

INNOVATION SCIENCE AND TECHNOLOGY

ISSUE 10, PART I / OCTOBER 2026

 **Acceptance of papers**



**Acceptance of
papers**

Published monthly



Topics

economics,
technology, social
sciences



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THE SCIENTIFIC-POPULAR ELECTRONIC
JOURNAL **"INNOVATION SCIENCE AND
TECHNOLOGY"** HAS BEEN REGISTERED
UNDER THE NUMBER **C-5669633** BY THE
AGENCY FOR INFORMATION AND MASS
COMMUNICATIONS (AOKA) OF THE
REPUBLIC OF UZBEKISTAN, EFFECTIVE
FROM OCTOBER 9, 2024.

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The scientific electronic journal "Innovation Science and Technology" has been included in the list of scientific publications recommended for the publication of main scientific results of dissertations for the award of PhD and DSc degrees in economics and technical sciences, in accordance with the Resolution No. 370 of the Presidium of the Higher Attestation Commission of the Republic of Uzbekistan, dated May 8, 2025.

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PRIORITY DIRECTIONS FOR INCREASING SECTORAL DIVERSIFICATION IN THE ECONOMY OF UZBEKISTAN'S REGIONS

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Abstract. This study examines sectoral diversification in Uzbekistan's regions and identifies priority directions for strengthening regional economic resilience. The empirical analysis uses preliminary gross regional product data for January–September 2025 published by the National Statistics Committee of the Republic of Uzbekistan. Sectoral concentration and regional specialization were assessed using the Herfindahl–Hirschman Index (HHI) and the Location Quotient (LQ). The results show notable regional differences: industry has a particularly high share in Navoi Region, services predominate in Tashkent City, and agriculture is a major specialization in several regions. The scientific novelty lies in combining HHI and LQ within a unified “concentration–specialization” diagnostic framework to identify corresponding diversification directions.

Keywords: economic diversification, regional economy, sectoral structure, HHI, LQ, regional specialization, industry, agriculture, services, economic resilience, competitiveness.

Annotatsiya. Ushbu tadqiqot O'zbekiston hududlari iqtisodiyotida tarmoq diversifikatsiyasini o'rganadi va hududiy iqtisodiy barqarorlikni mustahkamlashning ustuvor yo'nalishlarini belgilaydi. Empirik tahlilda O'zbekiston Respublikasi Milliy statistika qo'mitasi tomonidan e'lon qilingan 2025-yil yanvar–sentabr oylariga oid yalpi hududiy mahsulotning dastlabki ma'lumotlaridan foydalanilgan. Tarmoq konsentratsiyasi va hududiy ixtisoslashuv Herfindahl–Hirschman indeksi (HHI) hamda Location Quotient (LQ) yordamida baholangan. Natijalar hududlar o'rtasida sezilarli tarkibiy farqlar mavjudligini ko'rsatdi: Navoiy viloyatida sanoat, Toshkent shahrida xizmatlar sohasi, qator hududlarda esa qishloq xo'jaligi asosiy ixtisoslashuv yo'nalishini tashkil etadi. Tadqiqotning ilmiy yangiligi HHI va LQ ko'rsatkichlarini yagona “konsentratsiya–ixtisoslashuv” diagnostik tizimida birlashtirish va unga mos diversifikatsiya yo'nalishlarini aniqlashdan iborat.

Kalit so'zlar: iqtisodiy diversifikatsiya, hududiy iqtisodiyot, tarmoq tarkibi, HHI, LQ, hududiy ixtisoslashuv, sanoat, qishloq xo'jaligi, xizmatlar, iqtisodiy barqarorlik, raqobatbardoshlik.

Аннотация. В исследовании рассматриваются структурные особенности отраслевой диверсификации экономики регионов Узбекистана и определяются приоритетные направления укрепления региональной экономической устойчивости. В эмпирическом анализе использованы предварительные данные по валовому региональному продукту за январь–сентябрь 2025 года, опубликованные Национальным статистическим комитетом Республики Узбекистан. Отраслевая концентрация и региональная специализация оценены с использованием индекса Херфиндала–Хиршмана (HHI) и коэффициента локализации (LQ) соответственно. Результаты показывают заметные различия в отраслевой структуре и специализации регионов: в Навоийской области особенно высока доля промышленности, в городе Ташкенте преобладает сфера услуг, а в ряде регионов сельское хозяйство является основным направлением специализации. Научная новизна исследования заключается в объединении HHI и LQ в рамках единой диагностической системы для формирования профиля «концентрация–специализация» и определения соответствующих направлений диверсификации.

