	.48**	1	-.27**	.47**	.57**	.53**
PI	-.21**	-.34**	-.42**	-.27**	1	-.49**	-.46**	-.39**
DM	.35**	.53**	.59**	.47**	-.49**	1	.68**	.64**
OP	.41**	.62**	.65**	.57**	-.46**	.68**	1	.71**
PSD	.37**	.58**	.55**	.53**	-.39**	.64**	.71**	1

**p < .01; illustrative values.

The illustrative correlation results indicate positive associations between governance quality, managerial autonomy, accountability, decision-making and organizational performance. Political interference shows negative relationships with managerial autonomy and decision-making effectiveness.

Regression Analysis

Table 5. Multiple Regression Analysis

Dependent Variable: Organizational Performance

Predictor	Beta (β)	t-value	p-value
Governance Quality	.31	4.82	<.001
Managerial Autonomy	.34	5.27	<.001
Accountability	.21	3.41	.001
Political Interference	-.17	-2.88	.004
Decision-Making Effectiveness	.29	4.46	<.001

$R^2 = 0.61$

Adjusted $R^2 = 0.60$

$F = 60.75, p < .001$

The illustrative regression model explains approximately 61% of the variance in organizational performance. Managerial autonomy has the strongest positive standardized coefficient, followed by governance quality and decision-making effectiveness. Political interference demonstrates a negative relationship with organizational performance.

Hypothesis Testing

Table 6. Summary of Hypothesis Testing

Hypothesis	Result	Decision
H1: Political Leadership → Governance Quality	Positive	Supported
H2: Governance Quality → Organizational Performance	Positive	Supported
H3: Managerial Autonomy → Organizational Performance	Positive	Supported
H4: Accountability → Organizational Performance	Positive	Supported
H5: Political Interference → Decision-Making	Negative	Supported
H6: Decision-Making → Public-Service Delivery	Positive	Supported
H7: Governance, Autonomy & Accountability → Performance	Significant	Supported

The illustrative results provide support for all proposed hypotheses.

Discussion

The findings suggest that political leadership and management should not be treated as completely separate domains. Political leadership can strengthen governance when it provides strategic direction, establishes priorities and promotes accountability.

Governance quality demonstrates a positive relationship with organizational performance. This indicates that transparent procedures, effective policy implementation and accountability can contribute to better institutional outcomes.

Managerial autonomy shows a comparatively strong relationship with organizational performance. This suggests that managers require adequate discretion to implement policies and resolve operational problems.

Accountability is also positively associated with organizational performance. Effective accountability can therefore function as a management mechanism rather than merely a political control mechanism.

In contrast, political interference demonstrates a negative relationship with decision-making effectiveness and organizational performance. The findings emphasize the importance of distinguishing legitimate political oversight from inappropriate interference in routine administrative management.

Managerial Implications

The study has several implications for public-sector management.

First, public institutions should establish a clearer distinction between policy direction and routine administrative implementation.

Second, managers should receive adequate decision-making authority within legal and institutional boundaries.

Third, organizational performance should be measured using clearly defined indicators such as efficiency, responsiveness, service quality and citizen satisfaction.

Fourth, transparent performance evaluation and accountability mechanisms should be strengthened.

Finally, public-sector managers should receive continuous training in leadership, decision-making, digital administration and organizational management.

Policy Implications

The study suggests the following policy measures:

1. Strengthening institutional transparency.
2. Establishing clear administrative responsibilities.
3. Improving managerial autonomy.
4. Developing measurable public-service performance indicators.
5. Strengthening grievance-redress mechanisms.
6. Promoting evidence-based decision-making.
7. Improving professional training for public-sector managers.

8. Increasing citizen participation and feedback.
9. Reducing inappropriate political interference.
10. Combining democratic accountability with administrative professionalism.

Limitations

- The study is geographically limited to Gwalior City and therefore its findings may not automatically be generalized to all cities of Madhya Pradesh.
- The study also relies on perceptions of respondents, which may introduce subjective bias. A cross-sectional design cannot fully establish long-term causal relationships.
- Most importantly, the numerical analysis presented in this draft is illustrative. Actual field data should be collected and analyzed before the study is submitted as an empirical research paper.

Conclusion

Political leadership, governance and management are interconnected dimensions of public-sector functioning. Political leadership provides democratic direction, whereas professional management converts policies into organizational action and public services. The present study develops an integrated framework connecting political leadership, governance quality, managerial autonomy, accountability, decision-making and organizational performance. The illustrative analysis suggests that governance quality, managerial autonomy, accountability and effective decision-making can contribute positively to organizational performance, whereas excessive political interference may negatively affect managerial effectiveness.

The central implication is that effective public-sector management does not require a complete separation of politics and administration. Instead, it requires an institutional balance in which political authorities provide democratic direction and accountability while professional managers receive sufficient autonomy to perform their responsibilities. For Gwalior City, strengthening this balance may contribute to more efficient public institutions, better decision-making and improved public-service delivery.

References

- Avolio, B. J., & Bass, B. M. (2004). Multifactor Leadership Questionnaire: Manual and Sampler Set. *Mind Garden*.
- Denhardt, R. B., & Denhardt, J. V. (2015). *The New Public Service: Serving, Not Steering*. Routledge.
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). *The Worldwide Governance Indicators: Methodology and analytical issues*. World Bank Policy Research Working Paper.
- Kaufmann, D., & Kraay, A. (2024). *The Worldwide Governance Indicators: Methodology and 2024 Update*. World Bank.
- Northouse, P. G. (2021). *Leadership: Theory and Practice*. Sage Publications.
- Osborne, S. P. (Ed.). (2010). *The New Public Governance? Emerging Perspectives on the Theory and Practice of Public Governance*. Routledge.
- Pollitt, C., & Bouckaert, G. (2017). *Public Management Reform: A Comparative Analysis – Into the Age of Austerity*. Oxford University Press.
- Robbins, S. P., & Judge, T. A. (2019). *Organizational Behavior*. Pearson.
- World Bank. (2024). *Worldwide Governance Indicators*. World Bank Group.
- World Bank. (2025). *Worldwide Governance Indicators: Documentation and Methodology*. World Bank Group.

METHODOLOGY FOR ASSESSING THE INVESTMENT ATTRACTIVENESS OF AGRICULTURAL ENTERPRISES.

Badalov Jamshid Jamolovich¹

ABSTRACT

The article analyzes the indicators used to assess the investment attractiveness of agricultural enterprises and presents an algorithm for calculating attractiveness as an integral indicator. The article also proposes criteria for assessing the investment attractiveness of agricultural enterprises.

Keywords: Agriculture, Agro-Industrial Complex, Investment, Investment Attractiveness, Assets.

Introduction

In an integrated approach to solving the most important state-level problems of ensuring food security of any country and sustainable socio-economic development of its territories, when making management decisions at all hierarchical levels on increasing the efficiency and placement of investments, it is important to take into account not only the essence and content of investment and investment processes and the interdependence of their various forms, but also the purposeful formation of the investment attractiveness of a state with developed agro-industrial production in all regions.

Agriculture is a key sector with low profitability and low investment attractiveness, but the growth of the entire economy depends on its development. If the state is interested in a stable and strong economy, it must provide financial support to the sector at the level of legislative and executive authorities. In this regard, the Decree of the President of the Republic of Uzbekistan No. PF-5853 dated October 23, 2019 "On Approval of the Strategy for the Development of Agriculture of the Republic of Uzbekistan for 2020-2030" identified "reducing state participation in the sector and introducing mechanisms to increase investment attractiveness, which provide for increasing the flow of private investment capital to support the modernization, diversification and sustainable growth of the agricultural and food sector" as a priority area[1]. Also, on January 26, 2023, the Resolution of the President of the Republic of Uzbekistan No. PQ-23 "On Additional Measures to Further Support the Activities of Cotton Raw Material Growers" was adopted, creating many opportunities for clusters in the sector[2]. In particular, a number of positive developments can be cited, such as: the creation of an opportunity to implement the savings of cotton-textile clusters in the form of money and material resources based on agreements with producers; the fact that 30 percent of the cost of land leveling units was reimbursed from the State budget to entities that purchased automated land leveling units with a laser device; the fact that up to 50 percent of the electricity costs spent on pumping irrigation of cotton fields were covered from the State budget. However, despite the above, one of the main obstacles that negatively affects the development of our country's regions is the lack of investments in the real sector of the regional economy. The investment attractiveness of regions should serve as the basis for developing their investment policy. It should be noted that today the investment attractiveness of the regions of our republic (especially rural areas) is not at the required level.

Attracting investments to agriculture has its own characteristics. As in other sectors of the economy, in agriculture, they invest capital in objects, that is, in the results of human labor, as well as in natural objects,

¹ Independent researcher of Termez State University

which, in another way, require capital with a long payback period and high risk, because nature lives by its own laws, which today can be difficult or expensive to manage.

REVIEW OF RELEVANT LITERATURE

A number of foreign and domestic scientists have conducted scientific work on the development of the economy based on attracting investments in agriculture and assessing its investment attractiveness. In particular, L.V. Tyu emphasizes that regions with advantages in the form of the presence of natural resources have a high level of investment attractiveness[3].

M.K. Komilov, P.D. Komilova, Z.M. Komilova also emphasize the need to take into account the influence of natural factors, and also emphasize that the main criteria for the investment attractiveness of the agro-industrial complex should be the financial and economic indicators of agricultural enterprises and the level of income of the rural population [4].

I.V. Sharikova, A.V. Sharikov write about the need to take into account the efficiency of the use of labor resources when assessing investment attractiveness[5]. Some economists have noted that the assessment of investment attractiveness is influenced by the conditions for rational land ownership and land use, that is, the possibility of purchasing, renting and using land, as well as the territorial land structure and qualitative characteristics of the land fund[6].

N.A. Rukhmanova summarizes the main principles that should be followed when justifying the methodology for assessing investment attractiveness. They are: substantiating a system of indicators that comparatively and objectively characterize the level of investment attractiveness of an enterprise; organizing and ensuring a system of continuous collection and processing of information necessary for building and analyzing a system of indicators of investment attractiveness of an enterprise; substantiating the principles and methods of integral (complex) assessment of the investment attractiveness of an enterprise[7].

D.Yu. Khuzhamkulov, drawing attention to the fact that the increasing attractiveness of the investment environment in our country leads to an annual increase in the volume of investments in fixed capital and the importance of the demand for investments in the economy on a macroeconomic scale, points out the expediency of achieving the introduction of mechanisms for the effective use of free market, human capital and labor, which will provide the basis for the promising development of agriculture in this process [8]. Sh.O.Elboyeva noted that if the level and state of specialization of agricultural production within the regions are not fully taken into account when attracting investments in agriculture, it will be difficult to achieve efficiency in the investment activity of farms directly at the micro level. Because agriculture is characterized by its uniqueness, natural and economic, locational, specialization and social conditions. This, in turn, determines the need to improve the scientific approach to improving the efficiency of investment allocated to the agricultural economy and its proper distribution[9].

Research methodology

The article uses economic, comparative, analytical and sample observation, statistical and modeling processes, economic-mathematical and other methods.

Analysis and results

Currently, the investment attractiveness of enterprises is determined on the basis of a rating system or banking methods that determine the borrower's creditworthiness. In this regard, there is a need to determine

a universal indicator of investment attractiveness. Such an indicator can be a synthetic coefficient of the investment attractiveness of an enterprise. When calculating the synthetic competitiveness index, five indicators of the financial and economic activities of the enterprise were taken into account (Table 1).

Table 1 : Algorithm for calculating investment attractiveness

Name and conditional designation of coefficients		Content	Calculation method	Minimum value	The biggest value
FI	Financial independence ratio	A ratio indicating the share of an enterprise's assets secured by its own funds.	$FI = \frac{PSI}{EXS}$ Here: PSI-passive income; EXS-expenses.	0,5	1
MC	Maneuverability coefficient	It shows the volume of the enterprise's own working capital in circulation and, as a result, determines how dependent or autonomous the enterprise is on external loans.	$MC = \frac{OWC}{ECQ}$ Here: OWC- own working capital; ECQ- equity.	0,2-0,5	1
CR	Coverage ratio	A financial ratio that compares a company's profit before interest and taxes with its interest expense.	$CR = \frac{CA}{CI}$ Bu yerda: CA-aylanma aktivlar; CI-joriy majburiyatlar.	1	2
ROA	Return on Assets	It is a financial indicator of the ratio of a company's profit to the value of its assets.	$ROA = \frac{NI}{ATA}$ Here: NI is net income; ATA is average total assets.	5%	50%
RCP	The coefficient of the actual cost of production assets	It reflects the share of production funds - fixed assets and production reserves - in the total value of the company's property.	$RCP = \frac{FA + RM + WP}{A}$ Here: FA- cost of fixed assets; RM-cost of raw materials; WP-cost of work in progress; A- assets of the enterprise.	0,5	0,9
SCIA	Synthetic coefficient of investment attractiveness	$SCIA = FI * MC * CR * ROA * RCP$		0,25	90

As the class of the obtained synthetic investment attractiveness coefficient increases, the investment attractiveness of an agricultural enterprise increases. Of course, assessment criteria are necessary to draw conclusions about the investment attractiveness of an enterprise. Typically, most experts suggest using the following criteria[10]:

0–0.25 - enterprises do not have investment attractiveness;

0.25–1.87 - enterprises have minimal (sufficient) investment attractiveness;

1.87–12.6 - a good level of investment attractiveness;

12.6–90 - a high level of investment attractiveness.

