



IQTISODIYOT & TARAQQIYOT

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- 08.00.07 Moliya, pul muomalasi va kredit
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- 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

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MUNDARIJA

O'RTA DAROMADLI MAMLAKATLARDA INNOVATSION XARAJATLARNING EKSPORT DIVERSIFIKATSIYASIGA TA'SIRI	20
Karimova Xulkar Raxmanali qizi Jalg'ashova Nazira Umbet qizi	
MINTAQADA SANOAT SALOHİYATI SAMARADORLIGINI OSHIRISHNING HOZIRGI HOLATI TAHLILI	26
Mamedov Ko'palboy Masharipovich	
TA'LIM XIZMATLARINI BOSHQARISHDA XALQARO STANDARTLAR ASOSIDA SIFATNI TA'MINLASH	30
Umarov Ravshanjon Gafurovich	
SANOAT KORXONALARIDA INNOVATSION FAOLIYAT SAMARADORLIGINI BAHOLASH USULLARI	36
Mamurov Doniyor Eldorovich	
MINTAQAVIY IQTISODIY RIVOJLANISHDA YASHIL INVESTITSİYALARDAN FOYDALANISH TAMOIYILLARI VA USULLARI	43
Ro'zimov Doniyor Soporboy o'g'li	
TOSHKENT METROPOLITENI SANOATIDA MAHALLIYLASHTIRISH DARAJASINING DINAMIKASI VA UNI XALQARO TAJRIBA BILAN QIYOSIY BAHOLASH	49
Mansurov Xamrokul Ilxomovich	
ЦИФРОВАЯ САМООРГАНИЗАЦИЯ БУДУЩИХ МЕНЕДЖЕРОВ КАК ФАКТОР ЭФФЕКТИВНОСТИ САМОСТОЯТЕЛЬНОГО ОБУЧЕНИЯ	56
Мирвосикий Хилола Хабибулла кизи	
XORAZM VILOYATIDA AHOLI BANDLIGINI TA'MINLASHNING ILMIY-AMALIY TAHLILI	64
Z.Sh. Matniyozova	
DEVELOPMENT MECHANISMS OF EMBEDDED FINANCE SERVICES IN COMMERCIAL BANKS OF UZBEKISTAN BASED ON OPEN BANKING	69
Khurramova Fotima Bakhodir qizi	
IMPROVING THE PRACTICE OF FINANCING INVESTMENT PROJECTS THROUGH SYNDICATED LOANS PROVIDED BY COMMERCIAL BANKS	76
Xudaynazarov Davrbek Abdullayevich	
TASHQI SAVDO DINAMIKASI VA BANK MOLİYAVIY XAVFSIZLIGI: O'ZBEKISTON TIJORAT BANKLARI MISOLIDA AMALIY TAHLIL	83
Babadjanov Shuxrat Atxamovich	
GREEN LENDING PRACTICED AMONG UZBEK COMMERCIAL BANKS: SURVEY- BASED ASSESSMENT OF READINESS AND CONSTRAINTS	90
Avazov Azizbek Ashurali o'g'li	
"YANGI O'ZBEKISTON – 2030" STRATEGIYASI DOIRASIDA IQTISODIY O'ZGARISHLARNING ASOSIY YO'NALISHLARI VA ULARNING SAMARADORLIGI	96
Amirov Otabek Xudoyberdi o'g'li	
BARQAROR YASHIL INVESTITSİYALARNING QAYTA TIKLANUVCHI ENERGETIKA RIVOJIGA ROLINI VA HISSASINI TAHLIL QILISH: O'ZBEKISTON MISOLIDA	101
Zilola Kazakova	
HUDUD SANOATIDA KAPITAL VA MEHNAT RESURLARI SAMARADORLIGINI KOB-B-DUGLAS MODELİ YORDAMIDA BAHOLASH	113
Turayev Baxrom Ergashevich	