Ключевые слова: экономическая диверсификация, региональная экономика, отраслевая структура, HHI, LQ, региональная специализация, промышленность, сельское хозяйство, услуги, экономическая устойчивость, конкурентоспособность.

INTRODUCTION

The stability and sustainable development of a regional economy largely depend on the structure of its production and service activities. Sectoral concentration can strengthen specialization and operational efficiency, while diversification can broaden opportunities for adapting to changing market conditions and external demand. Therefore, diversification should be understood as the development of interconnected, high-value-added activities based on existing economic competencies. In Uzbekistan, the effective use of regional economic potential, the creation of new production capacities, investment attraction, and structural transformation remain

important priorities of state policy. The New Uzbekistan Development Strategy for 2022–2026, approved by Presidential Decree No. PF-60 of January 28, 2022, emphasizes regional development and the efficient use of production potential [1].

Imbs and Wacziarg showed that sectoral concentration may follow a U-shaped pattern, with economies initially diversifying and later entering a stage of re-specialization [2]. Frenken, van Oort, and Verburg emphasized that diversity among related sectors can promote knowledge exchange and support new economic activities [3]. These approaches provide a theoretical basis for developing value chains linked to existing regional specialization.

A comprehensive assessment of regional diversification can be achieved through the joint use of sectoral structure and specialization indicators. Combining HHI-based concentration analysis with LQ-based specialization analysis makes it possible to form a broader structural profile of regional economies and identify promising development directions. The aim of this study is to assess the sectoral structure and relative specialization of Uzbekistan's regions using January–September 2025 data and to substantiate corresponding diversification directions. The objectives are to compare regional sectoral structures, calculate the Herfindahl–Hirschman Index (HHI), identify specialization using the Location Quotient (LQ), jointly interpret both indicators, and formulate diversification directions based on existing regional competencies.

LITERATURE REVIEW

Economic diversification is closely linked to regional development and long-term growth. The literature considered in this study focuses on three areas: the portfolio approach, stages of economic development, and the regional “related variety” approach. Markowitz showed that allocating resources among different assets can support a more balanced structure [4], providing a theoretical basis for broadening the sectoral base of economic activity. Jacobs emphasized that interaction among different activities can support innovation and new economic activities [5]. Lucas and Romer highlighted the role of human capital, knowledge, and technological innovation in long-term growth [6; 7]. Accordingly, diversification can involve the transfer of skills, technologies, and knowledge to new areas of economic activity.

Imbs and Wacziarg identified a U-shaped relationship between diversification and income levels, showing that economies may pass through stages of diversification and re-specialization [2]. This suggests that diversification objectives should reflect the stage of development and existing regional competencies. Frenken, van Oort, and Verburg distinguished between “related variety” and “unrelated variety,” linking related variety to regional knowledge exchange and development [3]. This approach is relevant to Uzbekistan's regions, where diversification can build on existing production and service competencies. Thus, diversification and specialization can be viewed as complementary elements of regional development, particularly when they are based on existing economic capabilities, infrastructure, knowledge, and value chains.

RESEARCH METHODOLOGY

The study applies the Herfindahl–Hirschman Index (HHI) and the Location Quotient (LQ) to assess sectoral concentration and regional specialization in agriculture, industry, construction, and services.

The empirical analysis is based on preliminary gross regional product data for January–September 2025 published by the National Statistics Committee of the Republic of Uzbekistan. Sectoral shares were recalculated for each region, and HHI and LQ indicators were jointly interpreted to construct a “concentration–specialization” profile.

This approach enables comparison of regional sectoral structures and identification of diversification directions consistent with existing economic competencies. During the preparation and editing of the article, artificial intelligence tools were used as an auxiliary instrument to an extent not exceeding 10%.

ANALYSIS AND RESULTS

The empirical basis of the study consists of preliminary gross regional product data for January–September 2025 published by the National Statistics Committee of the Republic of Uzbekistan. Data for the Republic of Karakalpakstan, 12 regions, and Tashkent City were obtained together with indicators by major types of economic activity [8]. Four sectors—agriculture, industry, construction, and services—were selected for the analysis. Their shares were renormalized within each region to ensure comparability in the HHI calculation.