In cases where enterprises have negative indicators, for example, if the enterprise does not have its own working capital or has incurred losses (i.e. it is practically impossible to calculate the profitability and maneuver coefficients), these indicators are assigned a value of zero. The investment attractiveness of such enterprises will definitely be zero (Table 2).

Table 2 : Investment attractiveness classes

Indicators	Values by class			
	0 class	1 class	2 class	3 class
Financial independence ratio	below 0,5	0,5-0,6	0,6-0,8	0,8-1
Maneuverability ratio	below 0,2	0,2-0,4	0,4-0,6	0,6-1
Coverage ratio	below 1,0	1,0-1,3	1,3-1,5	1,5-2
Return on assets	below 5%	5-10 %	10-25 %	25-50 %
Real cost ratio of production assets	below 0,5	0,5-0,6	0,6-0,7	0,7-0,9
Synthetic ratio of investment attractiveness	0-0,25	0,25-1,87	1,87-12,6	12,6-90

Thus, the presented indicators fully reflect the financial and economic condition of the enterprise and correspond to the indicator of investment attractiveness.

Conclusions and proposals

Intensification of the investment process is not only the main condition for pulling agriculture out of a deep crisis, but also becomes the most important decisive factor for its further development. The priority task in the initial period of agrarian reform is not only to reform the social system in the countryside through institutional changes, but also to attract large-scale investments to the agricultural sector.

Almost all sectors and branches of the agro-industrial complex, be it agriculture, processing industry, capital-producing sectors, or rural housing construction, are in dire need of investments. Therefore, creating conditions for a large-scale influx of investments into agriculture should become the most important priority direction of the state agrarian policy strategy at the current stage. First of all, it is necessary to ensure the formation of a favorable, economically equivalent market environment at the state level, in which the economy will accept investments, and business entities will have and expand investment opportunities to renew their fixed capital and increase it at the expense of their own and attracted funds, including foreign capital. This can be achieved to a high degree by introducing a new economic management mechanism that is adequate to the market system and takes into account the specific characteristics of agriculture.

References

- O'zbekiston Respublikasi Prezidentining 2019 yil 23-oktyabrdagi "O'zbekiston Respublikasi qishloq xo'jaligini rivojlantirishning 2020 - 2030 yillarga mo'ljallangan strategiyasini tasdiqlash to'g'risida"gi PF-5853-son Farmoni. <https://lex.uz/docs/4567334>.
- O'zbekiston Respublikasi Prezidentining 2023-yil 26-yanvarda "Paxta xom ashyosi yetishtiruvchilar faoliyatini yanada qo'llab-quvvatlashning qo'shimcha chora-tadbirlari to'g'risida"gi PQ-23-sonli qarori. <https://lex.uz/ru/docs/-6373130>.
- Тю Л.В. Методические подходы к определению инвестиционной привлекательности сельского хозяйства // Сибирская финансовая школа. - 2006. - № 1(58). - С. 85-90.
- Камилов М.К. Проблемы повышения инвестиционной привлекательности АПК. // Региональные проблемы преобразования экономики. - 2014. - № 7. - С. 92-97.
- Шарикова И.В. Оценка инвестиционной привлекательности сельского хозяйства региона (на примере Саратовской области) [Текст: электронный] // Национальные интересы: приоритеты и безопасность. – 2014. - №36. - URL: <https://cyberleninka.ru/article/n/otsenka-investitsionnoy-privlekatelnosti-selskogo-hozyaystva-regiona-na-primere-saratovskoy-oblasti>.
- Суцеский П.С. Роль землеустройства в формировании инвестиционной привлекательности сельскохозяйственных территорий. // Вестник факультета землеустройства Санкт-Петербургского государственного аграрного университета. - 2017. – № 3. – С. 55-57.
- Рухманова Н.А, Сравнительная характеристика методов оценки инвестиционной привлекательности предприятия [Текст: электронный] // Инновационная экономика: перспективы развития и совершенствования. – 2018. – № 8 (34). – URL: <https://cyberleninka.ru/article/n/sravnitelnaya-harakteristika-metodov-otsenki-investitsionnoy-privlekatelnosti-predpriyatiya-1>.
- Хужамкулов Д.Ю. Иқтисодийнинг қишлоқ хўжалиги тармоғига инвестицияларни жалб этишни ривожлантириш. / Zamonaviy dunyoda innovatsion taraqqiyot: nazariya va amaliyot"nomli ilmiy, masofaviy, onlayn konferentsiya. T. 2, Выпуск 26, сс. 14–16. Zenodo. <https://doi.org/10.5281/zenodo.10117938>
- Elboyeva Sh.O. O'zbekiston respublikasi qishloq xo'jaligi iqtisodiyotida investitsiyadan samarali foydalanish. // Muhandislik va iqtisodiyot jurnali, 2025-yil, yanvar. № 1-son, 163-167 b. <https://muhandislik-iqtisodiyot.uz>
- Осмоловская П.С. Инвестиционное развитие сельского хозяйства региона. // Молочнохозяйственный вестник, Экономические науки, №3 (15), III кв. 2014. - С83-90.

LOAD-ADJUSTED ECO-EFFICIENCY ASSESSMENT OF RAILWAY REPAIR PLANTS

Abdurakhmanova Mukaddas Tokhtasinovna¹

ABSTRACT

This article develops a load-adjusted assessment methodology for comparing the ecological-economic efficiency of heterogeneous railway repair enterprises. The purpose of the study is to overcome three sources of structural incomparability — product-mix heterogeneity, differing capacity-utilisation levels, and differing external operating conditions — that make raw specific-consumption ratios unsuitable for cross-plant comparison and investment prioritisation. The methodology converts heterogeneous repair categories into a labour-intensity-weighted equivalent unit, corrects specific resource consumption for capacity-utilisation using a fixed-variable cost split estimated through a bounded interval approach, decomposes the observed change in specific consumption into technological and load-factor components without residual, and aggregates plant-level scores into a sector-level index through non-compensatory geometric weighting. Applied to two structurally different railway repair plants, the corrected comparison narrows an apparent multiple-fold gap in electricity intensity to a materially smaller, genuinely technology-driven difference, while the decomposition shows that, for a plant whose utilisation rose substantially, roughly one third to one half of the observed improvement in several resource categories is attributable to fuller loading rather than technological modernisation. The findings provide plant managers and sector regulators with a diagnostic tool that separates genuine environmental-technological progress from the statistical artefact of changing output volume, thereby improving the targeting of modernisation investment.

Keywords: Eco-Efficiency, Railway Repair Enterprises, Capacity-Utilisation Correction, Equivalent Unit, Composite Indicator, Non-Compensatory Aggregation.

1. Introduction

Comparing the environmental-resource performance of industrial repair enterprises within the same sector is often assumed to be straightforward: divide resource consumption by output and rank the resulting ratios. In practice, such comparisons are frequently misleading. Repair enterprises within a single railway holding typically differ in what they produce (traction-unit overhaul versus spare-parts machining versus assembly restoration), in how fully their capacity is loaded from year to year, and in the external operating conditions — traction technology, regional ecological density — under which they work. A raw specific-consumption ratio conflates all three sources of variation with genuine differences in environmental-technological performance, and a ranking built on such ratios can reward the wrong plant.

The problem is not merely conceptual. Where product mix differs sharply — one plant performing labour-intensive overhaul with heavy testing and assembly operations, another performing metal machining with a high share of material throughput — the same underlying technological competence can produce specific-consumption ratios that point in opposite directions across different resource categories, so that no single ratio, and no unweighted combination of ratios, supports a defensible conclusion. Where capacity utilisation differs and is itself changing over time, an improvement in a raw ratio may reflect nothing more than fuller

¹ Acting Associate Professor (PhD), Faculty of Economics, Department of Green Economy, (TSUE)

loading of largely fixed environmental infrastructure — treatment facilities, ventilation, heating — rather than any technological change, a distinction that matters directly for how modernisation funds should be allocated.

The construction of composite indicators from heterogeneous, partially non-comparable component data has an established methodological literature. The non-compensatory aggregation principle — under which a poor score on one component cannot be offset by a strong score on another — is developed by [1] and adopted as best practice in the OECD/JRC handbook on composite indicators [2], while systematic uncertainty and sensitivity testing of composite scores against methodological choices is formalised by [3]. This literature addresses how to aggregate once comparable component scores exist; it does not by itself resolve the prior problem of rendering structurally heterogeneous plants comparable in the first place — a gap that is particularly acute in capital-intensive repair industries such as railway rolling-stock maintenance, where product mix and load factor vary sharply across otherwise similar enterprises.

The purpose of this article is to design and validate a load-adjusted assessment methodology that renders structurally heterogeneous railway repair plants comparable on ecological-economic grounds, and to decompose observed changes in their specific resource consumption into a technologically attributable component and a load-factor-attributable component, so that modernisation investment can be targeted at genuine technological gaps rather than at plants that merely happen to be more fully loaded.

2. Methods

The methodology addresses product-mix heterogeneity, capacity/load heterogeneity, and external-condition heterogeneity through a fixed sequence of corrections, since applying them out of order causes each subsequent correction to partly undo the previous one (Table 1).

Table 1 : Sources of structural incomparability among railway repair plants and the corresponding corrections

Source of incomparability	Manifestation	Correction applied	Order of application
Product-mix heterogeneity	Repair categories and output nomenclature are not directly comparable across plants	Conversion to a labour-intensity-weighted equivalent unit	1st
Output volume and load-factor differences	Semi-fixed costs are spread unevenly across output depending on capacity utilisation	Capacity-utilisation correction of specific consumption	2nd
Traction-type heterogeneity	Emissions are recorded at different stages depending on diesel vs electric traction	Traction-composition correction	3rd
Regional heterogeneity	An identical discharge causes different damage depending on local ecological density	Regional correction applied to the damage valuation only	Applied to damage value

Source: author's elaboration.

Product-mix heterogeneity is addressed first by converting heterogeneous repair categories into a single equivalent-unit measure of output, weighted by relative labour intensity — chosen over a materials-based weight because labour intensity is directly linked to equipment operating time, energy use, and auxiliary-material consumption, whereas a materials-based weight captures only one dimension of environmental load:

$$Q_k = \sum_{j=1}^m n_j \cdot \kappa_j \quad (1)$$

$$\kappa_j = \frac{h_j}{h_b}$$

where Q_k is the equivalent (reduced) output volume, n_j is the number of repairs of category j completed, κ_j is the conversion coefficient for that category, h_j is its labour intensity, h_b is the labour intensity of the base repair category (the most frequently performed, best-normed category), and m is the number of repair categories.

Capacity/load heterogeneity is addressed second. A plant's specific environmental and resource expenditure contains a fixed component — treatment facilities, ventilation, heating, waste-storage upkeep — that does not vary with output, and a variable component that does. Observed specific consumption is restated at a common, normative load level:

$$w_q = w_o \cdot \frac{g(k_n)}{g(k_q)} \quad (2)$$

$$g(k) = \frac{\alpha}{k} + 1 - \alpha$$

where w_q is the load-corrected value, w_o is the observed value, k_q is the plant's actual capacity-utilisation coefficient, k_n is the normative (best-practice or technologically rational) utilisation level, and α is the fixed-cost share of the resource in question. Because the correction's result is highly sensitive to α , three approaches to estimating it were compared (Table 2).

Table 2 : Approaches to estimating the fixed-cost share and their applicability to railway repair plants

Approach	Data requirement	Main limitation	Adopted
Cost-estimate decomposition	Itemised environmental cost lines in the plant's cost estimate	Requires a level of cost-accounting detail rarely available in practice	No
Time-series econometric regression	A minimum of ten to twelve annual observations per plant	Collinearity between utilisation and technological trend in short series produces economically meaningless (negative) coefficients	No
Interval (bounded) approach	A plausible parameter range plus a stability check across that range	Yields a conditional, not a point, conclusion when stability fails	Yes

Source: author's elaboration.

The bounded interval approach sets a plausible range for α rather than a single point estimate and repeats the correction at both ends of that range; a conclusion is treated as robust only if it holds across the entire interval, and as conditional — pending cost-estimate data — if it reverses within the interval. The observed change in load-corrected specific consumption between a base and a reporting period is then split, without residual, into a technological component (the change that would have occurred at an unchanged load factor) and a load component (the change attributable purely to fuller or weaker loading, at an unchanged technological level):

$$\begin{aligned}\Delta w_T &= (w1_1 - w1_0) \cdot g(k_0) \\ \Delta w_Y &= w1_1 \cdot [g(k_1) - g(k_0)]\end{aligned}\quad (3)$$

where the superscript 1 denotes the value restated at full utilisation and the subscripts 0 and 1 denote the base and reporting periods; by construction the two components sum exactly to the total observed change, so that no part of the change is left unattributed.