“MAHALLA BANKIRI” INSTITUTI DAVLATBANK HAMKORLIGINING OPERATSION BO‘G‘INI SIFATIDA: SAMARADORLIK MEZONLARI VA OPTIMAL YUKLAMA PARAMETRLARI	120
Nurmuratov Azamat Mamarizo o‘g‘li	
SHAHAR JAMOAT TRANSPORTI YO‘NALISHLARINING AHOLI EHTIYOJLARIGA MOSLIGINI TADQIQ ETISH (URGANCH SHAHRI MISOLIDA)	127
Abdullayeva Shahzodaxon Fazliddin qizi	
O‘ZBEKISTONDA QISHLOQ XO‘JALIGINI RO‘YXATGA OLISHNING AGRAR IQTISODIY O‘SISHNI TA‘MINLASHDAGI INSTITUTSIONAL ROLI	132
Shohujayeva Zebo Safoyevna	
Xolov Javlonbek Davronovich	
УЗБЕКИСТАН КАК АКАДЕМИЧЕСКИЙ ХАБ ВЫСШЕГО ОБРАЗОВАНИЯ ЦЕНТРАЛЬНОЙ АЗИИ	138
Эргашева Шахло Тургуновна	
БУХГАЛТЕРСКИЙ УЧЕТ КАК ИНФОРМАЦИОННАЯ ОСНОВА ФИНАНСОВОГО КОНТРОЛЯ ПРЕДПРИЯТИЯ	146
Маннапова Раъно Абборовна	
YOSHLAR TADBIRKORLIGINI MOLIVAVIY, INSTITUTSIONAL VA RAQAMLI QO‘LLABQUVVATLASHNING INTEGRATSIYALASHGAN RAQAMLI MODELLARI: “3M-PLATFORMA” VA “SMART YOUTH BUSINESS ECOSYSTEM” KONSEPSIYALARI	154
Xojiyev Ma‘murjon Muxsinjon o‘g‘li	
RAQAMLI BANK XIZMATLARINING IQTISODIY VA INSTITUTSIONAL XUSUSIYATLARI	163
Begimqulova Sevara Nurmamatovna	
KICHIK TADBIRKORLIK SUBYEKTLARINING IQTISODIY SAMARADORLIGINI OSHIRISH OMILLARI	169
Yusupov Muxiddin Soatovich	
Normaxmatov Fazliddin Nuriddin o‘g‘li	
OLIY TA‘LIMDA INNOVATSION MENEJMENT IMKONIYATLARIDAN SAMARALI FOYDALANISH	177
Abdullayev Farhod Ozodovich	
“YASHIL MAKON” UMUMMILLIY LOYIHASINI AMALGA OSHIRISHNING TASHKILIY-AMALIY NATIJALARI	180
Jamshidbek Bobojonov	
QISHLOQ XO‘JALIGI MAHSULOTLARI EKSPORTI SAMARADORLIGINI OSHIRISHDA KLASSTERLARNING AHAMIYATI	184
Radjabova Mavluda Ergash qizi	
STRENGTHENING MAHALLA ENTREPRENEURSHIP THROUGH AN INTEGRATED ECOSYSTEM: FUNCTIONAL LINKAGES, DIGITAL COORDINATION, AND REGIONAL EVIDENCE	189
Zafarjon Odiljonovich Tuxtasinov	



STRENGTHENING MAHALLA ENTREPRENEURSHIP THROUGH AN INTEGRATED ECOSYSTEM: FUNCTIONAL LINKAGES, DIGITAL COORDINATION, AND REGIONAL EVIDENCE

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Abstract. This study develops an integrated model of the **mahalla** entrepreneurial ecosystem and provides an exploratory empirical assessment of regional entrepreneurship patterns in Uzbekistan. It also proposes the **Mahalla Entrepreneurship Ecosystem Index** as an outcome-oriented tool for digital monitoring and the evaluation of entrepreneurial ecosystem performance.

Keywords: mahalla; entrepreneurial ecosystem; small business; digital platform; regional development.

Annotatsiya. Tadqiqotda mahalla tadbirkorlik ekotizimining integratsiyalashgan modeli ishlab chiqilgan hamda O'zbekistonda hududlar kesimidagi tadbirkorlik rivojlanishining empirik xususiyatlari dastlabki baholangan. Natijalarga yo'naltirilgan raqamli monitoringni amalga oshirish uchun **Mahalla tadbirkorlik ekotizimi indeksi** taklif etilgan.

