



## IQTISODIYOT & TARAQQIYOT

*Ijtimoiy, iqtisodiy, texnologik, ilmiy, ommabop jurnal*

**2026-YIL**  
**IYUN/6-SON, I-QISM**



ISSN: 2992-8982

<https://yashil-iqtisodiyot-taraqqiyot.uz/>





## IQTISODIYOT & TARAQQIYOT

*Ijtimoiy, iqtisodiy, texnologik, ilmiy, ommabop jurnal*

### Bosh muharrir:

**Sharipov Kongiratbay Avezimbetovich**

*Elektron nashr. 2026-yil, may.*

### Bosh muharrir o'rinbosari:

**Karimov Norboy G'aniyevich**

### Muharrir:

**Qurbonov Sherzod Ismatillayevich**

### Tahrir hay'ati:

**Salimov Oqil Umrzoqovich**, O'zbekiston Fanlar akademiyasi akademigi  
**Abduraxmanov Kalandar Xodjayevich**, O'zbekiston Fanlar akademiyasi akademigi  
**Sharipov Kongiratbay Avezimbetovich**, texnika fanlari doktori (DSc), professor  
**Rae Kvon Chung**, Janubiy Koreya, TDIU faxriy professori, "Nobel" mukofoti laureati  
**Osman Mesten**, Turkiya parlamenti a'zosi, Turkiya – O'zbekiston do'stlik jamiyati rahbari  
**Axmedov Durbek Kudratillayevich**, iqtisodiyot fanlari doktori (DSc), professor  
**Axmedov Sayfullo Normatovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Abduraxmanova Gulnora Kalandarovna**, iqtisodiyot fanlari doktori (DSc), professor  
**Kalonov Muxiddin Baxritdinovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Siddiqova Sadoqat G'afforovna**, pedagogika fanlari bo'yicha falsafa doktori (PhD)  
**Xudoyqulov Sadirdin Karimovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Maxmudov Nosir**, iqtisodiyot fanlari doktori (DSc), professor  
**Yuldashev Mutallib Ibragimovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Samadov Asqarjon Nishonovich**, iqtisodiyot fanlari nomzodi, professor  
**Slizovskiy Dimitriy Yegorovich**, texnika fanlari doktori (DSc), professor  
**Mustafakulov Sherzod Igamberdiyevich**, iqtisodiyot fanlari doktori (DSc), professor  
**Axmedov Ikrom Akramovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Eshtayev Alisher Abdug'aniyevich**, iqtisodiyot fanlari doktori (DSc), professor  
**Xajiyev Baxtiyor Dushaboyevich**, iqtisodiyot fanlari doktori (DSc), professor  
**Hakimov Nazar Hakimovich**, falsafa fanlari doktori (DSc), professor  
**Musayeva Shoiraz Azimovna**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), professor  
**Ali Konak (Ali Ko'nak)**, iqtisodiyot fanlari doktori (DSc), professor (Turkiya)  
**Cham Tat Huei**, falsafa fanlari doktori (PhD), professor (Malayziya)  
**Foziljonov Ibrohimjon Sotvoldixo'ja o'g'li**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), dots.  
**Faxridinov Zafarjon Faxridin o'g'li**, O'zb. Res. Bosh prokuraturasi HIJQKD boshqarma boshlig'i  
**Utayev Uktam Choriyevich**, Anijon viloyati prokurorining o'rinbosari  
**Ochilov Farkhod**, O'zb. Res. Bosh prokuraturasi IJQK Departamentining Namangan viloyati boshqarmasi boshlig'i  
**Buzrukxonov Sarvarxon Munavvarxonovich**, iqtisodiyot fanlari nomzodi, dotsent  
**Axmedov Javohir Jamolovich**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD)  
**Toxirov Jaloliddin Ochil o'g'li**, texnika fanlari bo'yicha falsafa doktori (PhD), katta o'qituvchi  
**Bobobekov Ergash Abdumalikovich**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), v.b. dots.  
**Djudi Smetana**, pedagogika fanlari nomzodi, dotsent (AQSH)  
**Krissi Lyuis**, pedagogika fanlari nomzodi, dotsent (AQSH)  
**Glazova Marina Viktorovna**, Iqtisodiyot fanlari doktori (Moskva)  
**Nosirova Nargiza Jamoliddin qizi**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), dotsent  
**Sevil Piriyeva Karaman**, falsafa fanlari doktori (PhD) (Turkiya)  
**Mirzaliyev Sanjar Makhamatjon o'g'li**, TDIU ITI departamenti rahbari  
**Ochilov Bobur Baxtiyor o'g'li**, TDIU katta o'qituvchisi  
**Golisheva Yelena Vyacheslavovna**, Iqtisodiyot fanlari nomzodi, dotsent.  
**Abdukarimova Dinara Rustamxonovna**, bank-moliya akademiyasi professori, DSc., professor.  
**Ikramov Murod Akramovich**, iqtisodiyot fanlari doktori (DSc), professor  
**Nazarova Ra'no Rustamovna**, iqtisodiyot fanlari doktori (DSc), professor