External-condition heterogeneity is addressed through two further corrections applied at different points in the assessment rather than to the plant score itself: a traction-composition correction, which separates direct emissions at the point of use from generation-stage emissions attributable to electric traction and reports the latter at sector rather than plant level (consistent with the principle that an enterprise should only be scored on factors it can control); and a regional correction, applied not to the plant's efficiency score but to the monetary valuation of environmental damage, reflecting that an identical discharge causes different social cost depending on local ecological density.

Plant-level scores are finally aggregated into a holding- and sector-level index through a four-stage hierarchical algorithm, illustrated in Figure 1. At each stage the aggregation object and the weighting basis change, and a deviation-feedback channel returns unusually large changes in an upper-level score to the lower levels for source diagnosis rather than treating aggregation as a one-way, irreversible compression of information.

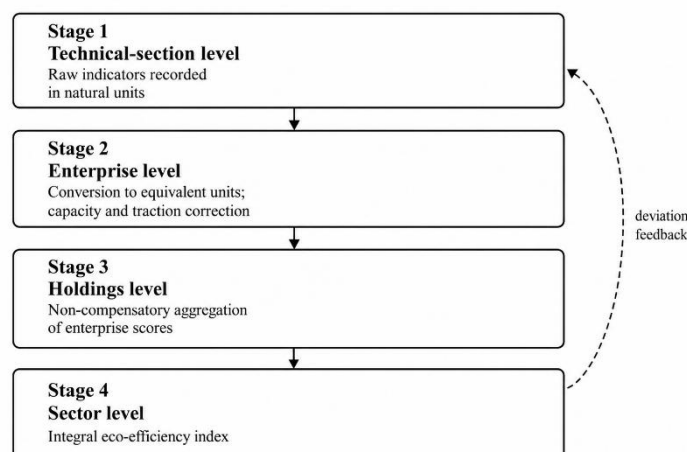


Figure 1. Four-stage hierarchical algorithm for load-adjusted eco-efficiency assessment

Source: author's elaboration.

Holding-level weights are set in proportion to each plant's share of equivalent output, and aggregation follows the non-compensatory geometric form recommended for composite indicators whose components should not substitute for one another [1; 2]:

$$v_i = \frac{Q_{ki}}{\sum_{j=1}^N Q_{kj}}$$

$$S_x = \prod_{i=1}^N S_i^{v_i}$$
(4)

where v_i is plant i 's weight, Q_{ki} is its equivalent output volume, S_i is its corrected efficiency score, S_x is the holding-level sub-index, and N is the number of plants in the holding. Because a geometric mean falls sharply toward zero if any single component score is very low, a plant with one severely under-performing resource category cannot be masked by strong performance elsewhere — the property that distinguishes non-compensatory from simple additive aggregation.

The stability of conclusions to the methodology's expert-set parameters — conversion coefficients, the fixed-cost share, and the regional coefficient bounds — was tested through four checks: randomised perturbation of aggregation weights, sequential exclusion of individual indicators, shifting of normalisation bounds, and, specific to this methodology, resampling of the correction coefficients themselves within their plausible ranges, following the general sensitivity-testing protocol for composite indicators [3].

3. Results

Applied to two structurally different railway repair plants — one specialising in labour-intensive traction-unit overhaul, the other in metal machining and component manufacture — the uncorrected specific-consumption ratios point in materially different directions across resource categories: the overhaul-oriented plant shows several times higher electricity intensity but visibly lower metal-waste intensity than the machining-oriented plant, a pattern explained entirely by product mix rather than by environmental performance. After conversion to the equivalent-unit basis, the electricity-intensity gap between the two plants narrows substantially, indicating that a large share of the raw disparity was a product-mix artefact rather than a genuine efficiency difference; the remaining, materially smaller gap is consistent with an underlying technological difference between the two production processes.

The technological/load decomposition, illustrated for a representative set of resource categories in Figure 2, shows that its outcome depends systematically on the technical nature of the resource. For resources whose consumption is dominated by heating, ventilation, and other largely load-independent uses, the load-factor component accounts for a substantial share — in some categories approaching half — of the observed improvement in specific consumption at a plant whose utilisation rose markedly over the period studied. For resources directly tied to the volume of material actually processed, such as metal waste, the technological component dominates overwhelmingly, and the load-factor component is minor.

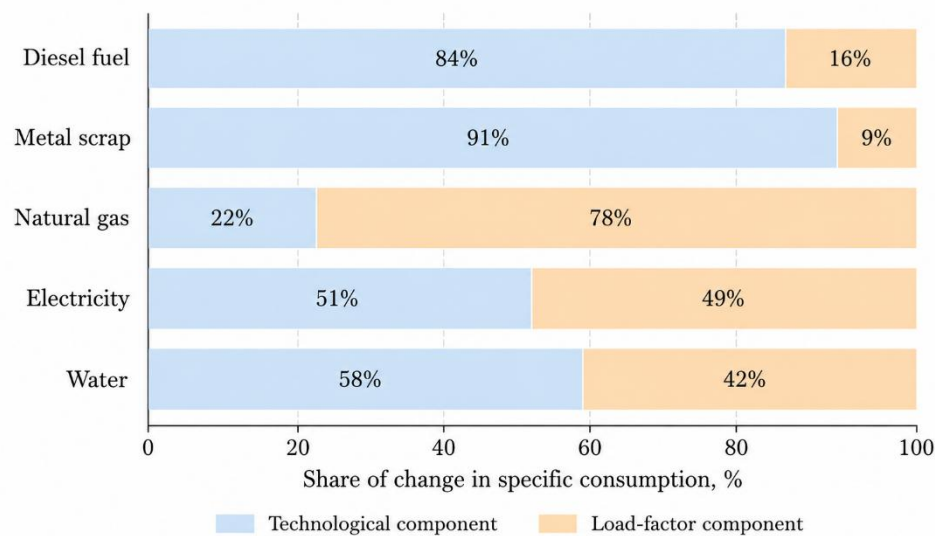


Figure 2. Illustrative decomposition of the change in specific resource consumption into technological and load-factor components

Source: author's elaboration, illustrative decomposition consistent with the methodology in equation (3).

At the second plant, whose capacity-utilisation coefficient changed only marginally over the same period, the technological component dominates across nearly every resource category, confirming that the observed improvement there is genuinely attributable to technological change rather than to load-factor variation. The contrast between the two plants demonstrates the practical value of the decomposition: without it, both plants would appear to have achieved broadly comparable environmental improvement, whereas the corrected analysis shows that only one of them has genuinely closed its technological gap.

Sensitivity testing confirms that the technological-component dominance conclusion for material-throughput-linked resources such as metal waste is stable across the entire plausible range of the fixed-cost share, whereas for a subset of energy-related resources the balance between the two components is more sensitive to that parameter and should be treated as conditional pending itemised cost-estimate data — precisely the outcome the bounded-interval approach in Table 2 is designed to reveal rather than conceal.

4. Discussion

The central methodological contribution of this study is the explicit, non-residual separation of technological progress from load-factor variation in specific resource consumption. Uncorrected comparison of repair enterprises risks two distinct errors with opposite policy implications: overstating the environmental gain from a period of rising output (rewarding a plant for fuller loading rather than for genuine modernisation), and understating environmental performance during a downturn in orders (penalising a plant for an external demand shock rather than for a technological failure). Both errors misdirect modernisation investment — the first toward plants that need no further technological support, the second away from plants that may urgently need it.

The methodology's four-stage hierarchical structure, together with its deviation-feedback channel, addresses a further common weakness of composite eco-efficiency indices: irreversible information loss during aggregation. By retaining the component indicators that produced each aggregated score at every

level, an unusual movement in a holding- or sector-level index can be traced back to its plant- and resource-level origin rather than remaining an unexplained aggregate anomaly — an operational realisation of the diagnostic use of composite indicators advocated in the constructing-composite-indicators literature [2; 3].

The finding that the technological/load balance differs systematically by resource type — dominated by load factor for largely fixed-infrastructure resources, dominated by technology for throughput-linked resources — has a direct implication for investment sequencing: modernisation spending targeted at heating, ventilation, and treatment infrastructure yields comparatively larger environmental returns at plants whose technological reserve in that category is still unopened (where the load-factor share is high), while spending on core process technology is better targeted at plants where the technological component already dominates and further load-factor gains have been exhausted.

The methodology's principal limitation is its reliance, in the absence of itemised cost-estimate data, on a bounded rather than a point estimate of the fixed-cost share, which leaves some resource-category conclusions conditional rather than fully robust. A second limitation is that several of its parameters — conversion coefficients and the fixed-cost share alike — were estimated from short time series at only two to three enterprises; as panel data accumulate across more plants and years, the econometric approach set aside in Table 2 due to collinearity becomes viable and can replace the interval approach with a point estimate, sharpening the decomposition without altering its underlying logic.

5. Conclusion

This study has developed a load-adjusted assessment methodology that renders structurally heterogeneous railway repair plants comparable on ecological-economic grounds by sequentially correcting for product-mix, capacity-utilisation, and external-condition heterogeneity, and by decomposing observed changes in specific resource consumption into technological and load-factor components without residual.

Applied to two structurally different plants, the corrected methodology substantially narrows an apparent multiple-fold performance gap driven by product mix, and reveals that a material share of one plant's observed environmental improvement is attributable to fuller capacity loading rather than technological modernisation, while the other plant's improvement is genuinely technological. A four-stage hierarchical aggregation algorithm with a deviation-feedback channel, together with sensitivity testing across the methodology's expert-set parameters, ensures that conclusions are both traceable to their source and appropriately qualified where they are sensitive to data currently unavailable.

From a practical standpoint, the methodology gives railway-repair-holding management and sector regulators a diagnostic tool that separates genuine environmental-technological progress from the statistical artefact of a changing output volume, improving the targeting of modernisation investment toward plants and resource categories where a technological gap genuinely remains. As firm-level panel data accumulate, recalibrating the fixed-cost share through the econometric approach set aside in this study is a natural direction for future research.

References

- Munda G., Nardo M. *Noncompensatory/Nonlinear Composite Indicators for Ranking Countries: A Defensible Setting* // *Applied Economics*. — 2009. — Vol. 41, No. 12. — P. 1513–1523.
- Nardo M., Saisana M., Saltelli A., Tarantola S., Hoffman A., Giovannini E. *Handbook on Constructing Composite Indicators: Methodology and User Guide*. — Paris: OECD Publishing, 2008. — P. 19–34.

- Saisana M., Saltelli A., Tarantola S. *Uncertainty and Sensitivity Analysis Techniques as Tools for the Quality Assessment of Composite Indicators* // *Journal of the Royal Statistical Society, Series A.* — 2005. — Vol. 168, No. 2. — P. 307–323.
- International Energy Agency; International Union of Railways. *Railway Handbook 2017: Energy Consumption and CO2 Emissions.* — Paris, 2017. — P. 26–41.
- Ryumina E.V. *Economic Analysis of Damage from Environmental Disturbances: monograph.* — Moscow: Nauka, 2009. — P. 24–47.
- Tereshina N.P., Galaburda V.G., Trikhunkov M.F. *Economics of Railway Transport: textbook.* — Moscow: UMTs ZhDT, 2006. — P. 41–56.
- International Energy Agency (IEA). *Railways Could Provide Much Greater Benefits for Energy and the Environment.* — Paris: IEA, 2019. — Available at: <https://www.iea.org/news/railways-could-provide-much-greater-benefits-for-energy-and-the-environment-according-to-iea-report>
- International Energy Agency (IEA). *The Future of Rail: Opportunities for Energy and the Environment.* — Paris: IEA, 2019. — Available at: <https://www.iea.org/reports/the-future-of-rail>
- International Transport Forum (ITF). *ITF Transport Outlook 2023.* — Paris: OECD Publishing, 2023. — 216 p. DOI: 10.1787/b6cc9ad5-en.
- International Union of Railways (UIC). *Energy Efficiency and CO₂ Emissions.* — Available at: <https://www.uic.org/sustainability/energy-efficiency-and-co2-emissions/>
- International Union of Railways (UIC). *Global Rail Sustainability Report 2024.* — Paris: UIC, 2024.
- Meyer J. R., Kain J. F., Wohl M. *The Urban Transportation Problem.* — Cambridge, MA: Harvard University Press, 1965. — 466 p.
- Organisation for Economic Co-operation and Development (OECD). *ITF Transport Outlook 2023.* — Paris: OECD Publishing, 2023. — Available at: <https://doi.org/10.1787/b6cc9ad5-en>.
- World Bank. *Railways: A Backbone for Sustainable Mobility.* — Washington, DC: World Bank, 2023.
- World Bank. *World Development Indicators: Transport.* — Washington, DC: World Bank, 2024. — Available at: <https://databank.worldbank.org/source/world-development-indicators>

When we take stock of the productivity gains that drive our prosperity, technology gets all the credit. In fact, management is doing a lot of the heavy lifting.