Kalit so'zlar: mahalla; tadbirkorlik ekotizimi; kichik biznes; raqamli platforma; hududiy rivojlanish.

Аннотация. В исследовании разработана интегрированная модель предпринимательской экосистемы махалли и проведена предварительная эмпирическая оценка региональных особенностей развития предпринимательства в Узбекистане. Предложен Индекс предпринимательской экосистемы махалли как инструмент цифрового мониторинга, ориентированного на оценку результатов.

Ключевые слова: махалля; предпринимательская экосистема; малый бизнес; цифровая платформа; региональное развитие.

INTRODUCTION

Entrepreneurship has become an important instrument for promoting employment, household income growth, poverty reduction, and balanced regional development. Contemporary research increasingly explains entrepreneurial development through the entrepreneurial ecosystem approach, which emphasizes the interaction among institutions, finance, human capital, infrastructure, networks, markets, and cultural factors within a specific territory. From this perspective, the effectiveness of entrepreneurship policy depends not only on the availability of individual support measures but also on the quality of functional linkages among public authorities, financial institutions, educational organizations, business associations, digital platforms, and entrepreneurs.

This approach is particularly relevant to Uzbekistan's mahalla system. The mahalla represents a distinctive local institution that combines community self-governance, social coordination, and increasingly significant economic development functions. The introduction of assistant khokims in every mahalla has strengthened the institutional capacity to identify household needs, support employment and entrepreneurship, facilitate access to credit and vocational training, and address local business constraints. At the same time, the expansion of state financing and the integration of digital information systems have created new opportunities for more targeted and evidence-based support for entrepreneurial initiatives.

Against this background, the present study develops an integrated model of the mahalla entrepreneurial ecosystem based on functional coordination, digital integration, and outcome-oriented monitoring. The study



also provides an exploratory empirical assessment of regional small-business patterns across Uzbekistan. It examines the concentration of operating small businesses, evaluates the relationship between business density and the share of small business in gross regional product, and proposes a composite Mahalla Entrepreneurship Ecosystem Index. The main contribution of the research lies in combining institutional analysis with regional statistical evidence and translating the entrepreneurial ecosystem concept into a practical monitoring framework adapted to the specific conditions of Uzbekistan's mahallas.

LITERATURE REVIEW

The concept of an entrepreneurial ecosystem interprets regional entrepreneurial activity as a set of interconnected resources, networks, markets, and governance mechanisms rather than as separate institutions. Acs et al. (2017) reveal the theoretical roots of this approach, emphasizing that an effective ecosystem is based on the alignment of the institutional environment, knowledge, and entrepreneurial capabilities. Stam (2015) shows that the main outcome of an entrepreneurial ecosystem is productive entrepreneurship and territorial value creation. Spigel (2017) argues that ecosystem effectiveness is determined by the relationships among finance, knowledge, social networks, and cultural factors. Audretsch and Belitsky (2017) highlight the role of institutional conditions, infrastructure, and innovation networks in the development of urban entrepreneurial ecosystems. Brown and Mason (2017) note that a universal ecosystem model cannot be applied uniformly across all regions and that policies need to be adapted to regional economic specialization and resource potential. Malecki (2018) focuses on the territorial characteristics and intersectoral connections of entrepreneurial ecosystems.

Roundy, Bradshaw, and Brockman (2018) view the ecosystem as a complex system that adapts to external influences. Stam and van de Ven (2021) systematize its institutional, material, and network elements. Sussan and Acs (2017) argue that digital platforms reduce the costs of information exchange and coordination. These perspectives indicate the importance of shaping the **mahalla** entrepreneurial ecosystem based on functional linkages among the assistant khokim, financial institutions, and an integrated digital platform.