## IQTISODIYOT & TARAQQIYOT

*Ijtimoiy, iqtisodiy, texnologik, ilmiy, ommabop jurnal*

### Editorial board:

**Salimov Okil Umrzokovich**, Academician of the Academy of Sciences of Uzbekistan  
**Abdurakhmanov Kalandar Khodjavevich**, Academician of the Academy of Sciences of Uzbekistan  
**Sharipov Kongiratbay Avezimbetovich**, Doctor of Technical Sciences (DSc), Professor  
**Rae Kwon Chung**, South Korea, Honorary Professor at TSUE, Nobel Prize Laureate  
**Osman Mesten**, Member of the Turkish Parliament, Head of the Turkey–Uzbekistan Friendship Society  
**Akhmedov Durbek Kudratillayevich**, Doctor of Economic Sciences (DSc), Professor  
**Akhmedov Sayfullo Normatovich**, Doctor of Economic Sciences (DSc), Professor  
**Abdurakhmanova Gulnora Kalandarovna**, Doctor of Economic Sciences (DSc), Professor  
**Kalonov Mukhiddin Bakhridinovich**, Doctor of Economic Sciences (DSc), Professor  
**Siddikova Sadokat Gafforovna**, Doctor of Philosophy (PhD) in Pedagogical Sciences  
**Khudoykulov Sadirdin Karimovich**, Doctor of Economic Sciences (DSc), Professor  
**Makhmudov Nosir**, Doctor of Economic Sciences (DSc), Professor  
**Yuldashev Mutallib Ibragimovich**, Doctor of Economic Sciences (DSc), Professor  
**Samadov Askarjon Nishonovich**, Candidate of Economic Sciences, Professor  
**Slizovskiy Dmitriy Yegorovich**, Doctor of Technical Sciences (DSc), Professor  
**Mustafakulov Sherzod Igamberdiyevich**, Doctor of Economic Sciences (DSc), Professor  
**Akhmedov Ikrom Akramovich**, Doctor of Economic Sciences (DSc), Professor  
**Eshtayev Alisher Abduganiyevich**, Doctor of Economic Sciences (DSc), Professor  
**Khajiyev Bakhtiyor Dushaboyevich**, Doctor of Economic Sciences (DSc), Professor  
**Khakimov Nazar Khakimovich**, Doctor of Philosophy (DSc), Professor  
**Musayeva Shoira Azimovna**, Doctor of Philosophy (PhD) in Economic Sciences, Professor  
**Ali Konak**, Doctor of Economic Sciences (DSc), Professor (Turkey)  
**Cham Tat Huei**, Doctor of Philosophy (PhD), Professor (Malaysia)  
**Foziljonov Ibrokhimjon Sotvoldikhoja ugli**, Doctor of Philosophy (PhD) in Economic Sciences, Associate Professor  
**Fakhridinov Zafarjon Fakhridin ogli**, Head of the DCEC under the Prosecutor General's Office of the Rep. of Uzb.  
**Utayev Uktam Choriyevich**, Deputy Prosecutor of Anijan Region  
**Ochilov Farkhod**, Head of the Namangan Regional Department of the Department of Internal Affairs of Rep. of Uzb.  
**Buzrukkhonov Sarvarkhon Munavvarkhonovich**, Candidate of Economic Sciences, Associate Professor  
**Akhmedov Javokhir Jamolovich**, Doctor of Philosophy (PhD) in Economic Sciences  
**Tokhirov Jaloliddin Ochil ugli**, Doctor of Philosophy (PhD) in Technical Sciences, Senior Lecturer  
**Bobobekov Ergash Abdumalikovich**, Doctor of Philosophy (PhD) in Economic Sciences, Acting Associate Professor  
**Judi Smetana**, Candidate of Pedagogical Sciences, Associate Professor (USA)  
**Chrissy Lewis**, Candidate of Pedagogical Sciences, Associate Professor (USA)  
**Glazova Marina Victorovna**, Doctor of Sciences in Economics (Moscow)  
**Nosirova Nargiza Jamoliddin kizi**, Doctor of Philosophy (PhD) in Economic Sciences, Associate Professor  
**Sevil Piriyeva Karaman**, Doctor of Philosophy (PhD) (Turkey)  
**Mirzaliyev Sanjar Makhamatjon ugli**, Head of the Department of Scientific Research and Innovations, TSUE  
**Ochilov Bobur Bakhtiyor ugli**, Senior lecturer at TSUI  
**Golisheva Yelena Vyacheslavovna**, Candidate of Economic Sciences, Associate Professor.  
**Abdukarimova Dinara Rustamkhanovna**, Doctor of Economic Sciences (DSc), Professor  
**Ikramov Murod Akramovich**, Doctor of Economic Sciences (DSc), Professor  
**Nazarova Ra'no Rustamovna**, Doctor of Economic Sciences (DSc), Professor

### Ekspertlar kengashi:

**Berkinov Bazarbay**, iqtisodiyot fanlari doktori (DSc), professor  
**Po'latov Baxtiyor Alimovich**, texnika fanlari doktori (DSc), professor  
**Aliyev Bekdavlat Aliyevich**, falsafa fanlari doktori (DSc), professor  
**Isakov Janabay Yakubbayevich**, iqtisodiyot fanlari doktori (DSc), professor  
**Xalikov Suyun Ravshanovich**, iqtisodiyot fanlari nomzodi, dotsent  
**Rustamov Ilhomiddin**, iqtisodiyot fanlari nomzodi, dotsent  
**Hakimov Ziyodulla Ahmadovich**, iqtisodiyot fanlari doktori, dotsent  
**Kamilova Iroda Xusniddinovna**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD)  
**G'afurov Doniyor Orifovich**, pedagogika fanlari bo'yicha falsafa doktori (PhD)  
**Fayziyev Oybek Raximovich**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), dotsent  
**Tuxtabayev Jamshid Sharafetdinovich**, iqtisodiyot fanlari bo'yicha falsafa doktori (PhD), dotsent  
**Xamidova Faridaxon Abdulkarim qizi**, iqtisodiyot fanlari doktori, dotsent  
**Yaxshiboyeva Laylo Abdisattorovna**, katta o'qituvchi  
**Babayeva Zuhra Yuldashevna**, mustaqil tadqiqotchi  
**Komilova Nilufar Karshiboyevna**, Geografiya fanlari doktori, professori  
**Umirzoqov Ja'sur Artiqboy o'g'li**, iqtisodiyot fanlari doktori (DSc), dotsent  
**Zebo Kuldasheva**, iqtisodiyot fanlari doktori (DSc), dotsent