Joan Magretta

GLOBAL FOOD SECURITY AND MECHANISMS FOR MITIGATING MALNUTRITION. INTERNATIONAL EXPERIENCE AND LESSONS FOR UZBEKISTAN

Akhmedova Nafisa Amirdiddin kizi¹

ABSTRACT

Ensuring sustainable food security remains a pivotal challenge for both developed and developing economies globally. This study examines the structural mechanisms of regulating food consumption through standardized normative frameworks amid severe supply deficits, incorporating regional agro-climatic constraints and national economic capacities. It provides a comprehensive analysis of the socio-economic determinants of malnutrition and undernourishment across vulnerable regions, including Latin America, the Caribbean, Oceania, Asia, and Sub-Saharan Africa. The paper critically differentiates between malnutrition as a physiological endpoint of nutrient deficiency and food insecurity as the systemic economic and social constraint precipitating this condition. Furthermore, this research evaluates institutional reforms and policy adjustments aimed at modernizing food security protocols in Uzbekistan, synthesizing international best practices to offer evidence-based recommendations for national policy implementation.

Keywords. Global food security, Malnutrition and hunger, Global, consumption, shortage, food security, "UZBEKISTAN-2030", International organizations (FAO, WHO, UNICEF), transformation, external risks, economic, mechanism, international, experience, agricultural market transformation, product, grain.

INTRODUCTION

Ensuring food security in the world is one of the most urgent tasks facing all countries. The main goal of reforms to regulate modern mechanisms for ensuring food security in Uzbekistan is to "increase the income of peasants and farmers by at least 2 times through intensive development of agriculture on a scientific basis, and increase the annual growth rate of agriculture by at least 5%. In particular, the following tasks are set: to specialize districts in the production of specific types of products, expand the scope of state support in agriculture and implement new insurance mechanisms, increase and protect soil fertility, improve the system of providing agro-industrial enterprises based on science and innovation, provide raw materials for them and increase production volumes by 1.5 times." 2.6 percent of the population of Uzbekistan, or about 1.9 million people, are malnourished. The following situations were noted regarding proper nutrition indicators. It was observed that approximately 36% of the population does not follow the rules of proper nutrition, and 44% of the population is not physically active.

According to the Food and Agriculture Organization of the United Nations (FAO), Uzbekistan is among the countries with a "moderate" level of malnutrition.

In this regard, it is necessary to improve the system of public administration in the sector, widely introduce market relations, strengthen the legal framework for relations between entities that produce, process and supply agricultural products to consumers, introduce resource-saving technologies, and provide agricultural producers with modern equipment to increase competitiveness and improve economic relations in the sector. Special attention is paid to these issues in the Resolution of the President of the Republic of

¹ PhD in Economics teacher at Tashkent State University of Economics

Uzbekistan No.PQ-120 dated February 8, 2022 “On approval of the Program for the development of the livestock sector and its branches in the Republic of Uzbekistan for 2022-2026”, and in the Decrees of the President of the Republic of Uzbekistan No. PF-158 dated September 11, 2023 on the Strategy “UZBEKISTAN - 2030”. The transition to an innovative path of economic development is associated not only with the need to solve the problems accumulated in the agricultural sector of the economy of Uzbekistan, but also with the need to address the main challenges facing this sector.

LITERATURE REVIEW.

The mechanisms and scientific and theoretical foundations of ensuring food security and reducing malnutrition in the world's countries are studied to a certain extent by foreign scientists Slim F., Ibrahim Z., Toufeili I., Haddarah A., Rejeb A. Assessment of food security strategies in twelve countries with different income levels: prospects for sustainability and food systems (2025), . Headey D., Ruel M. Food inflation and child malnutrition in LMICs (2023), Sachs J.D., Fuller G., Lafortune G. Research on sustainable development. From the CIS countries, scientists Frolov K.V., Gordeyev A.V., Maslennikova O.A. Stages of ensuring and developing food security, their specific features and their place in the socio-economic development of the country (2011), Balabanov V.S., Borisenko E.N. Food Security: International and Domestic Aspects (2012) and other works of scientists have studied the development trends, evolution of peasant farms and the problems of increasing the efficiency of state regulation of food security. Issues of improving food security in Uzbekistan include Abulqosimov H.P. Economic Security of the State (2012), Rasulov T.S. Theoretical Aspects and Directions of Ensuring Food Security (2017), Dustmatov B.O. Problems of Food Security (2022), Khojageldiyev Ch.P. Improving the Provision of the Population with Food Products (2022), Topildiyev S.R. Problems of Food Security (2023), Rustamova I.B. Scientific Methodological Foundations of Increasing the Efficiency of Innovative Processes in the Agricultural Sector (2020), Aliyev Ya.E. "They conducted their own scientific research on the development of the agricultural market in ensuring food security (2020). Theoretical foundations malnutrition and food security. Malnutrition and food insecurity are closely related and represent different stages in the process of providing food to the population. While malnutrition reflects the end state in which the population's needs for essential energy and nutrients are not met, food insecurity describes the economic and social constraints that lead to this outcome. Therefore, a deterioration in food security is usually reflected in an increase in malnutrition indicators after a certain period of time. One of the important macroeconomic factors affecting the level of food security is the change in food prices. Food inflation directly affects the real incomes and purchasing power of the population, limiting the opportunities for quality and sufficient nutrition, especially for low-income groups. Therefore, changes in food prices are one of the main economic indicators explaining the relationship between food security and malnutrition.

RESEARCH METHODOLOGY.

The methodology of the article is based on the analysis of scientific and increasingly popular sources, the principles of comparative, logical analysis, sequence, objectivity, the implementation of economic experiments in practice on the basis of scientific research on the implementation of reforms consistently carried out in the new economic policy of the republic, the development of a system of using innovative technologies to ensure food security in Uzbekistan, scientific abstraction, induction and deduction, monographic observation, economic and statistical analysis, grouping.

ANALYSIS AND RESULTS

In the 21st century, ensuring food security and eliminating hunger is recognized as one of the priority strategic directions of global economic development. As a result of rapid population growth, climate change, geopolitical conflicts, pandemics, disruptions in international logistics chains, and instability of food prices, the problems of malnutrition and food security in countries around the world are becoming more complex. Therefore, the issue of combating hunger is considered not only as a social policy, but also as an important component of macroeconomic stability, human capital development, and sustainable economic growth. Sustainable Development Goal 2 (SDG-2 – Zero Hunger), established as part of the 2030 Agenda for Sustainable Development adopted by the United Nations in 2015, aims to end hunger, achieve food security, improve nutrition and promote sustainable agriculture. The goal is to end hunger in all its forms by 2030, meet the needs of the population, especially children, women and vulnerable groups, increase the efficiency of smallholder farms and ensure the sustainability of food production systems. Research conducted by the UN and its specialized agencies, in particular the Food and Agriculture Organization of the United Nations (FAO), the World Food Programme (WFP), the International Fund for Agricultural Development (IFAD), UNICEF and the World Health Organization (WHO), has developed a comprehensive approach to ensuring food security. According to this approach, reducing malnutrition can be achieved not only by increasing agricultural production, but also by expanding social protection programs, developing cash transfers and subsidies, improving school feeding systems, stabilizing food prices, establishing strategic reserves and implementing inclusive agricultural policies. According to the latest FAO reports, while global hunger has declined somewhat after a sharp increase in 2019–2021, current trends indicate that it will be difficult to fully achieve the SDG-2 targets by 2030.

The impact of hunger on the countries of the world. FAO data show that malnutrition rates do not develop in the same direction across regions, but rather vary significantly depending on the level of economic development, agricultural potential, demographic pressure, climate risks and the effectiveness of social protection systems. Although the global malnutrition rate decreased from 12.0 percent to 8.2 percent between 2005 and 2024, this positive trend was not uniform across all regions. In particular, the rate remained high in Africa, while a significant decrease was observed in Asia, and the recovery process in Latin America and the Caribbean was relatively rapid in 2021–2024.

The African region remains one of the regions with the highest levels of malnutrition in the world during the period under review. In 2005, the prevalence of malnutrition in Africa was 18.9 percent, while in 2024 this figure reached 20.2 percent. In terms of population, the number of people suffering from hunger increased from 178.0 million in 2005 to 306.5 million in 2024. This shows that while the relative indicator for Africa remains relatively high, the problem has become more acute in absolute terms. This trend is explained by rapid population growth, high dependence of agriculture on climate, internal conflicts, poverty and inadequate infrastructure.

**Regional differentiation and trends in malnutrition rates in the world and major regions
(2005–2024, in percent)**

Territory	Food insecurity rate (%)									
	2005	2010	2015	2018	2019	2020*	2021*	2022*	2023*	2024*
World	12.0	8.7	7.7	7.3	7.5	8.5	8.8	8.7	8.5	8.2

Africa	18.9	15.9	15.9	16.6	17.4	18.5	18.9	18.9	20.0	20.2
North Africa	6.8	5.6	5.8	6.0	5.9	6.6	7.5	7.8	10.5	10.7
Sub-Saharan Africa	22.0	18.4	18.2	19.0	20.0	21.2	21.5	21.3	22.1	22.3
East Africa	31.4	24.6	23.9	24.8	27.0	26.6	27.1	25.7	25.9	25.9
Central Africa	28.4	23.1	23.8	24.9	25.4	28.3	28.2	28.7	29.7	30.2
Southern Africa	4.7	6.9	8.5	7.5	8.0	9.5	11.2	10.3	11.1	11.4
West Africa	12.7	11.8	11.5	12.1	11.9	14.1	14.1	15.1	16.3	16.5
Asia	13.8	9.4	7.7	6.5	6.6	7.8	8.1	7.9	7.3	6.7
Asia outside India	10.5	7.0	5.4	5.1	4.6	5.1	5.2	5.4	5.3	5.2
Central Asia	13.1	6.5	4.0	3.0	2.7	3.3	3.2	3.0	2.8	2.8
Eastern Asia	6.7	2.7	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Southeast Asia	16.8	11.7	7.9	6.0	5.7	5.8	5.7	5.2	5.2	4.9
South Asia	20.1	15.1	12.9	10.6	11.0	13.6	14.2	13.9	12.2	11.0
Western Asia	10.3	6.1	9.3	10.6	10.6	10.9	11.4	11.9	12.5	12.7
Western Asia and North Africa	8.6	5.9	7.7	8.4	8.4	8.9	9.6	10.0	11.6	11.8
Latin America and the Caribbean	8.5	5.9	5.0	5.7	5.5	6.1	5.9	5.7	5.3	5.1
Caribbean	17.8	14.1	12.7	13.6	13.7	14.8	14.7	17.6	17.4	17.5
Latin America	7.8	5.3	4.5	5.1	4.9	5.5	5.3	4.8	4.5	4.2
Central America	7.3	6.3	6.2	5.8	5.4	5.5	5.3	5.1	5.0	5.0
South America	8.0	4.9	3.8	4.9	4.6	5.5	5.3	4.7	4.2	3.8
Oceania	6.7	7.4	7.1	7.4	7.4	7.0	7.8	7.5	7.7	7.6
North America and Europe	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5

There are also significant disparities within Africa. The highest rates of malnutrition are in sub-Saharan Africa, East Africa and Central Africa, where food insecurity is a structural problem. For example, while the rate of malnutrition in East Africa remained at around 25.9 percent in 2024, it reached 30.2 percent in Central Africa. This shows that the problem of hunger in some regions is closely linked not only to economic factors, but also to environmental, political and institutional factors.

Regional distribution and trends in the number of undernourished people in the world and major regions (2005–2024, million people)

Territory	2005	2010	2015	2018	2019	2020*	2021*	2022*	2023*	2024*
World	788.8	612.7	577.4	564.9	584.1	670.1	697.5	695.2	688.4	673.2
Africa	178.0	170.1	193.7	217.9	233.9	255.2	267.3	272.9	296.2	306.5

North Africa	13.0	11.8	13.5	14.8	15.0	16.8	19.5	20.5	28.1	29.1
Sub-Saharan Africa	165.0	158.3	180.2	203.2	218.9	238.3	247.9	252.4	268.1	277.5
East Africa	93.9	85.1	94.3	106.1	118.7	119.9	125.3	121.9	126.1	129.7
Central Africa	32.9	31.4	38.0	44.0	46.4	53.2	54.7	57.4	61.2	64.3
Southern Africa	2.7	4.1	5.5	5.0	5.4	6.5	7.8	7.3	8.0	8.3
West Africa	35.5	37.7	42.4	48.0	48.4	58.6	60.0	65.7	72.7	75.1
Asia	552.2	397.5	343.0	301.8	306.7	366.2	382.2	375.7	347.2	323.4
Asia outside India	297.9	209.7	169.4	163.6	150.4	167.1	172.5	178.7	177.9	173.5
Central Asia	7.8	4.1	2.8	2.2	2.0	2.5	2.5	2.4	2.3	2.3
Eastern Asia	102.7	43.5	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.
Southeast Asia	95.0	70.6	50.7	40.1	38.2	39.3	38.7	35.8	35.6	33.8
South Asia	325.1	264.9	240.9	206.3	215.7	269.9	285.2	280.4	249.2	226.7
Western Asia	21.6	14.4	24.8	29.6	30.0	31.5	33.3	35.5	38.1	39.3
Western Asia and North Africa	34.6	26.3	38.2	44.3	45.0	48.3	52.8	56.0	66.2	68.3
Latin America and the Caribbean	47.2	35.0	31.2	36.4	35.0	39.8	38.4	37.1	35.1	33.6
Caribbean	7.1	5.9	5.4	5.9	5.9	6.5	6.4	7.8	7.7	7.8
Latin America	40.1	29.1	25.8	30.6	29.1	33.3	32.0	29.3	27.4	25.9
Central America	10.6	9.8	10.4	10.1	9.4	9.6	9.4	9.2	9.1	9.1
South America	29.5	19.3	15.4	20.4	19.7	23.6	22.6	20.1	18.2	16.7
Oceania	2.3	2.8	2.9	3.2	3.2	3.1	3.5	3.4	3.5	3.5
North America and Europe	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.	m.m.e.