RESEARCH METHODOLOGY

The research applies a mixed conceptual–empirical design. The conceptual component combines systemic, institutional, structural–functional, and ecosystem approaches with contemporary entrepreneurial ecosystem theory. Three official SIAT datasets were matched by territorial code: (1) operating small businesses, excluding farms and dehqan farms, as of **1-January-2025**; (2) permanent population at the beginning of 2025; and (3) the small-business share in GDP/GRP for **January–December 2025** (National Statistics Committee of the Republic of Uzbekistan, 2026a, 2026b, 2026c). The unit of analysis is the region. National totals and district-level observations were excluded from the correlation analysis. All calculations are based on public administrative statistics.

Business density is calculated as:

$$D_i = (N_i / P_i) \times 1,000, \quad (1)$$

where N_i is the number of operating small businesses, and P_i is the permanent population of region i . Because the SIAT population series is reported in thousands, the numerical computation is N_i divided by the population reported in thousands.

Regional concentration is measured using each region's national share q_i , the Herfindahl–Hirschman Index (HHI), and the four-region concentration ratio (CR4):

$$q_i = N_i / \Sigma N_i; \quad HHI = \Sigma q_i^2; \quad CR4 = \Sigma_{i=1}^4 q_i \times 100. \quad (2)$$

H2 is evaluated using Pearson's product-moment correlation, Spearman's rank correlation, and the exploratory bivariate model:

$$S_i = \beta_0 + \beta_1 D_i + \varepsilon_i, \quad (3)$$

where S_i is the small-business share in GRP. Given the small sample and structural outliers, the coefficients are interpreted as descriptive associations rather than causal estimates.

For future **mahalla**-level monitoring, the study proposes a composite **Mahalla Entrepreneurship Ecosystem Index (MEEI)**:



$$MEEI_i = \Sigma(w_j Z_{ij}), \quad \Sigma w_j = 1, \quad (4)$$

where Z_{ij} is a normalized indicator, and w_j is its weight. Six dimensions are recommended: access to finance and assets; human capital; institutional coordination; digital integration; market connectivity; and outcomes, such as business survival, employment, income growth, and repayment quality. A dynamic resource–reinvestment relationship can be expressed as:

$$R_{i,t+1} = (1 - \delta)R_{i,t} + \alpha Y_{i,t} + X_{i,t}, \quad (5)$$

where R is the local resource stock, Y is ecosystem-generated income, α is the reinvestment rate, δ is resource depreciation, and X represents external programs and investment.

ANALYSIS AND RESULTS

Functional Interconnection of the Mahalla Entrepreneurial Ecosystem

The analysis identifies a dual coordination core. The assistant khokim performs an institutional brokerage function by diagnosing local needs, screening projects, linking residents to finance and training, and escalating infrastructure or regulatory issues. The integrated digital platform performs an informational coordination function by combining administrative data, tracking applications, identifying bottlenecks, recording outcomes, and creating feedback for policy improvement. Neither mechanism is sufficient on its own. Human discretion without integrated data may lead to fragmentation and unequal access, whereas digitalization without local brokerage may result in formal compliance rather than effective support.

Table 1 presents the functional division of labor. The system operates through vertical relationships between national programs and local implementation, horizontal relationships among banks, training providers, business associations, firms, and mahalla institutions, and feedback relationships linking business outcomes to resource allocation. External finance and public programs enter the ecosystem, institutions transform them into support services, entrepreneurial activity generates firms and employment, income expands local demand, and part of the resulting economic and fiscal capacity is reinvested. The central platform monitors every stage rather than only the initial disbursement (Table 1).

Table 1.
Functional division of labor in the mahalla entrepreneurial ecosystem¹

Participant	Core ecosystem function
Mahalla citizens' assembly	Local diagnosis, trust building, mobilization, social inclusion, and feedback from residents.
Assistant khokim	Institutional brokerage, project screening, referral to finance and training, coordination, and barrier resolution.
Commercial banks and microfinance institutions	Credit assessment, financing, repayment monitoring, financial literacy, and restructuring support.
Training providers and universities	Entrepreneurship skills, vocational training, consulting, mentoring, and evidence-based evaluation.
Business associations and Hunarmand structures	Peer mentoring, standards, supplier cooperation, representation, and market access.
Local government and infrastructure agencies	Land, utilities, permits, shared facilities, logistics, and the removal of infrastructure constraints.
Entrepreneurs and anchor firms	Production, job creation, innovation, supplier linkages, apprenticeship, and peer learning.
Integrated digital platform operator	Data integration, unique case tracking, transparency, alerts, dashboards, and feedback loops.