### Board of Experts:

**Berkinov Bazarbay**, Doctor of Economic Sciences (DSc), Professor  
**Pulatov Bakhtiyor Alimovich**, Doctor of Technical Sciences (DSc), Professor  
**Aliyev Bekdavlat Aliyevich**, Doctor of Philosophy (DSc), Professor  
**Isakov Janabay Yakubbayevich**, Doctor of Economic Sciences (DSc), Professor  
**Khalikov Suyun Ravshanovich**, Candidate of Economic Sciences, Associate Professor  
**Rustamov Ilhomiddin**, Candidate of Economic Sciences, Associate Professor  
**Khakimov Ziyodulla Akhmadovich**, Doctor of Economic Sciences, Associate Professor  
**Kamilova Iroda Xusniddinovna**, Doctor of Philosophy (PhD) in Economics  
**Gafurov Doniyor Orifovich**, Doctor of Philosophy (PhD) in Pedagogy  
**Fayziyev Oybek Raximovich**, Doctor of Philosophy (PhD) in Economics, Associate Professor  
**Tukhtabayev Jamshid Sharafetdinovich**, Doctor of Philosophy (PhD) in Economics, Associate Professor  
**Khamidova Faridaxon Abdulkarimovna**, Doctor of Economic Sciences, Associate Professor  
**Yakhshiboyeva Laylo Abdisattorovna**, Senior Lecturer  
**Babayeva Zuhra Yuldashevna**, Independent Researcher  
**Komilova Nilufar Karshiboyevna**, Doctor of Geographical Sciences, Professor  
**Umirzokov Jasur Artiqboy ugli**, Doctor of Economic Sciences (DSc), Associate Professor  
**Zebo Kuldasheva**, Doctor of Economic Sciences (DSc), Associate Professor

- 08.00.01 Iqtisodiyot nazariyasi
- 08.00.02 Makroiqtisodiyot
- 08.00.03 Sanoat iqtisodiyoti
- 08.00.04 Qishloq xo'jaligi iqtisodiyoti
- 08.00.05 Xizmat ko'rsatish tarmoqlari iqtisodiyoti
- 08.00.06 Ekonometrika va statistika
- 08.00.07 Moliya, pul muomalasi va kredit
- 08.00.08 Buxgalteriya hisobi, iqtisodiy tahlil va audit
- 08.00.09 Jahon iqtisodiyoti
- 08.00.10 Demografiya. Mehnat iqtisodiyoti
- 08.00.11 Marketing
- 08.00.12 Mintaqaviy iqtisodiyot
- 08.00.13 Menejment
- 08.00.14 Iqtisodiyotda axborot tizimlari va texnologiyalari
- 08.00.15 Tadbirkorlik va kichik biznes iqtisodiyoti
- 08.00.16 Raqamli iqtisodiyot va xalqaro raqamli integratsiya
- 08.00.17 Turizm va mehmonxona faoliyati

**Muassis:** "Ma'rifat-print-media" MChJ

**Hamkorlarimiz:** Toshkent davlat iqtisodiyot universiteti,  
O'zbekiston Respublikasi Bosh prokuraturasi huzuridagi Iqtisodiy  
jinoyatlarga qarshi kurashish departamenti

### Jurnalning ilmiyligi:

“Yashil” iqtisodiyot va  
taraqqiyot” jurnali

O'zbekiston Respublikasi  
Oliy ta'lim, fan va innovatsiyalar  
vazirligi huzuridagi Oliy  
attestatsiya komissiyasi  
rayosatining  
2023-yil 1-apreldagi  
336/3-sonli qarori bilan  
ro'yxatdan o'tkazilgan.



# MUNDARIJA

|  |    |
|--|----|
| O'ZBEKISTON MOLIYA TIZIMINING ZAMONAVIY HOLATI VA UNING BARQARORLIK KO'RSATKICHLARI .....  | 18 |
| <b>Nazarov G'ayrat Xayrullayevich</b>  |    |
| YUKLARNI TASHISHDA ZARURIY TRANSPORT XUJJATLARI.....   | 22 |
| <b>Ne'matov Husniddin Alijon o'g'li</b>  |    |
| SURXONDARYO VILOYATI HUDUDLARINING MOLIYAVIY BARQARORLIGINI OSHIRISHDA MOLIYAVIY IMTIYOZ VA PREFERENSIYALARNI SAMARALI QO'LLASH YO'NALISHLARI.....                               | 27 |
| <b>Otamurodova Dildora Abdukrimovna</b>  |    |
| GLOBAL BEQARORLIK SHAROITIDA MILLIY IQTISODIYOTNING RAQOBATBARDOSHLIGINI OSHIRISH MODELLARI .....  | 32 |
| <b>Saidnazarova Odinabonu Saidolim qizi</b>  |    |
| СОВРЕМЕННЫЕ ТЕНДЕНЦИИ ИССЛЕДОВАНИЙ В ОБЛАСТИ УЧЕТА И АУДИТА ФИНАНСОВЫХ ИНСТРУМЕНТОВ.....   | 37 |
| <b>Пулатова Мадина Бейсеновна</b>  |    |
| <b>Табаев Азамат Зарипбаевич</b>   |    |
| MAJBURIYATMI YOKI MAJBURIY RISK? MOLIYAVIY MAJBURIYATLAR KONSEPTUAL ASOSLARINING IQTISODIY TABIATI VA ZAMONAVIY TALQINLARI.....  | 42 |
| <b>Palvanov Xusniddin Bekimmatovich</b>  |    |
| ПРИНЦИПЫ И МЕТОДЫ УЧЕТА ФИНАНСОВЫХ РЕЗУЛЬТАТОВ В СИСТЕМЕ КОРПОРАТИВНОГО УПРАВЛЕНИЯ.....  | 47 |
| <b>Пу Кебин</b>  |    |
| TRANSPORT XIZMATLARI SIFATINI BARQARORLIK NUQTAYI NAZARIDAN O'RGANISH METODOLOGIYASI.....  | 51 |
| <b>Xodjaniyazov Elbek Sardorovich</b>  |    |
| VILOYAT SANOAT KORXONALARINING INNOVATSION RIVOJLANISHIGA TA'SIR ETUVCHI KO'P OMILLI EMPIRIK MODELLAR ASOSIDA TAHLIL QILISH VA PROGNOZLASH (Qashqadaryo viloyati misolida) ..... | 57 |
| <b>Avazova Nafisa Namazovna</b>  |    |
| SANOAT KORXONALARI SHOVQINI VA ATMOSFERA CHIQINDILARINING TURAR-JOY HUDUDLARI EKOLOGIYASIGA TA'SIRINI KAMAYTIRISH CHORALARI .....  | 61 |
| <b>Saparova Shohida Abduvaliyevna</b>  |    |
| SANOAT SHOVQINI VA ATMOSFERA IFLOSLANISHINING SHAHAR TURAR JOY HUDUDLARI VA EKOLOGIYASIGA TASIRINI O'RGANISH.....  | 65 |
| <b>Shaxyusupova Nilufar Erkin qizi</b>   |    |
| BARQAROR SHAHAR RIVOJLANISHIDA SANOAT OQOVA SUVLARINI BIOLOGIK TOZALASH TEXNOLOGIYALARINING ROLI.....  | 69 |
| <b>Tursunova Aziza Asrorovna</b>   |    |
| SHAHAR EKOLOGIK MUHITIGA SANOAT KORXONALARINING TA'SIRINI BAHOLASH.....  | 75 |
| <b>Imomnazarov Farrux Saibjabbor o'g'li</b>  |    |
| O'ZBEKISTONDA AYOLLAR TADBIRKORLIGI: RIVOJLANISH TENDENSIYALARI VA IQTISODIY KO'RSATKICHLAR TAHLILI.....   | 78 |
| <b>Xusanova Zulfiya Raxmatullayevna</b>  |    |
| KORXONALARDA INVESTITSIYA SAMARADORLIGINI OSHIRISHDA INNOVATSION BOSHQARUV MEKANIZMLARINI TAKOMILLASHTIRISH.....   | 87 |
| <b>No'monjonova Muazzam Mahbubjon qizi</b>   |    |
| SOLIQ TIZIMIDA SOLIQ RISKINI BAHOLASH USLUBIYOTI TAKOMILLASHTIRISH MASALALARI.....   | 93 |
| <b>Nasimov Ravshanjon Azimovich</b>  |    |