In the Asian region, significant positive dynamics were observed during 2005–2024. In 2005, the undernourishment rate in Asia was 13.8 percent, while in 2024 this figure decreased to 6.7 percent. In absolute terms, the number of people suffering from hunger decreased from 552.2 million to 323.4 million people. This decrease is associated with increased agricultural production, technological innovations, poverty reduction programs, expansion of social protection systems, and the formation of food reserves and subsidy systems in some countries. At the same time, the same situation is observed within the Asian region. While the undernourishment rate in East Asia has been recorded at less than 2.5 percent since 2015, in South Asia this figure was 11.0 percent in 2024. This shows that South Asian countries still face challenges such as high population density, income inequality, malnutrition among children and women, rural poverty, and inadequate social infrastructure. In West Asia, the rate is expected to increase from 10.3 percent in 2005 to 12.7 percent in 2024. This indicates that geopolitical instability, import dependence, and high food price volatility are negatively affecting food security in the region. The overall dynamics for Latin America and the Caribbean are relatively positive. In 2005, the malnutrition rate in this region was 8.5 percent, but in 2024 it decreased to 5.1 percent. The number of people suffering from hunger decreased from 47.2 million to 33.6 million people. In particular, the gradual improvement in the level of food security in the region in 2021-2024 is particularly noteworthy. However, even in this region, the Caribbean stands out as a relatively weak link. While in 2024 the malnutrition rate in the Caribbean was 17.5 percent, in Latin America this figure was

around 4.2 percent. This difference is explained by the dependence of small island states on imports, high vulnerability to natural disasters, the cost of food logistics and limited domestic production capabilities.

Innovation and Technological Development. Modern scientific research shows that economic growth alone is not enough to reduce the level of malnutrition in the world. The development of social protection systems is of great importance in order to ensure physical and economic access to food for the poor and vulnerable segments of the population. Therefore, social protection mechanisms are recognized by the UN, FAO, World Food Program (WFP), World Bank and other international organizations as one of the most effective tools in the fight against hunger. Social protection is understood as a system of economic, financial and organizational measures implemented by state and non-state institutions aimed at ensuring the protection of the population from economic and social risks. From the point of view of food security, the main task of this system is to guarantee the minimum level of food consumption for socially vulnerable segments of the population and mitigate the negative consequences of economic crises, natural disasters and other emergencies

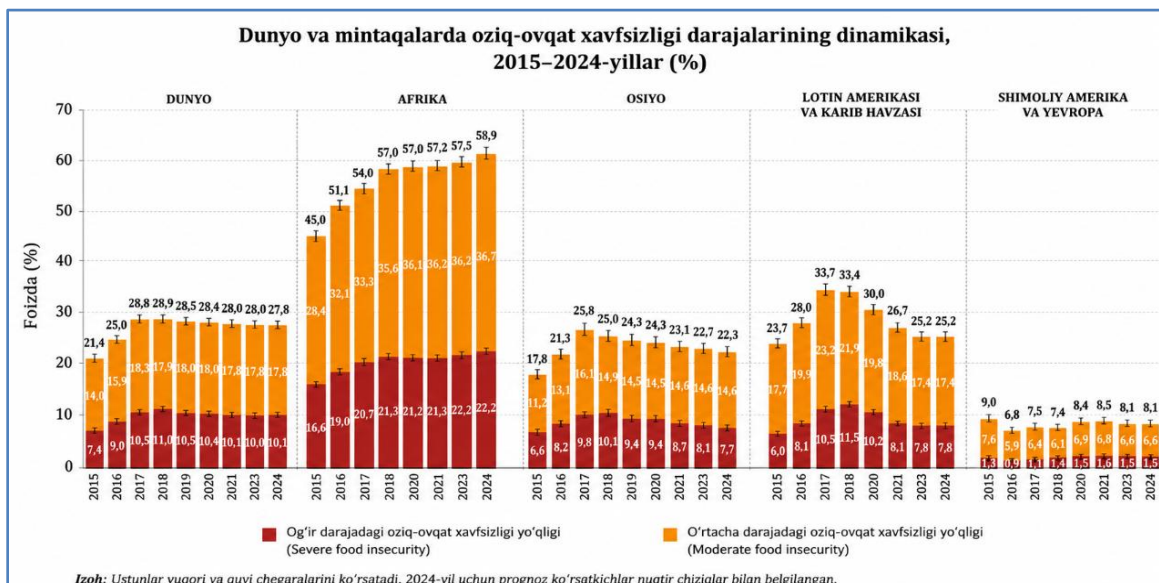
Expanding investment opportunities. In modern international practice, the system of cash transfers and targeted subsidies is one of the most widely used and empirically based mechanisms for reducing malnutrition. The essence of this mechanism is that the state ensures economic access to food for vulnerable groups of the population by providing direct financial assistance or allocating subsidies that reduce the prices of basic food products. A comparative study by Slim et al. (2025) published in the Springer Nature journal *Discover Sustainability* and covering the experience of 12 countries shows that this mechanism acts as the main tool for ensuring food security in low-income and middle-income countries. In high-income countries, the school feeding system performs a fundamentally different function: here the issue is not about hunger, but about forming a culture of healthy eating. In Germany, school feeding programs are implemented in an integrated manner with the Nutri-Score labeling system, which helps children develop healthy eating habits from an early age. Research by the Global Child Nutrition Foundation (2025) shows that the focus of school feeding in high-income countries is undergoing an evolutionary shift from “ending hunger” to “preventing obesity and malnutrition.” Regional analysis based on FAO data shows that while the decline in the level of malnutrition in the world is considered a positive trend at the global level, its territorial distribution remains uneven. The experience of Asia and Latin America shows that the combination of economic growth, agricultural policies, social protection and food market regulation mechanisms plays an important role in reducing hunger. The experience of Africa and some small island developing states confirms that increasing production alone is not enough to ensure food security, but also requires comprehensive measures to increase infrastructure, institutional management, climate-resilient agricultural policies and increasing the purchasing power of the population.

Theoretical foundations of legal and economic regulation of food safety. Food inflation rates varied significantly across countries across income groups between December 2024 and November 2025. Inflationary pressures remained particularly high in low-income countries, with rising food prices significantly reducing the affordability of food for the population in countries such as Zimbabwe, the Palestinian Territories, the Islamic Republic of Iran, and Burundi. This is due to deteriorating food security indicators and an increased risk of hunger in these countries. In the lower-middle-income group, food inflation was relatively moderate. In particular, in Uzbekistan, the 2.4 percent rate in December 2024 rose to 6–7 percent in the summer of 2025, but stabilized by the end of the year. India and Bangladesh have also seen a downward trend in food inflation, demonstrating the effectiveness of their policies to regulate prices and

support food markets. There are also sharp differences in food inflation across upper-middle-income countries. While inflation rates remain high in countries such as Turkey and Argentina, prices have remained relatively stable in China, Thailand, Peru and Ecuador. This suggests that food security is not only linked to income levels, but also to macroeconomic stability, monetary policy and the effectiveness of market institutions. In general, there is a direct relationship between food inflation and food security. High price increases reduce the real value of people's incomes, limit access to food products, and ultimately lead to an increase in food insecurity and malnutrition. Therefore, in the experience of countries around the world, controlling food inflation and ensuring price stability is considered one of the important economic mechanisms for reducing malnutrition. To assess the long-term impact of inflationary processes on global food systems and how hunger and malnutrition indicators will develop in the future, FAO has studied the future trends of change in the world and regions. Forecasts until 2030, developed on the basis of current trends, allow us to assess prospective changes in the field of food security.

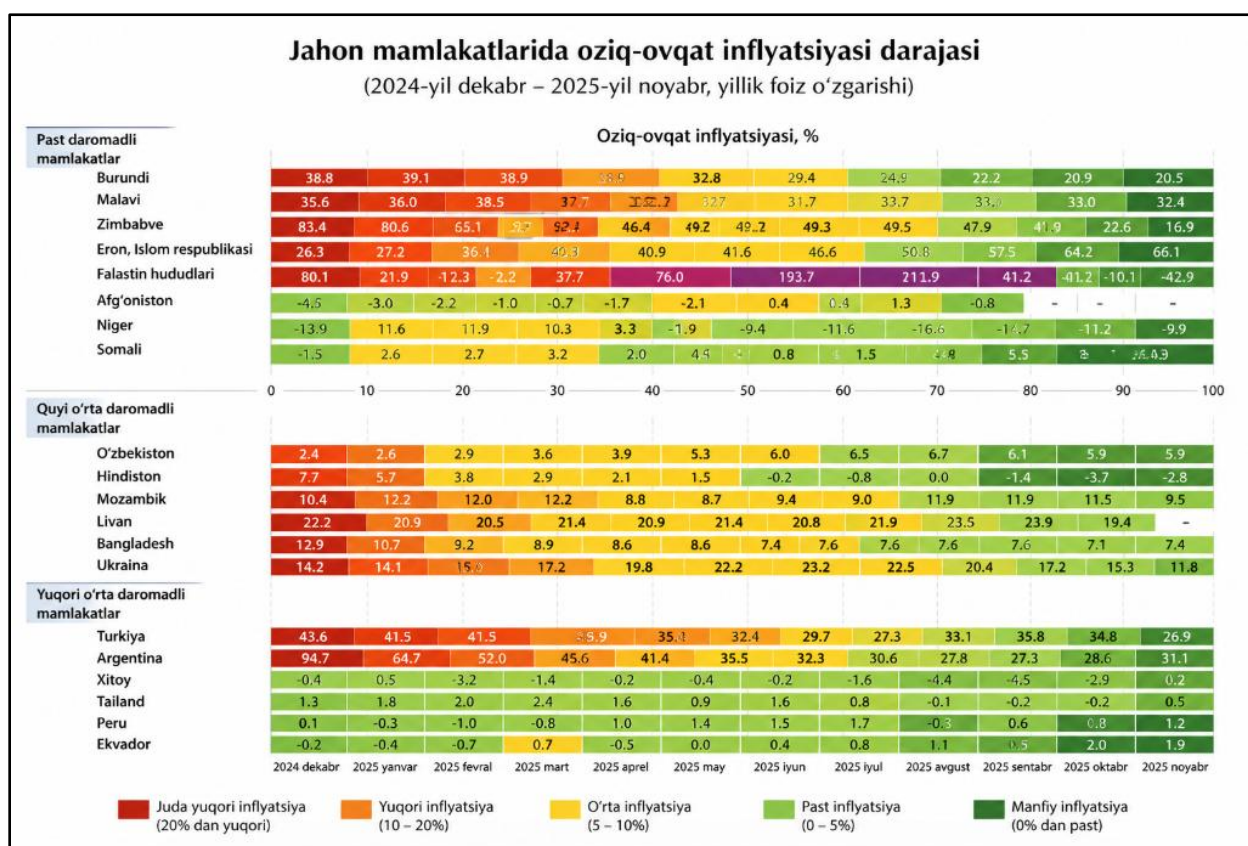
Experience of foreign countries. In general, there is a direct relationship between food inflation and food security. High price increases reduce the real value of people's incomes, limit access to food products, and ultimately lead to an increase in food insecurity and malnutrition. Therefore, in the experience of countries around the world, controlling food inflation and ensuring price stability is considered one of the important economic mechanisms for reducing malnutrition. To assess the long-term impact of inflationary processes on global food systems and how hunger and malnutrition indicators will develop in the future, FAO has studied the future trends of change in the world and regions. Forecasts until 2030, developed on the basis of current trends, allow us to assess prospective changes in the field of food security. The most difficult situation in terms of regions is observed in the African continent. Moderate food insecurity has increased from 45 percent to almost 59 percent, and severe food insecurity from 16.6 percent to 22.2 percent. This indicates that economic and physical access to food is increasingly limited on the continent.