¹ Note. Developed by the author based on the source manuscript and the entrepreneurial ecosystem literature.



REGIONAL STATISTICAL RESULTS

The regional results demonstrate marked asymmetry. On **1-January-2025**, Tashkent city contained 84,453 operating small businesses, representing 23.6% of the national total. Tashkent region, Samarkand, and Fergana followed. Together, the four leading territories accounted for 49.8% of all operating small businesses. The HHI was 0.105, indicating a distribution that is diversified across regions but strongly concentrated in the capital and several major regional markets. Syrdarya had the smallest absolute number (8,639), whereas Andijan had the lowest business density (5.77 businesses per 1,000 residents). Tashkent city had the highest density (27.13), followed by Navoi (14.77) and Tashkent region (11.06).

H1 is therefore supported: regional entrepreneurship is not concentrated in a single territory; however, almost half of the operating business base is located in four regions, and nearly one quarter is concentrated in the capital alone. Table 2 and Figure 1 illustrate this distribution.

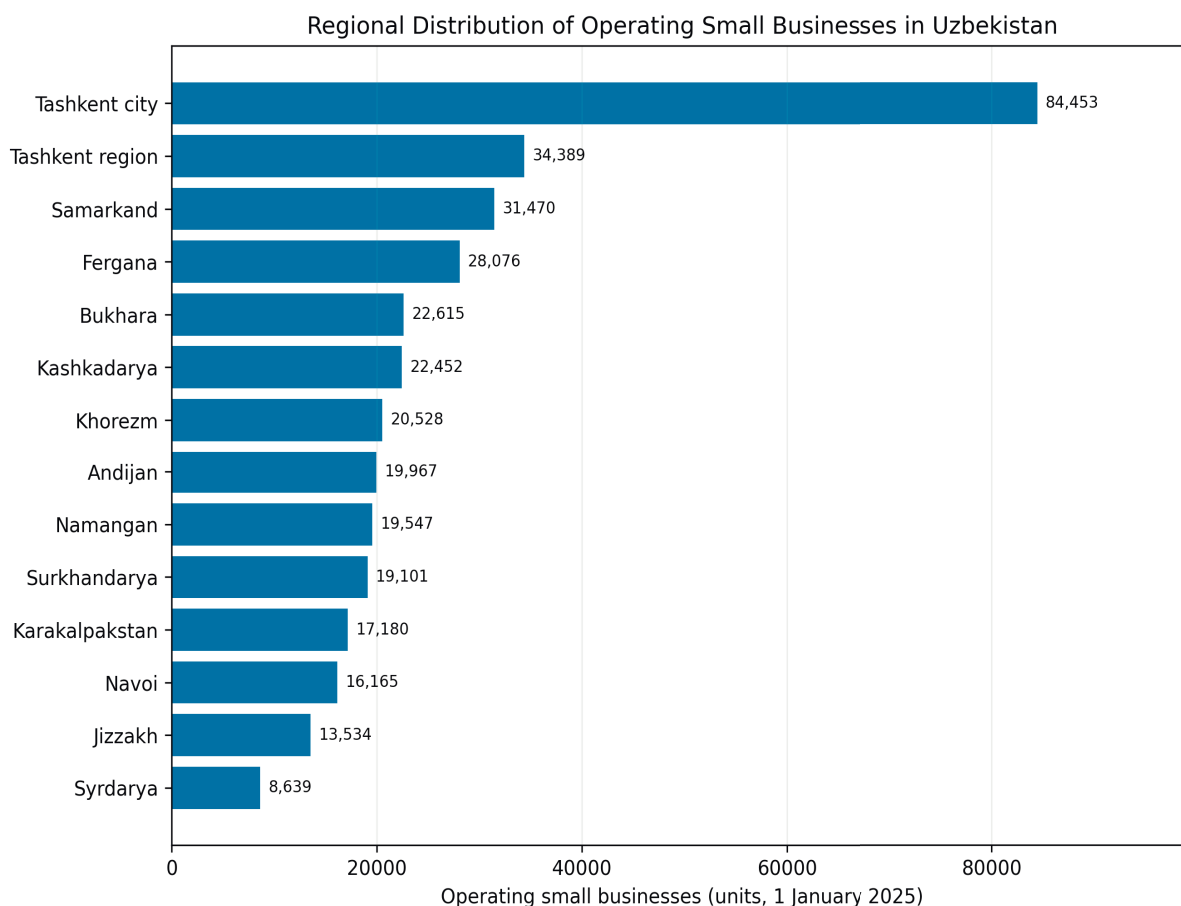


Figure 1. Operating small businesses by region, 1-January-2025²

The relationship between business density and value-added contribution does not support **H2**. Pearson's correlation was negative and statistically significant at the conventional 5% level ($r = -0.582$, $p = 0.029$). Spearman's rank correlation produced a similar result ($\rho = -0.541$, $p = 0.046$). In the simple regression, one additional operating small business per 1,000 residents was associated with an approximately 1.51 percentage-point lower small-business share in GRP ($R^2 = .339$), although this coefficient is highly sensitive to the small sample and structural outliers. Figure 2 shows that Tashkent city combines very high business density with a moderate small-business share in GRP, whereas Navoi combines relatively high business density with a very low share because large-scale mining and industry dominate regional value added.

² Source: Author's calculations based on SIAT dataset 261.