The normalized share of sector i in region r is calculated as follows:

$$s_{ir} = X_{ir} / \sum_i X_{ir}$$

where X_{ir} is the volume of sector i in the GRP of region r , and $\sum_i X_{ir}$ is the sum of the four sectors included in the analysis.

Sectoral concentration was assessed using the Herfindahl–Hirschman Index:

$$HHI_r = \sum_i (s_{ir})^2$$

A higher HHI value reflects greater concentration of economic activity in one or several sectors. In this study, HHI values are used to compare structural differences across regions.

Regional specialization was assessed using the Location Quotient:

$$LQ_{ir} = (X_{ir} / \sum_i X_{ir}) / (\sum_r X_{ir} / \sum_r \sum_i X_{ir})$$

An $LQ > 1$ indicates that the sector's regional share is higher than its national share, while an $LQ < 1$ indicates a relatively smaller share. An $LQ = 1$ indicates equal shares.

The joint use of HHI and LQ makes it possible to construct a regional “concentration–specialization” profile and identify corresponding diversification directions. January–September 2025 data provide a consistent cross-sectional basis for this assessment.

The results show that Uzbekistan's regions differ in their sectoral structures and specialization profiles. Based on the preliminary GRP data published by the National Statistics Committee [8], the following table was compiled.

Table 1. Volume of GRP by major sectors in Uzbekistan's regions, January–September 2025, billion soums

Region	GRP	Agriculture	Industry	Construction	Services
Republic of Karakalpakstan	36 814.1	6 948.9	7 429.3	3 044.5	18 539.7
Andijan	74 620.5	19 956.1	21 443.2	4 787.8	26 807.8
Bukhara	59 871.0	19 186.1	12 038.8	5 767.8	21 479.2
Jizzakh	37 782.0	14 035.9	7 412.4	2 442.8	13 238.5
Kashkadarya	69 484.6	20 560.2	11 844.9	5 292.3	28 842.9
Navoi	108 396.2	9 900.4	80 142.3	4 305.1	13 158.2
Namangan	58 582.9	15 640.7	9 934.0	4 644.9	27 371.4
Samarkand	87 483.9	25 079.9	14 908.2	5 868.6	40 276.8
Surkhandarya	46 926.5	17 459.6	4 392.7	4 555.9	19 839.2
Syrdarya	24 645.9	6 937.5	7 424.0	1 826.2	7 803.1
Tashkent Region	126 761.2	20 897.2	54 744.1	10 572.6	37 065.9
Fergana	78 896.7	20 007.7	15 184.4	5 687.1	36 380.0
Khorezm	44 142.6	14 425.1	6 776.9	3 846.5	18 265.6
Tashkent City	252 111.2	0.0	60 843.3	26 299.0	144 556.4

Source: National Statistics Committee of the Republic of Uzbekistan, press release on GRP for January–September 2025; systematized by the author.

The data in Table 1 show notable regional differences in economic volume and sectoral structure. In Navoi Region, industrial output amounts to 80,142.3 billion soums, accounting for 74.5% of the four-sector total. In Tashkent City, services amount to 144,556.4 billion soums, representing 62.4%. In Jizzakh and Surkhandarya regions, agriculture accounts for 37.8%, highlighting its important role in the regional economic structure.

These structural characteristics provide a basis for defining diversification directions for each regional profile. In industrially developed regions, new activities linked to existing value chains can support further value creation. In agriculturally specialized regions, processing, storage, logistics, and food industries can strengthen agro-industrial linkages and broaden development opportunities. Thus, diversification should build on the existing economic base and support complementary activities.

Table 2. Normalized sectoral shares and HHI by region, January–September 2025

Region	Agriculture, %	Industry, %	Construction, %	Services, %	HHI
Republic of Karakalpakstan	19.3	20.7	8.5	51.6	0.353
Andijan	27.3	29.4	6.6	36.7	0.300
Bukhara	32.8	20.6	9.9	36.7	0.295
Jizzakh	37.8	20.0	6.6	35.7	0.314
Kashkadarya	30.9	17.8	8.0	43.3	0.321

Navoi	9.2	74.5	4.0	12.2	0.581
Namangan	27.2	17.2	8.1	47.5	0.336
Samarkand	29.1	17.3	6.8	46.8	0.338
Surkhandarya	37.8	9.5	9.9	42.9	0.345
Syrdarya	28.9	30.9	7.6	32.5	0.291
Tashkent Region	17.0	44.4	8.6	30.1	0.324
Fergana	25.9	19.7	7.4	47.1	0.333
Khorezm	33.3	15.6	8.9	42.2	0.321
Tashkent City	0.0	26.3	11.4	62.4	0.471

Note: shares are normalized relative to the sum of the four sectors in each region; $HHI = \sum s_i^2$. Source: author's calculations based on Table 1 data.