MUNDARIJA SOÐERЖAHИE CONTENTS

KICHIK VA O'RTA BIZNES SUBYEKTLARINI RAQAMLASHTIRISHNING  
IQTISODIY SAMARADORLIGI ..... 100  
**Kazakova Zulayho Salaxiddinovna**  
THE IMPACT OF DIGITAL LITERACY ON LABOR PRODUCTIVITY IN UZBEKISTAN'S  
SERVICE SECTOR: A REGRESSION ANALYSIS..... 106  
**Ismoilov Elyorjon Makhamadali Ugli**  
**Urinov Bobur Nasilloevich**



# THE IMPACT OF DIGITAL LITERACY ON LABOR PRODUCTIVITY IN UZBEKISTAN'S SERVICE SECTOR: A REGRESSION ANALYSIS

Ismoilov Elyorjon Makhamadali Ugli  
Tashkent State University of Economics  
Management Faculty  
Student of Group MNP-28/23i  
Email: ismailovan082@gmail.com

Urinov Bobur Nasilloevich  
Head of Innovative Management Department  
Tashkent State University of Economics

**Abstract.** This study investigates the impact of digital literacy on labor productivity in Uzbekistan's service sector during 2017–2024. Using balanced panel data from four service industries, a Fixed Effects regression model was employed. The results reveal a structural wage elasticity of 3.55, indicating that employment expansion is concentrated in sectors actively utilizing digital technologies. Based on the findings, the study recommends targeted modernization and improvement of enterprises to transform surplus labor into highly productive employment opportunities.

**Keywords:** labor productivity, digital literacy, fixed effects model, service sector, average wages, information and communication technologies, digitalization, Uzbekistan, employment, regression analysis, empirical analysis, industry analysis, elasticity.

**Annotatsiya.** Ushbu tadqiqotda 2017–2024-yillar davomida O'zbekiston xizmatlar sohasida raqamli savodxonlikning mehnat unumdorligiga ta'siri o'rganilgan. Tahlil jarayonida xizmatlar sektorining 4 ta tarmog'i bo'yicha muvozanatlashgan panel ma'lumotlardan foydalanilib, qat'iy ta'sirlar (Fixed Effects) regressiya modeli qo'llanilgan. Olingan natijalar 3,55 ga teng bo'lgan tarkibiy ish haqi elastikligi mavjudligini ko'rsatdi. Ushbu holat raqamli texnologiyalardan faol foydalanadigan tarmoqlarda bandlikning kengayishi bilan izohlanadi. Tadqiqot natijalariga ko'ra, korxonalarni maqsadli modernizatsiya qilish va takomillashtirish orqali ortiqcha ishchi kuchini yuqori unumdor bandlikka yo'naltirish tavsiya etiladi.

**Kalit so'zlar:** mehnat unumdorligi, raqamli savodxonlik, qat'iy ta'sirlar modeli, xizmatlar sohasi, o'rtacha ish haqi, axborot-kommunikatsiya texnologiyalari, raqamlashtirish, O'zbekiston, bandlik, regressiya tahlili, empirik tahlil, tarmoq tahlili, elastiklik.

**Аннотация.** В данном исследовании рассматривается влияние цифровой грамотности на производительность труда в сфере услуг Узбекистана за 2017–2024 годы. Для анализа использованы сбалансированные панельные данные по 4 отраслям сферы услуг и применена регрессионная модель с фиксированными эффектами (Fixed Effects). Полученные результаты показали наличие структурной эластичности заработной платы на уровне 3,55. Данный результат связан с расширением занятости в отраслях, активно использующих цифровые технологии. На основе проведенного анализа рекомендуется целевая модернизация и совершенствование предприятий для трансформации избыточной рабочей силы в высокопроизводительную занятость.