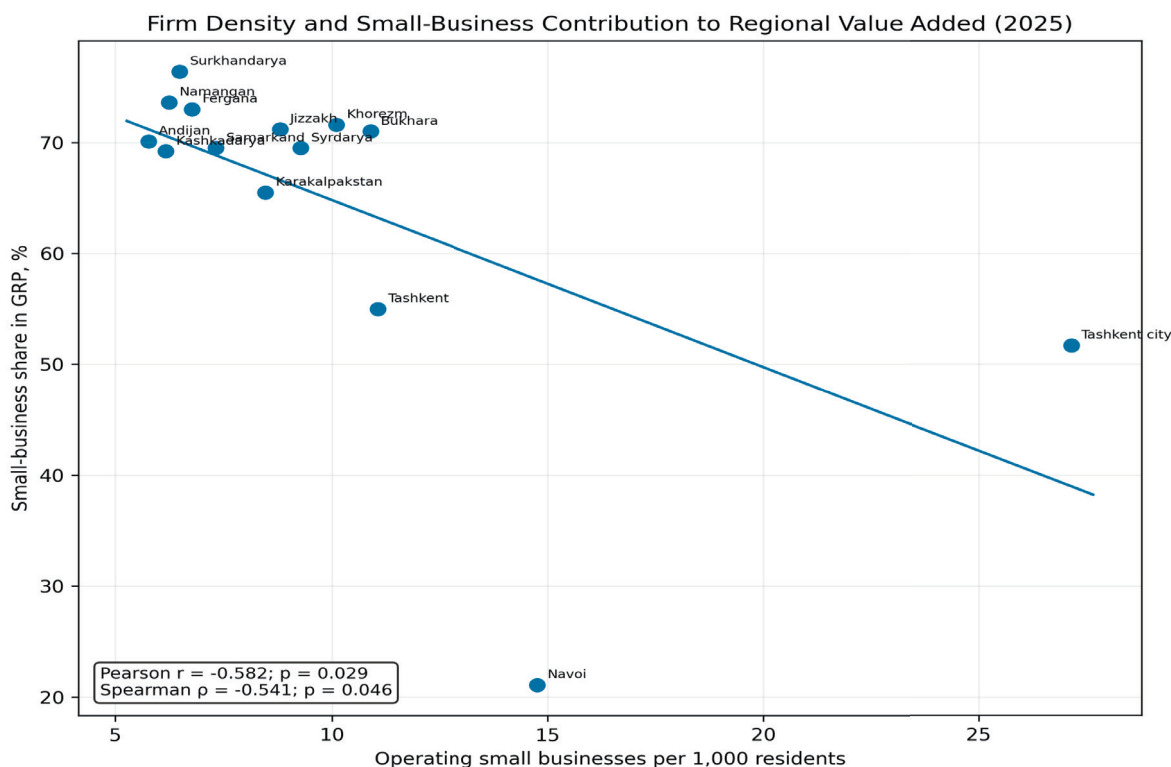


Figure 2. Business density and small-business share in GRP³

Conversely, Surkhandarya, Namangan, and Fergana have lower business densities but high small-business shares in GRP. The results should therefore be interpreted as evidence that firm counts and regional economic structure measure different dimensions of ecosystem performance. The findings reinforce the relational view of entrepreneurial ecosystems. Productive entrepreneurship depends on how finance, knowledge, infrastructure, markets, and institutions are connected rather than simply on whether each component exists (Spigel, 2017; Stam & van de Ven, 2021). The mahalla system has a distinctive advantage because it can identify household capabilities and constraints at a granular level. Its main risk is that performance becomes input-oriented—measured by the number of loans, training activities, or registrations—rather than outcome-oriented. The rejection of **H2** is substantively important. A region may have many operating firms while small business represents a smaller share of regional value added because large corporations, extractive industries, or capital-intensive activities dominate GRP. Conversely, a high small-business share may reflect a less industrialized economy in which small firms and household activities account for most production. Therefore, neither business density nor the small-business share in GRP should be used alone as a success indicator. A balanced dashboard should combine entry, survival, productivity, formal employment, household income, export participation, innovation, credit repayment, and inclusion (Table 2).

Table 2.
Summary of hypothesis testing⁴

Hypothesis	Statement	Evidence	Decision
H1	Regional operating small businesses are unevenly concentrated.	HHI = 0.105; CR4 = 49.8%; Tashkent city = 23.6%.	Supported
H2	Business density is positively associated with the small-business share in GRP.	Pearson $r = -0.582$ ($p = 0.029$); Spearman $\rho = -0.541$ ($p = 0.046$).	Rejected

Digital coordination can transform the mahalla system from a collection of programs into a learning ecosystem. The planned integration of tax, credit, and mahalla information systems provides the technical

³ Source: Author's calculations based on SIAT datasets 261, 246, and 420.

⁴ Source: Developed by the author