According to the calculations, HHI values range from 0.291 to 0.581. The most balanced four-sector distribution is observed in Syrdarya (0.291), followed by Bukhara (0.295) and Andijan (0.300). Navoi records an HHI of 0.581, reflecting the strong role of industry, which accounts for 74.5% of the four-sector total. In Tashkent City, the HHI is 0.471, with services accounting for 62.4%. These results indicate that higher HHI values may reflect strong specialization or concentration of major economic activities. Therefore, interpreting HHI together with the Location Quotient (LQ) provides a broader understanding of regional structural profiles and diversification potential.

Table 3. Location Quotient (LQ) by region, January–September 2025

Region	Agriculture	Industry	Construction	Services
Republic of Karakalpakstan	0.978	0.702	1.017	1.214
Andijan	1.384	0.998	0.788	0.865
Bukhara	1.661	0.699	1.185	0.865
Jizzakh	1.913	0.678	0.790	0.840
Kashkadarya	1.564	0.605	0.955	1.021
Navoi	0.466	2.532	0.481	0.288
Namangan	1.375	0.586	0.969	1.119
Samarkand	1.474	0.588	0.818	1.101
Surkhandarya	1.911	0.323	1.183	1.010
Syrdarya	1.464	1.051	0.914	0.766
Tashkent Region	0.858	1.508	1.030	0.708
Fergana	1.311	0.667	0.884	1.109
Khorezm	1.686	0.531	1.066	0.993
Tashkent City	0.000	0.892	1.363	1.469

Note: $LQ > 1$ indicates relative specialization; $LQ < 1$ indicates that the sector's relative share in the region is below its share in the national structure. Source: author's calculations based on Table 1 data.

The LQ results clarify the sectors associated with HHI concentration patterns. In Navoi Region, the industrial LQ is 2.532, while in Tashkent Region it is 1.508. In Tashkent City, the services LQ is 1.469 and the construction LQ is 1.363.

In agriculture, the highest LQ values are recorded in Jizzakh (1.913) and Surkhandarya (1.911), with notable specialization also observed in Bukhara, Khorezm, Kashkadarya, Samarkand, Syrdarya, Andijan, Namangan, and Fergana. These results indicate opportunities for developing higher-value-added activities linked to agricultural competencies.

For services, LQ values above 1 are recorded in the Republic of Karakalpakstan, Kashkadarya, Namangan, Samarkand, Surkhandarya, Fergana, and Tashkent City. Construction specialization is observed in the Republic of Karakalpakstan, Bukhara, Surkhandarya, Tashkent Region, Khorezm, and Tashkent City. The joint interpretation of HHI and LQ shows that Navoi is characterized by strong industrial specialization, while Tashkent City is shaped by services and construction. Regions with high agricultural LQ values have potential

for expanding related value chains and complementary activities. This approach is consistent with the “related variety” concept [3].

The first direction is vertical diversification in industrially specialized regions through deeper processing, higher-value-added products, industrial cooperation, and industrial services.

The second direction is agro-industrial diversification through storage, processing, packaging, logistics, and export services in agriculturally specialized regions.

The third direction is the development of high-value-added services, including digital, financial, educational, professional, logistics, and tourism services.

The fourth direction is interregional production cooperation and clustering through integrated value chains across regions.

The fifth direction is the development of infrastructural and institutional conditions, including transport, digital connectivity, skilled personnel, investment, innovation, and human capital support.