**Ключевые слова:** производительность труда, цифровая грамотность, модель фиксированных эффектов, сфера услуг, средняя заработная плата, информационно-коммуникационные технологии, цифровизация, Узбекистан, занятость, регрессионный анализ, эмпирический анализ, отраслевой анализ, эластичность.



## INTRODUCTION

The rapid transition towards a digital economy has become a crucial catalyst of modern economic growth, which cannot occur without workforce transformation and structural modernization, taking Uzbekistan as a prominent example [1]. As various digital technologies are penetrating deeper into the national industry, the fundamental understanding of operational effectiveness is undergoing dramatic transformation. Such systemic shifts require a highly qualified workforce that possesses advanced professional expertise in digital literacy. The development of such digital competencies, first of all, starts with modernization, followed by the digital transformation of the educational environment. This lays a foundation for the future development of human capital [2].

In Uzbekistan, the government bodies are aiming at targeted national strategies. They are focused on multifaceted digitalization, which can significantly raise living standards as well as overall labor productivity. Such achievements can be possible if informal economic activities are reduced, fostering the proliferation of technology-based employment arrangements [1]. Yet, the precise causal impact of a digitally skilled workforce in the context of a dynamically expanding service sector requires meticulous assessment, even though the macroeconomic imperatives of the digital landscape are already accepted. Therefore, this study uses regression analysis to examine how the digital literacy of the workforce affects the average wages in the service sectors in Uzbekistan.

## LITERATURE REVIEW

The theoretical foundation connecting digital literacy with labor productivity is deeply rooted in conventional theories of human capital, which state that the targeted acquisition of new skills improves a worker's marginal productivity, further increasing the opportunity to earn more income [6]. In the modern digital age, this concept is often explained through skill-biased technological change. This paradigm suggests that the integration of cutting-edge information technologies disproportionately increases wage premiums for workers who possess digital literacy while simultaneously reducing routine tasks [7, 8]. In the service industry, which is intrinsically characterized by high information saturation, empirical literature systematically demonstrates that digital competencies play a crucial role in operational effectiveness, reducing costs and improving organizational performance [9].

In countries with transition economies, the macroeconomic benefits of digital literacy are closely connected with structural modernization and the formalization of the labor market. Pioneering empirical studies in developing nations indicate that the systemic integration of Information and Communication Technologies leads to substantial productivity gains as well as network externalities, especially in skill-intensive subsectors such as logistics, finance, and telecommunications [10, 11]. However, the true scale of such productivity growth is constrained by institutional bottlenecks, inadequate training programs, and regional disparities in digital infrastructure, which can inadvertently increase the national "digital divide" [12].

Even after extensive global research on Skill-Biased Technological Change (SBTC), significant empirical gaps remain regarding the quantitative estimation of sectoral wage elasticity in the context of digital transition in Central Asian economies. Most existing local research is primarily conceptual or descriptive in nature rather than econometric in orientation [13]. Therefore, this study focuses on addressing this structural gap by conducting a comprehensive panel regression analysis to identify the marginal impact of employment expansion across conventional and technologically driven sectors in Uzbekistan.

## RESEARCH METHODOLOGY

This study utilizes quantitative panel data analysis to examine the empirical elasticity of labor productivity in relation to employment in the service sector in Uzbekistan. For this reason, a balanced dataset, which encompasses observations from 2017–2024, was created. This includes information about four distinct sectors: Accommodation and Food, Wholesale and Retail, Information and Communication, and Finance and Insurance [3].

Taking into account the macroeconomic scale, the average nominal salary indicator was used as a metric for marginal labor productivity, while the baseline shortcomings in digital expertise were defined using survey data at the company level [4]. To isolate the influence of workforce expansion while controlling for time-invariant factors, a Least Squares Dummy Variable (LSDV) fixed-effects regression model was estimated using a Log-Log transformation [5]. After the detection of structural heteroskedasticity, which was found using the Breusch–Pagan test, heteroskedasticity-consistent (HC1) robust standard errors were used for all parameters in order to ensure valid statistical inference.