Dynamics of food security levels in the world and countries (2024-2025, percent)



This situation is associated with increasing demographic pressure, low agricultural productivity, political instability, armed conflicts and the negative impact of climate change, and indicates that the problem of food

insecurity is becoming systemic. In the Asian region, although the indicators deteriorated during the pandemic, a gradual recovery has occurred in recent years. The decline in moderate and severe food insecurity is due to the recovery of economic activity in the region, modernization of agriculture, expansion of targeted support programs for the population, and government price stabilization policies. At the same time, significant disparities remain between developed and developing countries within the region. Latin America and the Caribbean have seen the most significant positive progress since 2021. The reduction in the average food insecurity rate is due to the effectiveness of social transfers, school feeding programs, food subsidies, and support mechanisms. The experience of this region confirms the important role of social policies and economic support measures in improving food security. In North America and Europe, the rates remained at the lowest levels throughout the period. In these regions, high levels of economic development, effective social protection systems, developed logistics infrastructure, and stable incomes of the population are considered key factors in ensuring food security. At the same time, the fact that the rates also deteriorated to some extent during the pandemic in these regions also indicates that the impact of global economic shocks on food systems is universal.

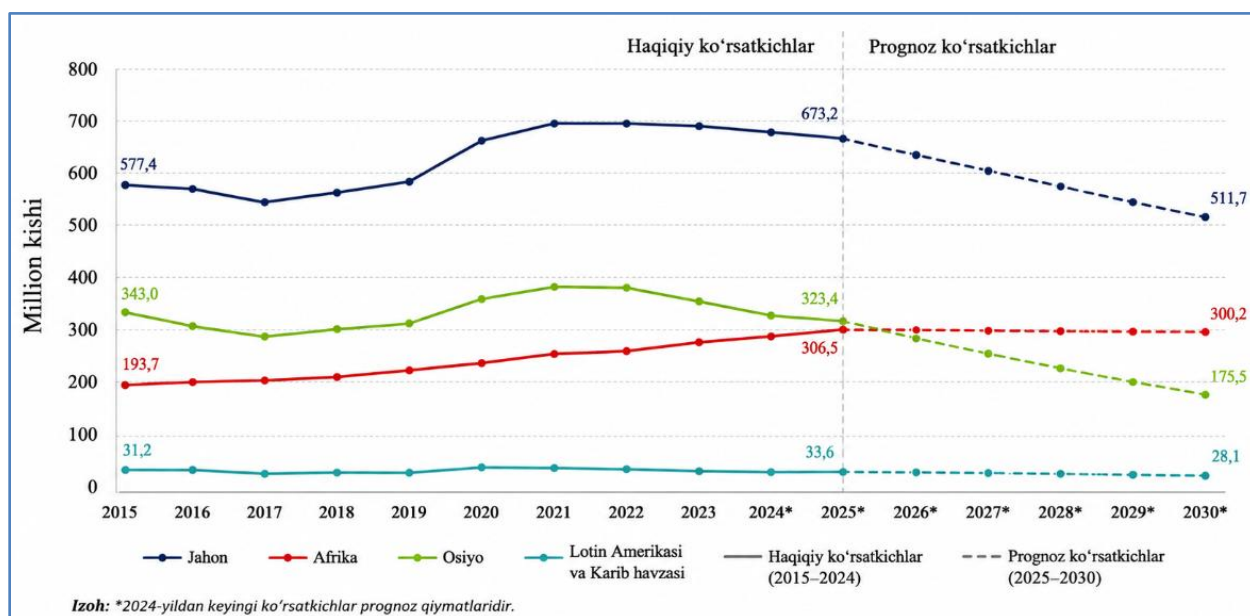


Food inflation rate in world countries (2024-2025, percent)

Food inflation rates varied significantly across countries across income groups between December 2024 and November 2025. Inflationary pressures remained particularly high in low-income countries, with rising food prices in Zimbabwe, the Palestinian Territories, the Islamic Republic of Iran, and Burundi significantly reducing the affordability of food for the population. This is explained by the deterioration in food security indicators and the increased risk of hunger in these countries.

The state of hunger in lower-middle- and upper-income countries. In the group of lower-middle-income countries, food inflation has formed at a relatively moderate level. In particular, in Uzbekistan, the indicator of 2.4 percent in December 2024 increased to 6-7 percent in the summer of 2025, but stabilized by the end of the year. A downward trend in food inflation was also observed in India and Bangladesh, which indicates the effectiveness of these countries' policies to regulate prices and support food markets. There are also sharp differences in food inflation among upper-middle-income countries. While inflation rates remain high in countries such as Turkey and Argentina, prices remain relatively stable in China, Thailand, Peru and Ecuador. This indicates that food security is not only related to income levels, but also to macroeconomic stability, monetary policy and the effectiveness of market institutions. In general, there is a direct relationship between food inflation and food security. High price increases reduce the real value of people's incomes, limit access to food products, and ultimately lead to food insecurity and an increase in malnutrition. Therefore, in the experience of countries around the world, controlling food inflation and ensuring price stability is considered one of the important economic mechanisms for reducing malnutrition. To assess the long-term impact of inflationary processes on global food systems, and to predict how hunger and malnutrition indicators will shape in the future, FAO has studied future trends in global and regional food security. Based on current trends, the projections to 2030 allow us to assess future changes in food security.

Trends in the number of undernourished people in the world and major regions and projections to 2030. (2015–2030, million people)



Although the dynamics of the level of malnutrition in the world in recent years indicate positive developments, medium-term projections developed by FAO confirm that serious risks remain for the global food security system. In particular, despite the fact that the number of people suffering from hunger in 2024 has decreased to 673.2 million people, if current trends continue, it is projected that by 2030 about 512 million people worldwide will remain chronically undernourished. This indicates that it remains difficult to fully achieve the SDG-2 ("Zero Hunger") goal set by the UN. FAO experts note that the relative decrease in hunger indicators at the global level is mainly due to positive developments in South and Southeast Asia and

South America. However, this overall result hides sharp differences by region. While food security is improving in some regions, hunger and malnutrition are increasing in others. The most alarming situation in the projections up to 2030 is in Africa. According to FAO estimates, if current trends do not change, by 2030, Africa will account for about 60 percent of the world's chronically hungry people. This means that this region remains the weakest link in the global food security system. Rapid population growth on the African continent, the high dependence of agricultural production on climate factors, armed conflicts, political instability and infrastructure constraints complicate the process of ensuring food security. In South Asia, despite relatively high economic growth rates, large populations, income disparities, persistent rural poverty, and food price volatility keep hunger risks high. At the same time, food security indicators are expected to improve in Latin America and the Caribbean as a result of social protection programs, targeted assistance mechanisms, and improved agricultural policies. In some parts of Asia, particularly in East and Southeast Asia, agricultural modernization, government subsidies, and strategic food reserves are projected to contribute to hunger reduction. In North America and Europe, malnutrition rates are expected to remain low due to developed institutional environments, high income levels, and effective social protection systems. The results of the forecast show that the geographical center of the hunger problem is increasingly concentrated in Africa and South Asia. This further strengthens the need to differentiate policies aimed at ensuring food security based on regional characteristics, expand social protection programs, support agriculture, stabilize food prices, and develop agrarian policies adapted to climate change. In this regard, the prospects for 2030 demonstrate the issue of increasing the effectiveness of economic, social, and institutional mechanisms aimed at reducing malnutrition in countries around the world as an urgent scientific and practical task.

CONCLUSION

The analysis revealed that the most optimal model for combating hunger for Uzbekistan should consist of five interrelated blocks.

First, it is necessary to strengthen the social protection system. In this regard, it is advisable to identify low-income families on the basis of the "Single Social Registry", expand cash transfers and targeted subsidies. This will increase economic access to food by supporting the incomes of the population.

Second, it is necessary to gradually improve the school feeding system. International experience shows that school feeding programs, along with improving children's health, also form a stable demand for local farms. Therefore, a school feeding system based on local agricultural products will have a multiplicative economic effect.

Third, it is necessary to improve the system of state support for agriculture. In this regard, it is possible to increase domestic food production through farmer subsidies, preferential loans, crop insurance and the introduction of innovative technologies.

Fourth, the development of strategic food reserves and state intervention purchases is important. In the context of global market instability, strategic reserves are one of the main tools for curbing food inflation and ensuring domestic market stability.

Fifth, it is necessary to create a digital monitoring and evaluation system. A monitoring system based on modern information technologies will allow assessing the effectiveness of state programs, controlling the targeted use of funds, and making prompt management decisions.

REFERENCES

- Resolution of the President of the Republic of Uzbekistan dated February 8, 2022 No. PQ-120 "On approval of the Program for the development of the livestock sector and its branches in the Republic of Uzbekistan for 2022-2026".
- Decree of the President of the Republic of Uzbekistan dated September 11, 2023 No. PF-158 "On the Strategy "UZBEKISTAN — 2030".3. United Nations. Transforming our World: The 2030 Agenda for Sustainable Development. New York: United Nations, 2015.
- FAO, IFAD, UNICEF, WFP and WHO. The State of Food Security and Nutrition in the World 2025 (SOFI 2025). Rome: FAO, 2025.
- 4.FAO, IFAD, UNICEF, WFP and WHO. The State of Food Security and Nutrition in the World 2024 (SOFI 2024). Rome: FAO, 2024.
- World Food Programme (WFP). Global Report on Food Crises 2025. Rome, 2025.
- Bleich S.N., Fleischhacker S., et al. Evidence for Policies and Practices to Address Global Food Insecurity. Annual Review of Public Health, 2024.
- FAO, IFAD, UNICEF, WFP and WHO. The State of Food Security and Nutrition in the World 2025. Rome: FAO, 2025.
- FAO. Social Protection and Resilience: Supporting Livelihoods in Protracted Crises and in Fragile and Humanitarian Contexts. Rome, 2024.
- World Food Programme (WFP). Global Report on Food Crises 2025.
- Scopus maqolasi: Assessing Food Insecurity Strategies Across Twelve Countries (2025).
- World Bank. The State of Social Safety Nets 2024. Washington D.C., 2024.
- Slim F., Ibrahim Z., Toufeili I., Haddarah A., Rejeb A. Assessing food insecurity strategies across twelve countries from different income levels: a sustainability and food systems perspective. Discover Sustainability. 2025;6:689. DOI: 10.1007/s43621-025-01525-x
- FAO, IFAD, UNICEF, WFP, WHO. The State of Food Security and Nutrition in the World 2024 (SOFI 2024). Rome: FAO. <https://doi.org/10.4060/cd1254en>
- Headey D., Ruel M. Food inflation and child undernutrition in LMICs. Nature Communications. 2023;14(1). DOI: 10.1038/s41467-023-43162-4
- OECD. Agricultural Policy Monitoring and Evaluation 2024. Paris: OECD Publishing. DOI: 10.1787/74da57ed-en
- Sachs J.D., Fuller G., Lafortune G. Sustainable Development Report 2024. SDG Transformation Center. <https://sdgtransformationcenter.org>
- Frolov K.V., Gordeev A.V., Maslennikova O.A. va boshqalar. Oziq-ovqat xavfsizligi. 2-bo'lim / - M.: Bilim, 2011-101. b.
- Balabanov V.S., Borisenko E.N. Oziq-ovqat xavfsizligi: xalqaro va ichki jihatlar. – M.: Iqtisodiyot, 2012. – B. 22 6.
- Economic security of the state. Textbook. - T.: T.: Academy, 2012. 352 pages..
- Dusmatov B.O. Development of innovative infrastructure in agro-industrial production in the context of modernization of the national economy. avt. ... i.f.d. T.:2022.-53 p.
- Kho'jageldiev Ch.P. Stimulation of increasing the productivity of irrigated agricultural lands. avt. ... i.f.d. T.: 2022.-56 p.
- Topildiev S.R. Improving the mechanism for regulating agrarian relations. - Iqt. fan. doc. ... dis. - T.: «Tipograff» LLC. 2023.-70 p.
- Rustamova I.B. Scientific and methodological foundations of increasing the efficiency of innovative processes in the agricultural sector. avt. ... i.f.d. T.: 2020. - 77 p.
- Aliev Y.E. "Issues of developing the agrarian market in ensuring food security" Electronic scientific journal of finance and banking ii issue. March-April, 2020 198-p

CHAIN-COMPATIBLE INCENTIVE ALLOCATION IN THE TEXTILE INDUSTRY

Nurullayeva Mexribon Muratovna¹

ABSTRACT

This article develops a constrained optimisation model for allocating a limited incentive resource across the sequential links of the textile value chain. The purpose of the study is to replace the volume-based allocation criterion used in current sector programmes with a rule derived from the chain-depth index and from the physical constraint that no downstream link can grow faster than the upstream supply feeding it. The chain-depth index is adopted as the objective function, subject to a resource constraint, a marginal-response function calibrated from panel-data estimates, and a chain-compatibility constraint unique to strictly sequential production. The Karush-Kuhn-Tucker conditions yield a closed-form optimal share proportional to the product of a link's chain position and its marginal response coefficient, raised to a power determined by the elasticity of that response. Applying the model to 2025 baseline data over a five-year horizon shows that the optimal share directed to the weaving-and-finishing link is 57.6 percent, more than four and a half times its 12.7 percent share of current export composition, and that the volume-based rule forgoes 76 percent of the chain-depth gain attainable under the optimal allocation. A self-adjusting feedback rule, together with its stability condition, converts the static optimum into a dynamic mechanism that reallocates the incentive resource automatically as outcomes are observed.