Table 4. Diversification directions corresponding to the structural profiles of regions

Regions	Structural characteristic	Priority directions
Navoi, Tashkent Region	High industrial share and industrial LQ	Vertical diversification; deep processing; industrial cooperation; high-value-added production
Jizzakh, Surkhandarya, Bukhara, Kashkadarya	LQ > 1 for agriculture	Agro-industry; food processing; storage and cooling; logistics; export value chains
Tashkent City and regions with a high share of services	Large share of the services sector	Digital services; business services; financial services; education; logistics; tourism
All regions	Need to strengthen intersectoral and interregional linkages	Production cooperation; clusters; localization; technology transfer and personnel training

The main scientific novelty of the study is the formation of a “concentration–specialization” diagnostic profile through the joint application of HHI and LQ. HHI reflects regional concentration, while LQ identifies relative sectoral specialization, providing a framework for aligning diversification policy with existing economic structures.

The practical significance lies in using this approach to identify priority sectors in regional development programs. HHI and LQ can be complemented by indicators of investment, employment, productivity, exports, innovation, and environmental performance.

The analysis covers January–September 2025 and four major sectors—agriculture, industry, construction, and services. Further research may include detailed subsectors and broader socio-economic indicators.

Future studies may use 2015–2025 panel data and incorporate investment, employment, productivity, exports, innovation, and intersectoral relatedness to broaden the assessment of regional diversification outcomes.

CONCLUSION AND SUGGESTIONS

The results show that Uzbekistan’s regions have diverse sectoral structures and specialization profiles. Based on January–September 2025 data, HHI values range from 0.291 to 0.581. In Navoi Region, this profile is associated with a 74.5% industrial share, while in Tashkent City it is shaped by a 62.4% share of services. LQ results complement the analysis by identifying the sectors forming each region’s relative specialization.

The main conclusion is that regional diversification can be effectively developed through new and interconnected activities based on existing economic competencies. This approach supports specialization advantages while expanding value chains and strengthening intersectoral linkages.

The following practical directions are proposed:

- develop differentiated diversification strategies based on HHI and LQ results;
- expand deep processing, technological modernization, and high-value-added production in industrially specialized regions;
- develop processing, storage, cooling, logistics, and export-oriented value chains in agriculturally specialized regions;
- expand digital, financial, educational, professional, and other high-value-added services in service-oriented regions;
- strengthen interregional production cooperation, clusters, and localization mechanisms;

- coordinate diversification with infrastructure, skilled personnel, innovation, and investment policies;
- conduct further econometric analysis of diversification in relation to employment, productivity, exports, and investment using multi-year panel data.

REFERENCES

1. President of the Republic of Uzbekistan. Decree No. PF-60 of January 28, 2022, "On the Development Strategy of New Uzbekistan for 2022–2026." — National Database of Legislation of the Republic of Uzbekistan. — URL: <https://lex.uz/docs/5841063>.
2. Imbs J., Wacziarg R. Stages of Diversification // *American Economic Review*. — 2003. — Vol. 93, No. 1. — P. 63–86. — DOI: 10.1257/000282803321455160. — URL: <https://doi.org/10.1257/000282803321455160>.
3. Frenken K., van Oort F.G., Verburg T. Related Variety, Unrelated Variety and Regional Economic Growth // *Regional Studies*. — 2007. — Vol. 41, No. 5. — P. 685–697. — DOI: 10.1080/00343400601120296. — URL: <https://doi.org/10.1080/00343400601120296>.
4. Markowitz H. Portfolio Selection // *The Journal of Finance*. — 1952. — Vol. 7, No. 1. — P. 77–91. — DOI: 10.1111/j.1540-6261.1952.tb01525.x. — URL: <https://doi.org/10.1111/j.1540-6261.1952.tb01525.x>.
5. Jacobs J. *The Economy of Cities*. — New York: Random House, 1969.
6. Lucas R.E. On the Mechanics of Economic Development // *Journal of Monetary Economics*. — 1988. — Vol. 22, No. 1. — P. 3–42. — DOI: 10.1016/0304-3932(88)90168-7. — URL: [https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7).
7. Romer P.M. Endogenous Technological Change // *Journal of Political Economy*. — 1990. — Vol. 98, No. 5, Part 2. — P. S71–S102. — DOI: 10.1086/261725. — URL: <https://doi.org/10.1086/261725>.
8. National Statistics Committee of the Republic of Uzbekistan. Gross Regional Product of the Republic of Uzbekistan for January–September 2025. — Press release, October 28, 2025. — URL: https://stat.uz/img/press-reizlar/analitika-vrp_zb-lotin_p31141.pdf.

Proofreader: Zokir ALIBEKOV

Layout and Designer: Oloviddin Sobir ugli

2026. № 10

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