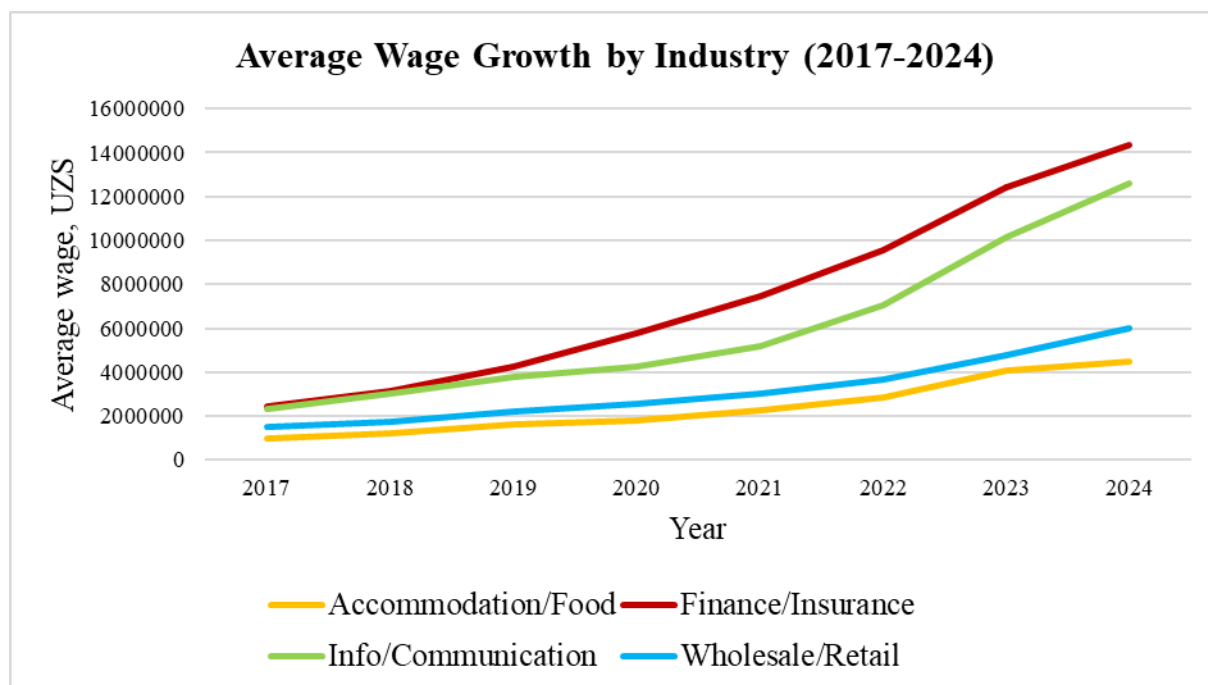
## ANALYSIS AND RESULTS

## Exploratory Statistics and Dynamics by Sector

In order to investigate the impact of digital literacy and technological integration on labor productivity, this study uses balanced panel data encompassing four distinct sectors in Uzbekistan from 2017–2024 (N = 32) [3]. There are certain constraints related to analyzing individual digital literacy at the macroeconomic level. Therefore, this econometric analysis assumes that the average level of wages can serve as a reliable metric for marginal labor productivity according to neoclassical economic principles. In addition, sectors such as Finance and Insurance, along with Information and Communication, play an important role in reflecting the demand for digital literacy, which mirrors the rapidly developing fintech and digital economy environment of Uzbekistan.

Initial calculations revealed substantial differences in wages that can be explained by the integration of technologies. Looking at the eight-year period, the highest growth in average wages (484.7%) was observed in the Finance and Insurance sector, followed by the Information and Communication sector (441.9%) [3]. In contrast, traditional sectors such as Accommodation and Food and Wholesale and Retail demonstrated comparatively lower rates of productivity (wage) growth, with the former reaching 362.7% and the latter 295.6%, respectively [3]. According to the World Bank Enterprise Survey (2019), 16.7% of regional companies reported critical bottlenecks associated with an insufficiently educated workforce [4], emphasizing the need for specialized digital skills that can enhance labor productivity in Uzbekistan's developing economy (Graph 1).

Graph 1. Average wage growth by 4 fields in Uzbekistan.



Based on **Graph 1**, the dynamics of average labor wages over time clearly illustrate this distinction. The rapid growth of the Finance and Insurance sector after 2020 corresponds with the accelerated digitalization of Uzbekistan's financial ecosystem, which has expanded access to financial services. This serves as a prime example of the macroeconomic benefits made possible through digital literacy.

## Digital Literacy

Before estimating the regression parameters, a correlation matrix was constructed in order to examine the fundamental linear relationships between the variables. The results showed a strong positive correlation between time (Year) and the Natural Logarithm of Average Wages ( $r = 0.76$ ), providing evidence of the continuous long-term growth of wages in the service sector.

Interestingly, the Natural Logarithm of Wages and the Natural Logarithm of Employment exhibited a negative correlation ( $r = -0.44$ ). Nevertheless, this unadjusted indicator is heavily distorted by sectoral heterogeneity. In the Wholesale and Retail sector, a large number of individuals are employed at relatively lower average wages compared to the highly specialized workforce in sectors such as Finance and Information Technology, where the share of digitally literate employees is considerably higher [3] (Graph 2).



Graph 2. Correlation matrix of numerical variables.

|                         |      |                         |          |              |          |
|-------------------------|------|-------------------------|----------|--------------|----------|
| Year                    | 1,00 | 0,03                    | 0,70     | 0,05         | 0,76     |
| Employed_Count_Thousand | 0,03 | 1,00                    | -0,33    | 0,94         | -0,30    |
| Avg_Wage                | 0,70 | -0,33                   | 1,00     | -0,43        | 0,94     |
| log_Employed            | 0,05 | 0,94                    | -0,43    | 1,00         | -0,44    |
| log_Wage                | 0,76 | -0,30                   | 0,94     | -0,44        | 1,00     |
|                         | Year | Employed_Count_Thousand | Avg_Wage | log_Employed | log_Wage |

Based on **Graph 2**, the correlation heatmap highlights the need to **take** into account sector-specific fixed effects. If **sectoral** differences are neglected, this can lead to omitted variable bias, further hiding the true marginal impact of labor expansion in the context of productivity in **the digital landscape**.

#### Regression Findings

For a rigorous quantitative estimation of **labor productivity** in relation to employment volume, a panel data fixed-effects model was utilized, **namely the** Least Squares Dummy Variable (LSDV) model. This model is represented as:

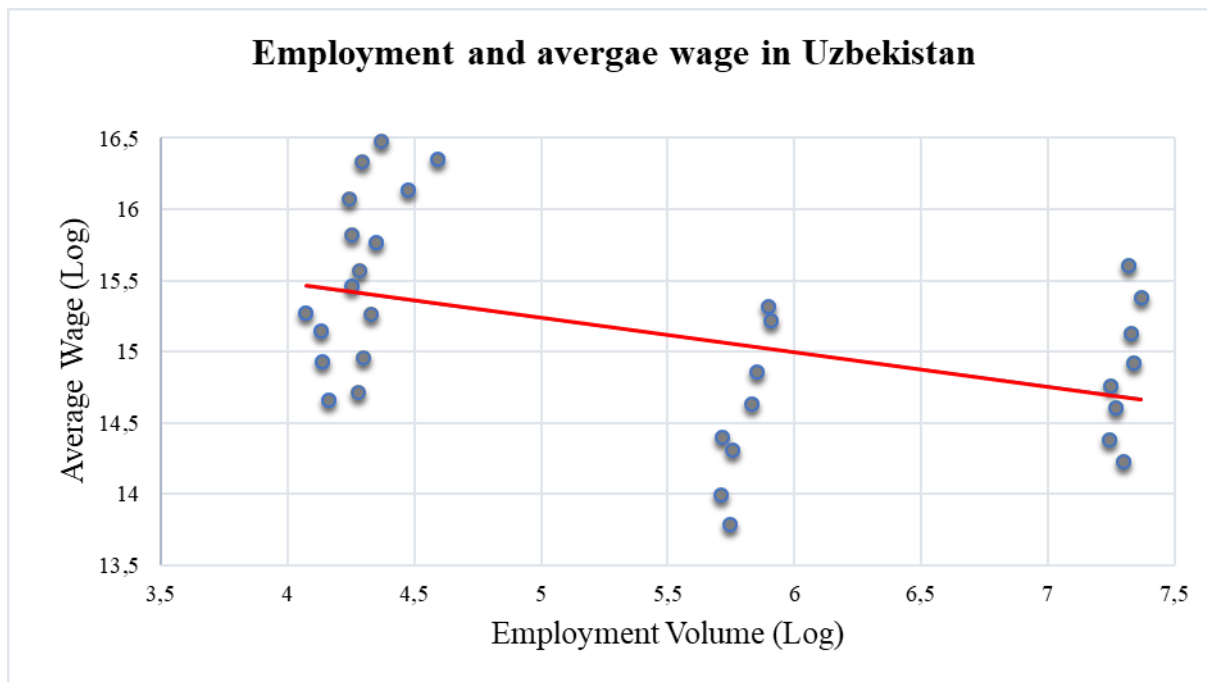
$$\ln(Wage_{it}) = \beta_0 + \beta_1 \ln(Employed_{it}) + \sum_{j=1}^{k-1} \gamma_j Industry_{jit} + \epsilon_{it}$$

Starting from  $\ln(Wage_{it})$ , this variable represents the natural logarithm of the average wage, where  $i$  denotes an industry and  $t$  denotes a year.  $\ln(Employed_{it})$ , on the other hand, represents the scale of employment. In addition, the model includes a dummy variable that captures unobserved time-invariant industry-specific effects. Finally,  $\epsilon_{it}$  represents the stochastic error term.

According to the results of the Ordinary Least Squares (OLS) estimation,  $R^2 = 0.6635$  (with adjusted  $R^2 = 0.6136$ ), indicating that approximately 66.4% of the variation in labor productivity can be explained by sector classification and employment scale. In addition, the overall F-statistic is highly significant, with  $F = 13.31$  and  $p < 0.001$ .

The main variable of interest is the estimated elasticity of average wages with respect to employment. The calculated coefficient  $\beta_1 = 3.5467$  indicates the presence of structural elasticity, as both variables are expressed in logarithmic form. In other words, a 1% increase in employment volume is associated with an approximately 3.55% increase in average wages, holding industry-specific effects constant (Graph 3).

Graph 3. Regression analysis.



Based on Graph 3, there is a scatterplot with its corresponding regression line, which graphically demonstrates the above-mentioned points. The positive slope within industry clusters indicates that, in certain fields in Uzbekistan, the increase in the number of workers can be explained by the increase in wage levels. This directly reflects underlying productivity growth. This is true evidence of the tendency toward structural shift and formalization toward higher-value, technology-driven activities.

#### 4.4 Econometric Diagnostics

To make sure that the statistical findings are correct, several diagnostic tests were used. First of all, the Breusch–Pagan test for heteroscedasticity gave a Lagrange Multiplier statistic of 10.55 ( $p = 0.032$ ). The presence of heteroscedasticity is confirmed, as the null hypothesis was rejected, which means that the error variance is not constant across all observations. Subsequently, Heteroscedasticity-Consistent (HC1) robust standard errors were applied to all output statistics. Even after applying these adjustments, the main metric remains highly significant, with robust  $p < 0.001$ , consequently generating a robust F-statistic with  $p = 2.41 \times 10^{-9}$ .

Moreover, in order to test for multicollinearity, the Variance Inflation Factor (VIF) was utilized. It is significantly high for  $\text{Ln}(\text{Employed})$ , at 163.5, with industry dummies having  $\text{VIF} \approx 45\text{--}46$ . Although it indicates substantial multicollinearity between employment scale and industry structure, for this particular dataset it is a mathematically expected artifact. Across all four analyzed industries, there are different initial employment scales. For example, while IT employs 72,000 workers, Wholesale accounts for nearly 1.48 million individuals [3]. Due to structural multicollinearity, fixed-effects estimation remains unbiased; however, it requires meticulous interpretation of the standard errors.

The empirical findings provide evidence that Uzbekistan's labor market dynamics are changing and that the concept of a "digital premium" is evident. Even though there is a robust positive statistical connection ( $\beta_1 = 3.5467$ ), it should be interpreted as elasticity within a small balanced group rather than as a general policy indicator.

According to the wage comparison between sectors, workers in traditional sectors earn comparatively lower wages. However, in Information and Communication, as well as Finance and Insurance, individuals earn relatively higher wages, which can be related to higher labor productivity in these sectors. In developing economies like Uzbekistan, with increasing digital economy initiatives, expanding the share of the population possessing digital literacy will be of paramount importance. Employment expansion in these fields, in the short term, will not cause diminishing marginal returns; rather, the positive elasticity implies network effects, which means increasing returns as the digital landscape expands. Consequently, policy initiatives should focus on addressing excessive employment in less productive sectors and facilitating the



movement of labor from traditional fields to highly productive sectors closely connected with the digital economy [4].

## CONCLUSION AND RECOMMENDATIONS

This study, through empirical calculations, proves the importance of developing human capital in the context of technological change. Especially within the context of Uzbekistan's emerging technologies, the Skill-Biased Technological Change (SBTC) framework gains considerable importance. The panel regression with fixed effects shows structural elasticity ( $\beta = 3.55$ ), which means that the expansion of the labor force in technology-driven sectors yields substantial wage premiums compared to traditional fields. There is an obvious increase in demand for digital technologies, as a sharp discrepancy exists between traditional and technology-driven sectors, which plays a crucial role as a modern catalyst of macroeconomic development.

