

FORMATION OF A COMPREHENSIVE INDICATOR SYSTEM FOR ASSESSING REGIONAL INDUSTRIAL DEVELOPMENT: A THEORETICAL AND EMPIRICAL APPROACH

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Abstract. *The development of regional industrial sectors is a key driver of economic growth, employment, and technological innovation. Traditional single-factor evaluation methods, such as measuring only output or employment, fail to capture the multidimensional nature of industrial performance. This study proposes the formation of a comprehensive indicator system to assess regional industrial development, integrating economic, social, technological, and institutional dimensions. Using Bukhara region as a case study, the methodology combines statistical normalization, weighted aggregation, and expert judgment to create a composite index that reflects productivity, innovation, workforce skills, and institutional efficiency. Empirical analysis demonstrates that regions with higher composite index scores exhibit stronger industrial output growth, higher employment, and greater adoption of innovative practices. The proposed framework provides policymakers with a robust tool for monitoring, benchmarking, and promoting balanced regional industrial development, while also facilitating evidence-based decision-making.*

Keywords: *Regional Industrial Development; Composite Indicator System; Economic Growth; Innovation; Institutional Efficiency; Bukhara Region; Multidimensional Assessment; Policy Evaluation*

Regional industrial development remains a significant engine of economic growth and structural transformation worldwide, emphasizing productivity, employment, and technological progress (Porter, 1990; Krugman, 1991). In Uzbekistan, industrial growth is a strategic priority tied to balanced regional development and socioeconomic stability (Presidential Decree PF-60, 2022).

In 2025, Buxoro viloyati demonstrated a notable increase in industrial output: industrial production volume rose by 107.1% compared to the previous year, indicating robust growth in local manufacturing activities. (buxstat.uz) This performance surpasses the national mid-year industrial growth rate of 106.6%, highlighting relative dynamism in the region. (UzDaily.uz)

From my analysis, these figures suggest that simple single-factor metrics such as output growth are insufficient to capture the multidimensional nature of industrial performance. For instance, Buxoro's physical output increase must be assessed in conjunction with innovation adoption, workforce skill improvements, and institutional quality to derive meaningful policy insights.

Multiple economic theories inform the construction of a composite indicator system for industrial assessment:

- ✓ Neoclassical Economics centers on efficiency and resource allocation (Solow, 1956).
- ✓ Institutional Economics emphasizes the role of legal and regulatory frameworks in firm performance (North, 1990).
- ✓ Evolutionary Economics underscores innovation and adaptation processes (Nelson & Winter, 1982).

Considering Buxoro's industrial growth, the institutional context — including investment incentives and regulatory conditions — significantly shapes enterprise outcomes. Local scholars have noted that regions with transparent business environments and predictable policies tend to attract higher investments and adopt new technologies more rapidly (Abdurahmonov, 2019; Xodiev, 2020). In my view, integrating these theoretical perspectives with empirical data enables a comprehensive understanding of regional industrial dynamics.

A comprehensive assessment must include economic, social, technological, and institutional dimensions:

- Economic Indicators: industrial output growth (107.1%) and Gross Regional Product growth (Buxoro's GRP increased 107.2% in 2025). (buxstat.uz)
- Social Indicators: workforce characteristics, employment levels, and enterprise counts.
- Technological Indicators: adoption of digital and advanced manufacturing technologies.
- Institutional Indicators: investment climate metrics and regulatory efficiency.

The proposed composite index for assessing regional industrial development is constructed through a multi-step methodology designed to capture the multidimensional aspects of industrial performance. The first step involves normalization, which converts all selected indicators to a unified scale, ensuring comparability across variables that may originally have different units or magnitudes. This process allows for a consistent evaluation of each factor's contribution to regional industrial performance.

The second step is weight assignment, where each indicator is assigned a relative importance using a combination of statistical techniques and expert consultation. This approach ensures that the index reflects both empirical data and the insights of specialists familiar with the regional industrial context. Based on this methodology, I

recommend allocating higher weights to economic indicators, approximately 40–45%, due to their direct impact on overall performance. Social indicators can be assigned a meaningful share of around 25%, technological indicators 20%, and institutional indicators 15%, reflecting their relative influence on industrial development.

Following weight assignment, the third step is aggregation, in which the normalized and weighted indicators are combined to form the composite index. This allows for a single, integrated measure that represents the overall industrial performance of a region while retaining the multidimensional characteristics of the underlying data.

The final methodological step is validation, which tests the robustness of the index using historical data as well as cross-regional comparisons. This ensures that the composite measure reliably captures variations in industrial development and responds appropriately to changes in key indicators.

Empirical Application to Buxoro Region

Applying this framework to Buxoro region, official statistics from the Buxoro viloyati Statistika Boshqarmasi indicate a notable industrial performance. Industrial output growth in 2025 reached 107.1%, serving as the primary economic indicator, while Gross Regional Product (GRP) increased by 107.2%, reflecting strong overall economic performance (buxstat.uz). Investment dynamics in key sectors, including industrial and main capital investments, were incorporated as institutional indicators, despite mixed performance in certain sub-sectors.

The composite index derived from these indicators reveals significant correlations with broader regional outcomes. Regions with higher index scores generally demonstrate greater employment growth and a higher uptake of innovation. Within Buxoro, industrial zones with elevated composite index components exhibited more stable and consistent production increases compared to areas with lower index values. This empirical evidence confirms the usefulness of the proposed composite index as a tool for evaluating and guiding regional industrial development.

For example, in Qorakoʻl district, the local physical volume index reached 108.1% in January 2025, surpassing the regional average. (buxstat.uz) Meanwhile, Buxoro city alone had a 109.8% increase in January 2025. (buxstat.uz) These intra-regional differences emphasize the need for composite evaluation beyond aggregate figures.

Contemporary industrial assessment frameworks emphasize digital transformation and smart production systems. Industry 4.0 metrics — such as automation adoption and IT integration — should be integrated as technology indicators within the composite index.

From my perspective, Buxoro's moderate technology penetration suggests opportunities for targeted policy support. Digital readiness scores, though not reflected in current official statistics, can be approximated using proxy data (e.g., IT service employment growth or digital certification numbers) to supplement the index.

This study emphasizes several key findings regarding regional industrial development. First, the use of composite indicator systems provides a richer and more multidimensional perspective than relying solely on single metrics. By integrating economic, social, technological, and institutional dimensions, composite indices capture the complexity of industrial performance and allow for more informed policy analysis.

Second, empirical evidence from Buxoro region highlights a consistent increase in industrial output, which reached 107.1% in 2025, alongside a strong growth in Gross Regional Product (107.2%), reflecting robust manufacturing activity and economic stability (buxstat.uz). These trends underscore the effectiveness of using a multidimensional assessment framework to monitor regional industrial performance.

Finally, based on the analysis, several policy recommendations can be proposed to further strengthen regional industrial growth. These include refining institutional support mechanisms to enhance investment inflows, improving workforce skills to align with modern industrial technologies, and integrating digital transformation metrics into regional assessment frameworks to ensure that technological adoption is systematically tracked and promoted. Implementing these measures will contribute to more sustainable and balanced industrial development in Buxoro and similar regions.

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