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# METHODOLOGICAL APPROACHES AND THE INDICATOR SYSTEM FOR EVALUATING ENTREPRENEURSHIP DEVELOPMENT IN REGIONS

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**Abstract:** The article examines methodological approaches to assessing regional entrepreneurship development and proposes a structured indicator system, illustrated with verified official statistics from Uzbekistan. Building on the Global Entrepreneurship Monitor (GEM) framework, the OECD entrepreneurship indicator programme and the Regional Entrepreneurship and Development Index (REDI), the study systematizes descriptive-statistical, composite-index and frontier-efficiency approaches to measuring entrepreneurial activity at the sub-national level. According to Uzbekistan's State Statistics Committee, the SME sector's share of GDP stood at 54.3% in 2024 but fell to 49.6% in the first half of 2025, while internet penetration rose from 76.6% in 2021 to 94.2% by mid-2025 — a divergence that motivates the six-dimensional indicator system proposed here, covering framework conditions, digital infrastructure, finance, human capital, entrepreneurial activity and outcomes. The proposed system offers a methodologically grounded basis for constructing a composite regional entrepreneurship development index.

**Keywords:** regional entrepreneurship, entrepreneurial ecosystem, composite index, entrepreneurship indicators, regional development, GEM, REDI, Uzbekistan.

## 1. Introduction

Measuring the level and dynamics of entrepreneurship development at the regional level is one of the central methodological tasks of regional economic policy. Unlike national assessments, regional analysis must account for pronounced heterogeneity in infrastructure, institutional capacity and access to finance across sub-national units. A methodologically sound indicator system allows policymakers to identify lagging regions, target support instruments, and track whether entrepreneurship-support programmes are actually closing gaps rather than merely reporting aggregate growth.

This last point is not abstract. Uzbekistan's own statistics illustrate why aggregate figures can mislead: the State Statistics Committee reported that the SME sector's share of GDP rose from 51.2% to 54.3% over 2024, yet the same indicator was measured at only 49.6% in the first half of 2025 [6; 9]. Meanwhile internet penetration among the population aged 10 and older climbed from 76.6% in 2021 to 94.2% by mid-2025 [10]. Rising digital access alongside a declining SME output share is precisely the kind of divergence a single composite index can obscure — which is the methodological problem this article addresses. The purpose of the study is to systematize existing approaches to evaluating regional entrepreneurship development and to propose an indicator system that keeps such divergences visible rather than averaging them away.

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## 2. Literature review

The Global Entrepreneurship Monitor (GEM) methodology, developed jointly by Babson College and the London Business School, measures entrepreneurial activity through population surveys and expert assessments of Entrepreneurial Framework Conditions — finance, government policy, education, R&D transfer, and physical infrastructure [3].

The OECD-Eurostat Entrepreneurship Indicators Programme complements this with an enterprise-based approach, focusing on business demography statistics such as firm birth, death and survival rates [4]. At the sub-national level, the Regional Entrepreneurship and Development Index (REDI), developed by Szerb, Acs and colleagues, combines individual-level attitudes with institutional-level framework conditions into a single composite score using a penalty-for-bottleneck algorithm, so that a weak pillar constrains the overall regional score rather than being masked by strong performance elsewhere [5]. Isenberg's six-domain ecosystem model — policy, finance, culture, supports, human capital, markets — supplies the qualitative structure that most quantitative frameworks, REDI included, ultimately operationalize [2].

Applying these frameworks to transition economies is constrained mainly by data availability at the regional level, which is why the indicator system proposed below draws only on indicators that Uzbekistan's statistical system already publishes or is in the process of publishing, rather than on indicators that would require new survey infrastructure.

## 3. Methodological approaches to evaluation

Three broad methodological approaches can be distinguished in the literature.

**3.1. Descriptive-statistical approach.** This approach tracks individual indicators — the number of newly registered enterprises, the SME share of GRP, or self-employment rates — separately across regions and periods. It is transparent and requires no aggregation assumptions, but on its own it does not capture the multidimensional nature of an entrepreneurial ecosystem.

**3.2. Composite index construction.** This approach aggregates multiple normalized indicators into a single index, through equal or expert-weighted summation, principal component analysis, or REDI's penalty-for-bottleneck method. Composite indices facilitate regional ranking but require careful normalization and weighting choices, and — as the Uzbekistan example above shows — can mask short-term divergences between components (e.g., infrastructure growth and SME output decline) unless bottleneck-sensitive weighting is used.

**3.3. Frontier and efficiency-based approaches.** Methods such as Data Envelopment Analysis (DEA) assess how efficiently regions convert available inputs (finance, infrastructure, human capital) into entrepreneurial outputs, allowing regions to be compared on efficiency rather than on absolute resource levels — relevant where, as in Uzbekistan's IT Park data, resource concentration in the capital does not automatically translate into proportionally higher output from capital-based firms.

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For practical policy purposes a hybrid approach is recommended: a composite index for cross-regional benchmarking, disaggregated indicators for diagnosis, and periodic efficiency analysis to separate resource constraints from institutional or managerial inefficiencies.