Based on the empirical findings, the following recommendations are proposed to further optimize national policy:

Specialized professionals were identified as a critical need during international business diagnostics. Therefore, governmental as well as private educational institutions should systematically integrate modern data analytics and information technology competencies into higher education curricula.

Strategic Infrastructure Development: Government bodies should promote the large-scale integration of digital technologies into sectors that remain labor-intensive yet relatively inefficient, such as Retail and Hospitality. Overcoming digital constraints can facilitate the formalization of employment relationships, generate positive network externalities, and ensure sustainable long-term economic growth across the entire sector.

Targeted Enterprise Modernization: Financial institutions should encourage micro, small, and medium-sized enterprises (MSMEs), particularly in adopting cloud computing solutions and digital transaction systems. Such measures can contribute to the effective transformation of labor surplus into highly productive, knowledge-intensive forms of employment.

## REFERENCES

- [1] M. M. Muminovna and U. A. Narmanov, "Ensuring Economic Growth through the Development of Digital Technologies in Uzbekistan," *Indonesian Journal of Innovation and Applied Sciences*, vol. 1, no. 1, pp. 77–81, 2021.
- [2] A. Muhamad, M. K. N. A. Aziz, and Y. A. Abdurakhmonovich, "Model for Economical Digital Smart Classes in Indonesian Islamic Primary Schools (Madrasah Ibtidaiyah) in the 21st Century," *Child Education Journal*, vol. 5, no. 1, pp. 11–23, 2023.
- [3] Stat.uz, "National Statistics Committee of the Republic of Uzbekistan," 2024. [Online]. Available: <https://stat.uz/en/>. [Accessed: 31 May 2026].
- [4] The World Bank, *Enterprise Surveys: What Businesses Experience – Uzbekistan 2019 Country Profile*. Washington, DC: The World Bank Group, 2019.
- [5] J. M. Wooldridge, *Introductory Econometrics: A Modern Approach*, 6th ed. Cengage Learning, 2015.
- [6] G. S. Becker, *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. New York: Columbia University Press, 1964.
- [7] D. H. Autor, F. Levy, and R. J. Murnane, "The Skill Content of Recent Technological Change: An Empirical Exploration," *The Quarterly Journal of Economics*, vol. 118, no. 4, pp. 1279–1333, 2003.
- [8] D. Acemoglu and P. Restrepo, "The Race Between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment," *American Economic Review*, vol. 108, no. 6, pp. 1488–1542, 2018.
- [9] D. W. Jorgenson and K. M. Vu, "The ICT Revolution, World Economic Growth, and Policy Issues," *Telecommunications Policy*, vol. 40, no. 5, pp. 383–397, 2016.
- [10] H. Galperin and M. F. Viacens, "Connected for Growth? The Impact of Broadband Logistics on Internet Use and Economy-Wide Productivity in Latin America," *Telecommunications Policy*, vol. 41, no. 4, pp. 254–268, 2017.
- [11] T. Niebel, "ICT and Economic Growth in Developing, Emerging and Developed Countries," *International Journal of Forecasting*, vol. 34, no. 4, pp. 1372–1392, 2018.
- [12] The World Bank, *World Development Report 2016: Digital Dividends*, 2016. [Online]. Available: <https://www.worldbank.org/en/publication/wdr2016>. [Accessed: 30 May 2026].
- [13] M. M. Mirzakarimova and U. A. Narmanov, "Ensuring Economic Growth through the Development of Digital Technologies in Uzbekistan," *Indonesian Journal of Innovation and Applied Sciences (IJIAS)*, vol. 1, no. 1, pp. 77–81, 2021.



## IQTISODIYOT & TARAQQIYOT

*Ijtimoiy, iqtisodiy, texnologik, ilmiy, ommabop jurnal*

**Ingliz tili muharriri:** Feruz HAKIMOV

**Musahhih:** Zokir ALIBEKOV

**Sahifalovchi va dizayner:** Hasan MAQSUDOV

---

**2026. № 6/1**

---

© Materiallar ko'chirib bosilganda "Yashil" iqtisodiyot va taraqqiyot" jurnali manba sifatida ko'rsatilishi shart. Jurnalda bosilgan material va reklamalardagi dalillarning aniqligiga mualliflar ma'sul. Tahririyat fikri har vaqt ham mualliflar fikriga mos kelmasligi mumkin. Tahririyatga yuborilgan materiallar qaytarilmaydi.

Mazkur jurnalda maqolalar chop etish uchun quyidagi havolalarga maqola, reklama, hikoya va boshqa ijodiy materiallar yuborishingiz mumkin. Materiallar va reklamalar pullik asosda chop etiladi.

EI.Pochta: sq143235@gmail.com

Bot: @iqtisodiyot\_77

Tel.: 93 718 40 07

Jurnalga istalgan payt quyidagi rekvizitlar orqali obuna bo'lishingiz mumkin. Obuna bo'lgach, @iqtisodiyot\_77 telegram sahifamizga to'lov haqidagi ma'lumotni skrinshot yoki foto shaklida jo'natishingizni so'raymiz. Shu asosda har oygi jurnal yangi sonini manzilingizga jo'natamiz.

"Yashil" iqtisodiyot va taraqqiyot" jurnali 03.11.2022-yildan O'zbekiston Respublikasi Prezidenti Adminstratsiyasi huzuridagi Axborot va ommaviy kommunikatsiyalar agentligi tomonidan №566955 reyestr raqami tartibi bo'yicha ro'yxatdan o'tkazilgan.

**Litsenziya raqami:** №046523. PNFL: 30407832680027

**Manzilimiz:** Toshkent shahar, Mirzo Ulug'bek tumani  
Kumushkon ko'chasi, 26-uy.



Jurnal sayti: <https://yashil-iqtisodiyot-taraqqiyot.uz>