foundation for case-level monitoring (Ministry of Economy and Finance of the Republic of Uzbekistan, 2025). However, data integration should follow clear governance principles, including unique project identifiers, interoperable classifications, privacy protection, audit trails, and a clear separation between program outputs and socioeconomic outcomes. This approach aligns with the concept of the digital entrepreneurial ecosystem, in which platforms connect users, institutions, and digital infrastructure while reducing search and coordination costs (Sussan & Acs, 2017).

Policy should also be differentiated according to ecosystem type. Metropolitan mahallas require innovation finance, scalable services, digital commerce, and business-to-business networks. Industrial regions require supplier development and stronger linkages between small firms and anchor enterprises. Agrarian and remote mahallas require logistics, processing capacity, water and energy infrastructure, cooperative market access, and mobile training. Thus, the assistant khokim should be evaluated not according to a uniform quota but on the basis of improvements relative to the mahalla's initial resource base, economic specialization, and market access.

CONCLUSION AND RECOMMENDATIONS

An effective mahalla entrepreneurial ecosystem requires more than financial support. It requires coordinated functions, continuous information exchange, transparent project tracking, and feedback mechanisms that reallocate resources toward activities generating sustainable employment and income. Regional evidence from Uzbekistan confirms the existence of a large small-business base while also highlighting substantial territorial and structural differences. Almost half of all operating small businesses were located in the four leading regions at the beginning of 2025, whereas business density was not positively associated with the small-business share in GRP.

The central policy implication is that ecosystem performance should be assessed based on quality and outcomes rather than on firm counts alone. Institutional brokerage by assistant khokims, combined with an integrated digital platform and a multidimensional Mahalla Entrepreneurship Ecosystem Index (MEEI), can provide the foundation for adaptive, differentiated, and evidence-based entrepreneurship policy at the mahalla level.

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