Keywords: Textile Industry, Value Chain, Incentive Allocation, Constrained Optimisation, Chain-Compatibility Constraint, Self-Adjusting Mechanism.

Introduction

Improving the mechanism that governs the economic development of a sector is not the same task as improving each of its instruments one at a time. A mechanism composed of several instruments is judged by how well those instruments are mutually calibrated, not by how many of them exist. Diagnostic work on the textile industry establishes three findings relevant here: the transmission capacity from incentive to outcome is weak, with a deepening-source coefficient of only 0.410; the weaving-and-finishing link behaves as the binding constraint in the chain, contributing no more than 0.035 to structural change; and the current incentive system tends to return the industry to its lower-value links whenever raw-material prices rise. Each of these findings points to a single, more fundamental question: how should a limited incentive resource be divided among the links of a value chain that cannot be treated as independent production units.

The sequential nature of textile production sharpens this question in a way that most other processing industries do not share. Ginning separates fibre from raw cotton, spinning converts fibre into yarn, weaving and knitting convert yarn into fabric, dyeing and finishing give that fabric commercial value, and cutting and sewing shape it into a finished garment. Each link depends physically on the output of the one before it, so that a policy which directs resources to a downstream link without regard to upstream supply risks accelerating demand for an input that cannot yet be delivered. Existing allocation practice does not recognise this constraint: support is currently granted in proportion to a link's export volume, which is precisely the criterion identified elsewhere as the direct source of a persistent conflict between the sector's

¹ Independent Researcher at the Tashkent Institute of Textile and Light Industry

strategic objective and its incentive design.

The purpose of this article is to formalise the allocation problem as a constrained optimisation exercise, to derive from it a closed-form rule for dividing the incentive resource across links, and to convert that static rule into a dynamic, self-correcting mechanism. The argument proceeds in three parts. The existing family of sector-development models is first shown to lack a criterion capable of answering the allocation question directly. A chain-compatible model is then constructed, solved in closed form, and applied to real baseline data over a five-year horizon. Finally, the resulting allocation is compared with current practice, its sensitivity to unobserved parameters is examined, and a feedback rule for keeping the allocation current is derived.

Literature Review

N.Kaldor's proposition that the growth of manufacturing determines the growth of aggregate productivity [1] provides the macro-level justification for treating processing depth as a policy objective, but the proposition does not distinguish which link within a manufacturing chain is responsible for the productivity gain. G.Gereffi's concept of chain position [2] supplies exactly this missing distinction, showing that value accrues unevenly across the stages of a commodity chain, yet Gereffi's framework describes chain position without converting it into an allocation rule that a resource-constrained policymaker could apply.

The mathematical apparatus required to close this gap comes from constrained optimisation theory. W.Karush's characterisation of the conditions for a constrained minimum [3] and H.Kuhn and A.Tucker's independent generalisation of the same result to nonlinear programming [4] together establish the first-order conditions used throughout this article; R.Dorfman, P.Samuelson and R.Solow's treatment of linear and nonlinear programming as tools of production economics [5] demonstrates how such conditions translate into an economically interpretable equal-marginal-productivity rule, the interpretation adopted below for the optimal incentive share.

The stability of a resource-allocation rule that adjusts itself over time, rather than being fixed once and re-examined only occasionally, rests on the classical analysis of adjustment processes in economic systems developed by K.Arrow and L.Hurwicz [6], whose stability condition for a linearised adjustment process is adapted below to the specific feedback rule proposed for reallocating the incentive resource across chain links.

A comparative reading of the sector-development literature identifies four families of model that could, in principle, guide incentive allocation in the textile industry: conventional sector programmes built around output and export targets, cluster models built around raw-material continuity, value-chain-oriented models built around chain position, and institutional models built around the quality of the regulatory environment. Their comparative properties are summarised in Table 1.

Table 1 : Comparative properties of existing sector-development mechanism models

Model type	Objective function	Allocation criterion	Feedback
Conventional sector programme	Output and export volume	Proportional to volume	None
Cluster model	Continuity of raw-material supply	By cluster composition	Indirect

Model type	Objective function	Allocation criterion	Feedback
Value-chain-oriented model	Chain position	Not formalised	None
Institutional model	Quality of the institutional environment	By institutional criteria	Qualitative only
Proposed chain-compatible model	Chain-depth index, D(S)	Chain position × marginal response	Formal, self-adjusting

Source: author's synthesis based on the literature reviewed.

The table shows that three of the four existing families define their objective in terms of volume, which is precisely the criterion that fails to distinguish which link of the chain is generating growth. The value-chain-oriented family introduces chain position as a concept but does not formalise it as an allocation criterion, and none of the four families contains a feedback channel capable of correcting the allocation as outcomes are observed. Consequently, the existing literature supplies the objective (Kaldor), the missing criterion in conceptual form (Gereffi), and the mathematical apparatus for deriving a formal criterion (Karush; Kuhn and Tucker; Dorfman, Samuelson and Solow) and for stabilising its dynamic use (Arrow and Hurwicz), but no prior work combines these elements into a single, chain-compatible allocation rule. This article supplies that combination.

Methods

The proposed model is organised in four layers, shown in Figure 1: a control loop that compares the target chain-depth index with its observed value and generates a deviation signal; an allocation node that splits the incentive resource across chain links; the technological chain itself, running from ginning through spinning, weaving and finishing, to cutting and sewing; and an output-and-feedback layer that reports export volume, value added, and the chain-depth index back to the control loop.

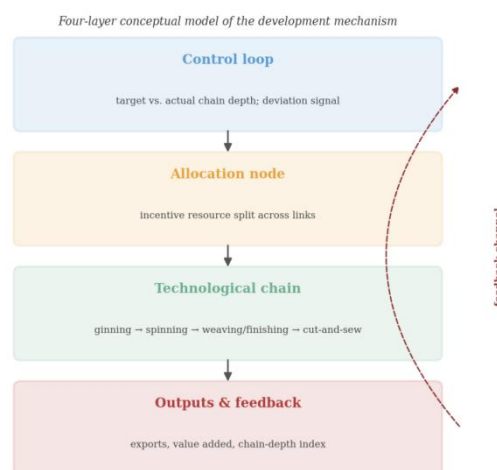


Figure 1. Four-layer conceptual model of the incentive-allocation mechanism

Source: author's elaboration.

The objective function is the chain-depth index established as the sector's development criterion in earlier stages of this research programme, written as a function of the allocation vector S :

$$\max D(S) = \sum_{k=2}^L \frac{l_k}{L} \cdot w_k(S) \quad (1)$$

where l_k denotes the ordinal position of link k in the chain, L the total number of links, and $w_k(S)$ the export share of link k under allocation S . The allocation is subject to three groups of constraint. The first is a resource constraint requiring the shares to sum to unity while remaining above a minimum floor $S_{\min}$, since no link can be left entirely without support without risking its exit from the chain. The second is a marginal-response function describing how a link's export growth responds to the incentive share it receives:

$$g_k(S_k) = \Lambda_k \cdot S_k^\alpha, \quad 0 < \alpha < 1 \quad (2)$$

where Λ_k is the marginal response coefficient of link k and α is the elasticity of that response with respect to the incentive share, restricted to the unit interval because doubling the incentive resource directed to a link does not double its output. The third and most distinctive constraint captures the physical sequencing of textile production: a downstream link cannot grow faster than the upstream supply that feeds it, plus whatever capacity buffer that upstream link happens to hold:

$$g_k \leq g_{k-1} + c_k, \quad k = 3, 4 \quad (3)$$

where c_k is the capacity buffer of the upstream link. This constraint has no counterpart in industries with parallel rather than sequential production paths, and it is this constraint that gives the model its chain-compatible character.

The constrained problem is solved using a Lagrangian, and for links whose chain-compatibility constraint is not binding, the Karush-Kuhn-Tucker conditions yield the equality that the weighted marginal product of the incentive resource must be equal across such links. This condition is the chain-position-weighted analogue of the classical equal-marginal-productivity rule, and it resolves into the closed-form optimal share:

$$S_k^* = \frac{(\frac{l_k}{L} \Lambda_k)^\sigma}{\sum_{j=2}^L (\frac{l_j}{L} \Lambda_j)^\sigma}, \quad \sigma = \frac{1}{1-\alpha} \quad (4)$$

The exponent σ is not a free parameter: it is fixed by the elasticity of the marginal-response function, so that a flatter response (α close to zero) flattens the resulting allocation toward equal shares, while a sharper response (α close to one) concentrates the allocation on the link with the highest chain-position-weighted marginal coefficient. The marginal response coefficients Λ_k were derived from the marginal effect estimated in an earlier panel-data model of this research programme, calibrated at 0.0916 for spinning, 0.1404 for weaving and finishing, and 0.1915 for cutting and sewing, with the elasticity α set at 0.5 on the ground that doubling the incentive resource directed to a link does not double its export growth, and the minimum floor $S_{\min}$ set at 0.10 so that no link is left without support.

To keep the allocation current as conditions change, a self-adjusting rule updates each link's share according to the gap between its contribution to the objective and the average contribution across links:

$$S_k(t+1) = S_k(t) \cdot (1 + \kappa \cdot (\delta_k(t) - \bar{\delta}(t))) \quad (5)$$

where κ is the speed of adjustment and $\delta_k(t)$ is link k 's contribution to the chain-depth objective at time t . The stability of this rule, once linearised, requires:

$$|1 - \kappa h| < 1, \quad h = \frac{1}{n} \sum_{k=2}^L \Lambda_k \cdot \alpha \cdot S_k^{\alpha-1} \quad (6)$$

The optimisation was solved over a five-year horizon (2026-2031) using 2025 baseline values as the starting point: incentive shares of 0.335, 0.127 and 0.538 for spinning, weaving-and-finishing and cutting-and-sewing respectively, a chain-depth index of 0.602, and an export volume of 2,782.2 million dollars. The capacity buffer was set at 0.06 for the weaving-and-finishing link and 0.02 for the cutting-and-sewing link, reflecting the more limited scope for rapid capacity expansion in dyeing and finishing documented elsewhere in this research programme.

Results

The comparative outcome of four allocation variants — volume-based (current practice), equal allocation, the unconstrained analytical optimum, and the chain-compatible optimum — is summarised in Table 2.

Table 2 : Comparative outcomes of four incentive-allocation variants, 2031

Allocation variant	S1 (spin.)	S2 (weave)	S3 (sew)	d (2031)
Volume-based (actual policy)	0.335	0.127	0.538	0.6189
Equal allocation	0.333	0.333	0.333	0.6466
Analytical optimum (unconstrained)	0.042	0.222	0.735	0.6644
Chain-compatible optimum	0.100	0.576	0.324	0.6739

Source: author's calculations.

The chain-compatible optimum directs 57.6 percent of the incentive resource to the weaving-and-finishing link, whose share of current export composition is only 12.7 percent — a ratio of more than four and a half to one. This finding runs counter to the volume-based intuition that support should track export size, and it arises directly from the chain-compatibility constraint: the unconstrained analytical optimum would

instead direct 73.5 percent of the resource to cutting-and-sewing, the link with the highest marginal response, but doing so would push demand for fabric beyond what the weaving-and-finishing link can supply, so the constraint redirects the resource upstream to open that bottleneck first. The comparison between the actual and optimal allocations is shown in Figure 2.

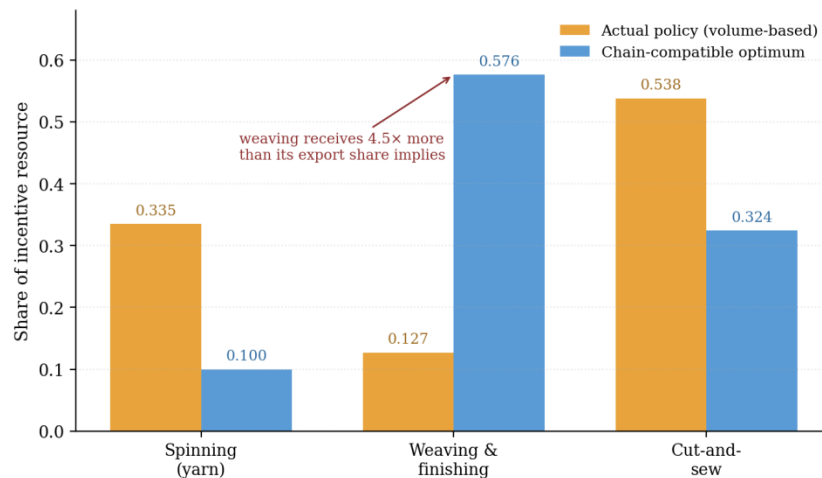


Figure 2. Actual (volume-based) versus chain-compatible optimal incentive allocation

Source: author's calculations.

