MECHANISMS FOR DIVERSIFYING SOCIO-ECONOMIC DEVELOPMENT INDICATORS OF REGIONS IN THE CONTEXT OF THE DIGITAL ECONOMY

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Abstract. *The thesis examines the mechanisms for diversifying socio-economic development indicators of regions in the era of digital transformation. It argues that the traditional metrics of economic growth — such as GDP and industrial output — no longer fully reflect the complexity and quality of regional progress. Instead, new indicators related to digitalization, innovation, social inclusion, and environmental sustainability must be integrated into regional policy evaluation. The study identifies institutional, technological, and human capital mechanisms that enable the diversification of development indicators. It emphasizes the role of digital platforms, data-driven governance, and smart specialization strategies in achieving balanced and inclusive regional growth.*

Keywords: *regional development, digital economy, socio-economic diversification, innovation indicators, smart governance, data analytics, sustainable growth.*

INTRODUCTION

In the twenty-first century, the digital economy has emerged as the dominant paradigm shaping the structure of production, employment, and governance worldwide. It transforms traditional economic relations by introducing new forms of value creation based on information, connectivity, and innovation. For regions, this transformation presents both opportunities and challenges: while digitalization opens access to global markets and technological advancement, it also increases disparities between dynamic and lagging territories.

Consequently, the need arises to diversify socio-economic development indicators — moving beyond narrow macroeconomic metrics toward a multidimensional framework that includes digital readiness, innovation capacity, human development, and environmental sustainability. This diversification ensures a more comprehensive understanding of regional performance and helps policymakers design tailored strategies for inclusive growth [1].

MATERIALS AND METHODS

Historically, regional development was evaluated primarily through economic output indicators such as Gross Regional Product (GRP), investment volume, and industrial productivity. However, in the digital age, these measures fail to capture qualitative aspects of growth, including innovation, digital literacy, and social inclusion.

The diversification of socio-economic indicators involves expanding the analytical framework to include:

- Digital infrastructure indicators (broadband access, data networks, e-services);
- Human capital indicators (digital literacy, education quality, workforce adaptability);

- Innovation indicators (startups, R&D intensity, intellectual property activity);
- Social indicators (equality, employment inclusivity, quality of life);
- Environmental sustainability indicators (carbon footprint, circular economy practices).

This multidimensional model reflects the reality that regional prosperity is not merely the accumulation of economic resources, but the synergistic interaction of digital, human, and institutional capital.

RESULTS AND DISCUSSION

Institutions play a critical role in facilitating indicator diversification. Effective regional governance requires the integration of digital monitoring systems into policymaking processes. Governments now rely on big data analytics, e-governance platforms, and open data portals to measure and compare the performance of local economies in real time.

For example, OECD's Regional Well-Being Index and the UNDP Human Development Index already incorporate non-traditional variables such as social inclusion, innovation, and environmental quality. Similarly, digital governments use integrated data dashboards to visualize key performance indicators (KPIs) of regional development dynamically.

In this institutional context, the feedback mechanism between public authorities, businesses, and citizens becomes more responsive and transparent. Data-driven policymaking reduces the risk of bureaucratic inertia, while participatory digital governance enhances accountability and citizen trust.

Digital technologies form the backbone of indicator diversification. The implementation of Internet of Things (IoT) systems, blockchain registries, and artificial intelligence (AI) tools allows for continuous data collection, real-time processing, and accurate regional assessment [3].

For instance:

- IoT sensors monitor energy consumption and environmental quality;
- AI algorithms analyze labor market trends and predict unemployment risks;
- Blockchain-based registries ensure transparency in public spending and regional investment tracking.

Moreover, big data platforms aggregate information from diverse sources — industrial production, digital transactions, education systems, healthcare, and mobility — to form an integrated picture of regional dynamics. This digital integration creates a new paradigm of "smart regional governance", where decisions are based not on outdated statistics but on live analytical insights.

No diversification mechanism can succeed without an adaptive and skilled workforce. The digitalization of the labor market requires new competencies in information management, coding, data literacy, and system design. Therefore, lifelong learning programs and digital reskilling initiatives have become strategic components of regional policy.

Regions that invest in education and human capital tend to achieve faster adaptation to technological change. For example, the Nordic countries have integrated

innovation indicators into their regional competitiveness assessments, measuring creativity, entrepreneurship, and digital skills alongside traditional economic metrics.

In addition, innovation ecosystems — universities, incubators, research centers, and startups — provide the foundation for developing knowledge-intensive industries. Their interaction with regional authorities forms the "quadruple helix" model (government–business–academia–society), which is essential for sustainable diversification of socio-economic indicators.

One of the most effective mechanisms for indicator diversification is the implementation of smart specialization strategies (S3). These strategies encourage regions to identify their unique competitive advantages and invest in innovation fields where they can excel globally — whether it be fintech, renewable energy, or digital logistics.

Smart specialization is inherently linked with data-driven management, where advanced analytics are used to monitor project efficiency and resource allocation. Regional governments in the European Union, for instance, employ digital monitoring frameworks under the *EU Cohesion Policy 2021–2027* to align investment with regional strengths.

This data-based governance model ensures that regional development becomes more targeted, efficient, and sustainable, reducing duplication of efforts and improving interregional collaboration.

CONCLUSION

The diversification of socio-economic development indicators under the influence of the digital economy is both a methodological necessity and a strategic opportunity for modern regions. Traditional economic metrics alone can no longer capture the complexity of digital transformation and its social consequences.

By incorporating new dimensions — digital readiness, innovation activity, human capital quality, and environmental sustainability — regions can create a more balanced and inclusive model of progress. The implementation of data-driven governance, smart specialization, and digital monitoring systems represents a crucial step toward improving transparency, accountability, and long-term competitiveness.

Ultimately, the success of these mechanisms depends on coordinated efforts among government institutions, businesses, academic communities, and civil society — forming a cohesive digital ecosystem that transforms data into development.

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