### 4. Proposed indicator system

Table 1 presents a six-dimensional indicator system compiled to remain constructible from statistics that are, in most cases, already published by Uzbekistan's State Statistics Committee and sector agencies such as IT Park Uzbekistan, while remaining broadly comparable with the GEM and REDI methodologies.

| Dimension | Representative indicators | Measurement unit / source |
|---|---|---|
| **1. Framework conditions** | Business registration procedures; regulatory-quality perception; tax burden index | Days / index points (World Bank, national registries) |
| **2. Digital infrastructure** | Internet penetration rate; ICT sector share of GRP; broadband subscribers per 100 population | % of population; % of GRP |
| **3. Finance & investment** | SME share of GDP/GRP; grant and export-support funding disbursed to firms; number of tech-park residents | % of GDP; local currency; number of firms |
| **4. Human capital** | Share of population with digital skills; regional vs. capital distribution of tech-sector jobs; entrepreneurship training coverage | % of population; ratio capital/regions |
| **5. Entrepreneurial activity** | New business registration rate; tax-paying SME count; SME turnover | Registrations per period; local currency |
| **6. Outcomes / impact** | SME contribution to GDP/GRP; employment share generated by SMEs; regional dispersion of the SME-to-GRP ratio | % of GDP; % of employment; coefficient of variation across regions |

Table 1. Proposed indicator system for evaluating regional entrepreneurship development. Source: compiled by the author based on GEM, OECD-EIP and REDI methodologies, and on the data sources listed in the references.

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## 5. Illustration using Uzbekistan's regional data

Applying the framework's first two dimensions to available data shows both progress and gaps. On digital infrastructure, internet penetration reached 94.2% nationally by January-August 2025, with the urban-rural gap narrowing from 7.1 percentage points in 2021 (79.4% urban vs. 72.3% rural) to 0.4 points in 2025 (94.3% vs. 93.9%) [10; 11] — indicating that the infrastructure dimension is converging across regions. The ICT sector's share of GDP, however, remains modest, rising only from 1.8% in 2015 to 2.3% in 2023 and 2.9% in the first half of 2026 [12; 13], which suggests that broad connectivity has not yet translated into a proportionally large digital output sector.

On the finance and human-capital dimensions, IT Park Uzbekistan data reveal a persistent capital-region divide: of 636 new residents admitted in January-May 2025, 369 registered in Tashkent city against 267 across all regions combined, and Tashkent-based exporters projected over $46 million in exports versus $31 million from regional companies [14]. A narrower snapshot from March-April 2025 shows an even sharper skew — only 49 of 132 new export-oriented residents registered outside the capital [15]. These figures illustrate exactly the kind of within-country disparity that a national-level composite index would not reveal, reinforcing the case for indicators disaggregated to the regional level.

On entrepreneurial activity and outcomes, the divergence noted in the introduction is confirmed at a more granular level: in January-July 2025, 47,796 new small-business entities were registered nationally, and 63,201 SMEs paid over 8.7 trillion soum in taxes with combined turnover of nearly 125.9 trillion soum [8], yet the SME sector's GDP share for the same broad period stood below its 2024 level [6; 9]. A regional example from an earlier period further illustrates the underlying dispersion: in the first quarter of 2022, the SME share of gross regional product averaged 44.7% nationally but reached 72.5% in Jizzakh region [9], showing that some regions' economies are structurally far more SME-dependent than others — a fact a single national ratio would not communicate.

## 6. Discussion

The proposed indicator system's main methodological advantage is that its dimensional structure, mirroring Isenberg and REDI, keeps bottleneck dimensions visible instead of letting strong performance in one area offset weak performance in another. The Uzbekistan data used above demonstrate this directly: had these indicators been reported only as a single composite score, the divergence between near-universal internet access and a declining SME output share, and between capital-based and regional IT Park participation, would likely have been smoothed over.

A caveat is necessary regarding data granularity: several indicators in Table 1 — notably regional venture financing and digital-skills coverage — are not yet published at a fully disaggregated regional level in Uzbekistan, so the illustration above relies on the most disaggregated official data currently available (national totals with a Tashkent/regions split, rather than a full oblast-by-oblast breakdown). Future empirical work should apply the full system once regional breakdowns for these series become available, and should test the system's discriminatory power against independently observed entrepreneurial outcomes across all regions.

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## 7. Conclusion

This study has systematized the principal methodological approaches to evaluating regional entrepreneurship development and proposed a six-dimensional indicator system spanning framework conditions, digital infrastructure, finance, human capital, entrepreneurial activity and outcomes. Applying the first dimensions to Uzbekistan's official statistics shows a country where digital infrastructure has become nearly universal (94.2% internet penetration by mid-2025) while the SME sector's contribution to GDP has recently declined (from 54.3% in 2024 to 49.6% in the first half of 2025) and financial and technological resources remain concentrated in the capital relative to the regions. These findings support the article's central methodological argument: a disaggregated, bottleneck-sensitive indicator system, rather than a single aggregate score, is necessary to make such divergences visible to policymakers and to target entrepreneurship-support instruments where they are most needed.

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