The chain-depth index attained under the volume-based rule reaches only 0.6189 by 2031, against 0.6739 under the chain-compatible optimum, a gap of 0.0550 index points. Measured against the improvement available from the 2025 baseline of 0.602, the volume-based rule captures only 24.0 percent of the attainable gain and forgoes the remaining 76.0 percent; in export terms, this corresponds to a shortfall of 369.0 million dollars by 2031.

The robustness of the optimal allocation to two parameters that were not directly estimated — the response elasticity α and the capacity buffer c — was examined through sensitivity analysis, shown in Figure 3.

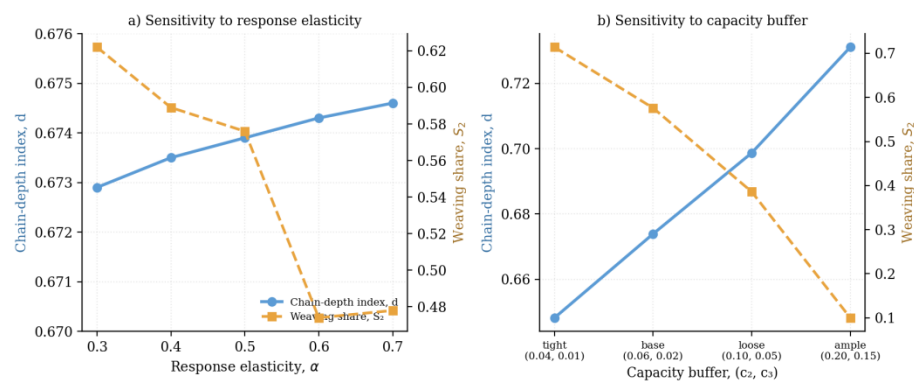


Figure 3. Sensitivity of the optimal allocation to the response elasticity and the capacity buffer

Source: author's calculations.

Panel (a) shows that varying the response elasticity across a wide plausible range, from 0.30 to 0.70, moves the chain-depth index by less than 0.002 index points, from 0.6729 to 0.6746; the weaving-and-finishing link retains the largest share throughout, never falling below 0.474. The main result is therefore not an artefact of the particular elasticity value chosen. Panel (b) shows the opposite pattern for the capacity buffer: as the buffer available to the weaving-and-finishing and cutting-and-sewing links widens, the optimal share shifts from weaving-and-finishing toward cutting-and-sewing, falling to 0.10 once the buffer reaches 0.20 and 0.15 — the point at which the bottleneck has effectively been removed and no further resource needs to be spent opening it. This second pattern confirms that the chain-compatibility constraint, not the response elasticity, is what drives the model's central finding.

The dynamic behaviour of the self-adjusting rule, applied from the 2025 baseline over the five-year horizon, is shown in Figure 4.

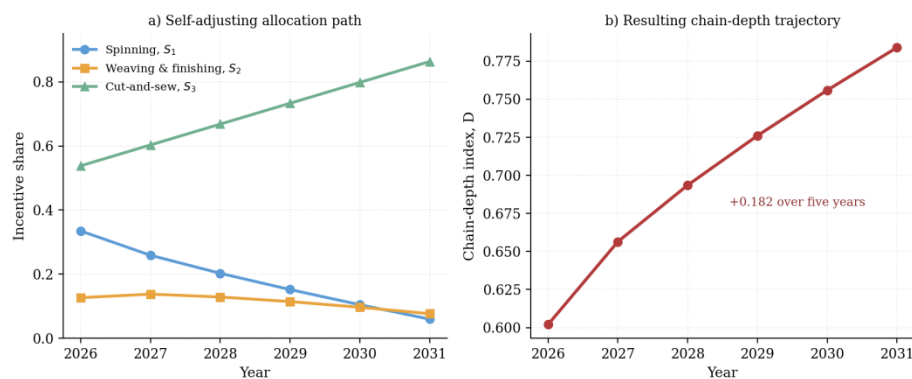


Figure 4. Trajectory of the self-adjusting allocation and the resulting chain-depth index, 2026-2031

Source: author's calculations.

Under the feedback rule, the spinning link's share falls from 0.335 to 0.060 as the chain-depth gap it can close narrows, while the cutting-and-sewing link's share rises from 0.538 to 0.863 as it increasingly captures the productivity gains generated upstream. The chain-depth index rises correspondingly from 0.602 to 0.784, a gain of 0.182 index points over five years achieved without any single re-optimisation, purely through the repeated application of the feedback rule. At the computed optimum, the stability parameter h equals 0.1352, so that the stability condition requires the adjustment-speed parameter κ to remain below 14.796; the value $\kappa = 0.8$ adopted for the annual policy cycle satisfies this condition with a wide margin.

Discussion

The result that the weaving-and-finishing link should receive the largest share of the incentive resource, despite its modest current export weight, extends N.Kaldor's growth-of-manufacturing proposition [1] by identifying which link within the manufacturing chain the growth-generating capacity actually resides in. It also gives G.Gereffi's chain-position concept [2] a first closed-form allocation rule: chain position enters the optimal-share formula multiplicatively with the marginal response coefficient, so that a link's claim on the incentive resource depends jointly on where it sits in the chain and on how responsive its output is, not on either factor alone.

The chain-compatibility constraint is the article's central theoretical contribution and has no direct

analogue in the constrained-optimisation literature applied to production economics by R.Dorfman, P.Samuelson and R.Solow [5], whose treatment of linear and nonlinear programming assumes that resources can be redirected toward whichever activity has the highest marginal return. In a strictly sequential chain this assumption fails, because a downstream activity's return depends on an upstream activity's throughput; the KKT conditions applied here [3; 4] therefore bind not only the resource constraint but also the upstream-supply constraint, and it is precisely this second binding constraint that redirects more than half the incentive resource away from the highest-marginal-response link and toward the link that, left unsupported, would have throttled the whole chain.

The stability of the dynamic reallocation rule follows K.Arrow and L.Hurwicz's classical treatment of adjustment-process stability [6]: because the estimated stability parameter h is small relative to the admissible range for the adjustment speed κ , the mechanism tolerates a wide margin of administrative error in how quickly incentive shares are revised, which is important in practice since sector-support instruments are typically reviewed on an annual rather than continuous basis.

In practical terms, the finding that current policy forgoes 76 percent of the attainable chain-depth gain implies that the shortfall is not primarily a matter of insufficient resources but of their misdirection. Reallocating the same incentive budget according to the chain-compatible rule, rather than increasing that budget, is sufficient to close most of the gap between the 2025 baseline and the chain-depth target implicit in national sector programmes. The sensitivity analysis further implies that policy attention should focus on relaxing the weaving-and-finishing capacity buffer specifically, since widening that buffer is what eventually allows the optimal allocation to shift toward the cutting-and-sewing link without violating the chain-compatibility constraint.

The model's limitations should be stated directly. The response elasticity was not estimated directly but assumed on theoretical grounds, although the sensitivity analysis shows the main result is not sensitive to this assumption within a wide plausible range. The capacity buffer parameters require confirmation from industry-association data rather than the aggregate estimate used here. Finally, the model determines how much incentive resource each link should receive but not the specific instrument mix within a link, a question addressed separately in this research programme.

Conclusion

This article has shown that the allocation of a limited incentive resource across a sequential value chain can be formalised as a constrained optimisation problem in which the chain-depth index is maximised subject to a resource constraint, a marginal-response function, and a chain-compatibility constraint unique to strictly sequential production. The Karush-Kuhn-Tucker conditions yield a closed-form optimal share proportional to the product of chain position and marginal response, raised to a power fixed by the elasticity of that response rather than chosen arbitrarily.

Applied to the textile industry, the chain-compatible optimum directs the largest share of the incentive resource to the weaving-and-finishing link, more than four and a half times its current export-composition share, because that link constitutes the binding bottleneck in the chain. Volume-based allocation, the criterion used in current sector programmes, is shown to forgo 76 percent of the attainable chain-depth gain, and this result is robust to a wide range of the response elasticity while remaining sensitive, as economic intuition suggests it should, to the capacity buffer available at the constraining link. A self-adjusting feedback rule, together with its analytically verified stability condition, converts the static optimum into a mechanism

that reallocates the incentive resource automatically as chain depth is observed to rise or fall.

From a policy standpoint, the analysis supports redesigning sector-support instruments around chain position and marginal response rather than export or output volume, and prioritising the relaxation of the weaving-and-finishing capacity buffer as the most direct route to a higher chain-depth index. Future research should estimate the response elasticity directly from firm-level data and extend the chain-compatibility constraint to other strictly sequential processing industries.

References

- Kaldor N. *Causes of the Slow Rate of Economic Growth of the United Kingdom*. — Cambridge: Cambridge University Press, 1966. — P. 3–14.
- Gereffi G. *International Trade and Industrial Upgrading in the Apparel Commodity Chain* // *Journal of International Economics*. — 1999. — Vol. 48, No. 1. — P. 37–70.
- Karush W. *Minima of Functions of Several Variables with Inequalities as Side Conditions*. — Chicago: University of Chicago, 1939.
- Kuhn H.W., Tucker A.W. *Nonlinear Programming* // *Proceedings of the Second Berkeley Symposium on Mathematical Statistics and Probability*. — Berkeley: University of California Press, 1951. — P. 481–492.
- Dorfman R., Samuelson P.A., Solow R.M. *Linear Programming and Economic Analysis*. — New York: McGraw-Hill, 1958. — 525 p.
- Arrow K.J., Hurwicz L. *On the Stability of the Competitive Equilibrium, I* // *Econometrica*. — 1958. — Vol. 26, No. 4. — P. 522–552.
- Decree of the President of the Republic of Uzbekistan No. PF-2, 10 January 2023. *On Measures to Support the Activity of Cotton-Textile Clusters and Fundamentally Reform the Textile and Garment Industry*. — Tashkent, 2023.
- Decree of the President of the Republic of Uzbekistan No. PF-6, 16 January 2025. *On Additional Measures to Develop the Processing Chain in the Textile and Garment Industry*. — Tashkent, 2025. — URL: <https://lex.uz/docs/-7330228>.
- Statistics Agency under the President of the Republic of Uzbekistan. *Official data on textile industry output and trade*. — Tashkent, 2025–2026. — URL: <https://stat.uz>.

**Good managers
don't fire. They
hire and inspire.**

Michael Scott

Information to Authors :

The paper should be typed in MS-Word.

- Title of the paper should be followed by Name, e-mail and affiliation of author(s).
- Use a single column layout with both left and right margins justified.
- Font Main Body text 10 point Style Arial or Times New Roman
- **Tables and Figures :** To the extent possible, tables and figures should appear in document near after where they are referred in the text. Avoid the use of small type in tables. In no case should tables or figures be in a separate document or file.
- An abstract of not more than 200 words is required.
- The paper should start with an introduction and with a Conclusion summarizing the findings of the paper.
- **References :** It is the author's obligation to provide complete references with the necessary information. References should appear to the text and the User of all references must be placed at the end of the manuscript.
- Papers are accepted for publication on the stand that these contain original unpublished work not submitted for publication anywhere else.
- Facts of papers presented / submitted in a conference / seminar must be clearly mentioned at the bottom of the first page of the manuscript and the author should specify with whom the any right rests.
- Papers are processed through a blind referral system of experts in the subject areas. To answer anonymity the writer's name, designation and other details should appear on the first page alongwith title of the paper and should not be repeated anywhere else.

All manuscripts should be in electronic form and sent to :

The Editor
Journal of Management Value & Ethics
Gwalior Management Academy (GMA) Publications
C-17, Kailash Nagar, Near New High Court,
Gwalior (M.P.) – INDIA – 474 006
Tel. : 0751-2230233 Mob. 09425121133
E-mail : jmveindia@yahoo.com
Website : www.jmveindia.com

- Payment to be made by Net Banking directly in the account of Gwalior Management Academy, Gwalior (M.P.)



GWALIOR MANAGEMENT ACADEMY

Run by: Lt. Muhar Singh Sengar Memorial Shiksha vikas Samitee

MEMBERSHIP FORM

Name :

Sex : Male / Female

Date of birth (MM/DD/YYYY).....

Address :

Phone.....Occupation.....

Email ID.....

Type of membership: **Life member / working member / student member**
(please tick any one).

I wish to be a part of the GMA and promise to work for promoting research activities in the interest of “**Journal of Management Value & Ethics**”, so please enroll my name as working /life member. I am enclosing a cross cheque in favour of **Gwalior Management Academy** payable at Gwalior.

(Signature of member)

Mode of Payment through NIFT or Cheque will be accepted.

MEMBERSHIP FEES

Student Members: Rs. 1000 P.A.
members: Rs. 5000 (one time)
Institutional member : Rs. 2000 P.A.
Working Members: Rs. 2000 P.A.
Life

Please send your duly filled membership forms/donations to :
C-17 Kailash Nagar Near, New High Court, Gwalior (M.P.) INDIA. Pin: - 474006

E-Mail to: jmveindia@yahoo.com, www.jmveindia.com
Phone: +91-0751-2230233, 9425121133