

**METHODOLOGICAL FOUNDATIONS FOR THE FORMATION OF
THE THEORY OF SUSTAINABLE DEVELOPMENT OF RURAL
AREAS IN THE CONTEXT OF DIGITAL TRANSFORMATION**

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Ключевые слова: устойчивое развитие сельских территорий, цифровая трансформация, институциональная способность, нестабильность, смешанные методы, сельское управление.

Key words: sustainable rural development, digital transformation, institutional capacity, fragility, mixed methods, rural governance.

Аннотация. В статье разработаны методологические основы формирования теории устойчивого развития сельских территорий в условиях цифровой трансформации. Устойчивое развитие сельских территорий рассматривается как многомерный и динамический процесс, формируемый взаимодействием экономических, экологических, социальных и институциональных факторов в условиях нестабильности. Предложена интегрированная методологическая рамка, объединяющая общенаучные методы, специальные аналитические инструменты и смешанный исследовательский подход. Особое внимание уделяется посреднической роли институциональной способности и условному влиянию цифровой трансформации на результаты устойчивого развития сельских территорий. В заключение представлена концептуальная модель, связывающая устойчивое развитие, систему управления и фактор нестабильности как ключевые детерминанты траекторий развития.

Summary: This article develops the methodological foundations for the formation of the theory of sustainable development of rural areas in the context of digital transformation. Sustainable rural development is conceptualized as a multidimensional and dynamic process shaped by the interaction of economic, ecological, social, and institutional factors under conditions of fragility. The study proposes an integrated methodological framework combining general scientific methods, specialized analytical tools, and a mixed-methods research design. Particular attention is given to the mediating role of institutional capacity and the conditional impact of digital transformation on rural sustainability outcomes. In conclusion, a conceptual model is presented that links sustainable development, the governance system and the instability factor as key determinants of development trajectories.

Introduction. Sustainable rural development has evolved into a multidimensional scientific paradigm shaped by the convergence of ecological economics, systems theory, institutional economics, and human development approaches [1; 2; 3]. Rather than a unified doctrine, it represents a complex framework in which sustainability depends on the interaction between economic viability, ecological integrity, and social inclusion.

The methodological challenge lies in translating these theoretical foundations into empirical research. This challenge becomes particularly acute in fragile contexts such as Lebanon, where institutional dysfunction and governance fragmentation significantly affect development processes [4]. In such environments, fragility constitutes a central analytical condition influencing research design and interpretation.

This article aims to systematize the methodological foundations for studying sustainable rural development in the context of digital transformation and institutional fragility.

Main Part.

1. Methodological Status of Sustainable Rural Development

Sustainable rural development must be understood as a dynamic process rather than a static objective. It reflects the capacity of rural territories to maintain economic, social, and ecological balance under changing conditions [2; 3].

Methodologically, this implies an interdisciplinary approach, as economic, environmental, and institutional dimensions are interdependent. Digital transformation further increases complexity by simultaneously affecting production systems, governance, and market access [5; 6].

2. General Scientific Methods. The methodological framework is based on four key general scientific methods:

Systems analysis, which conceptualizes rural areas as complex adaptive systems characterized by feedback relationships [2];

Dialectical method, which examines structural tensions between economic growth, ecological limits, and social equity [1];

Structural-functional analysis, focusing on institutional structures and their capacity to perform development functions [3];

Historical-genetic method, which explains current development conditions through historical institutional trajectories [7].

Together, these methods provide a comprehensive analytical foundation for understanding rural sustainability processes.

3. Special Research Methods. To operationalize theoretical principles, the study employs five groups of specialized methods:

Indicator-based analysis, using economic, social, environmental, and institutional indicators aligned with the SDGs [8];

Spatial analysis, examining territorial disparities and rural-urban linkages [9];

Institutional analysis, focusing on governance capacity as a key mediating variable [3; 7];

Econometric modeling, analyzing relationships between digital infrastructure and development outcomes [10];

Comparative analysis, contrasting Lebanon and Belarus as analytically complementary cases [11].

This combination allows for a multidimensional evaluation of sustainable rural development.

4. Mixed-Methods Approach. Given the complexity of the research object, a mixed-methods approach is adopted. Quantitative methods identify structural patterns, while qualitative methods explain underlying institutional and social mechanisms [2; 3].

The integration of both approaches ensures methodological triangulation and enhances the validity of findings. Survey data provide insights into digital adoption and livelihood conditions, while case studies and institutional analysis reveal governance constraints and development dynamics [4; 10].

5. Conceptual Framework. The conceptual framework integrates four core dimensions:

Sustainability pillars (economic, social, environmental) [1; 8];

Digital transformation as a conditional instrument [5; 6];

Institutional capacity as a mediating variable [3; 7];

Fragility as a structural modifier [4].

Digital transformation functions as a conditional instrument whose developmental outcomes depend on institutional quality and resource availability. Institutional capacity determines whether digital technologies translate into inclusive and sustainable development outcomes [3].

In fragile contexts such as Lebanon, weak governance structures intensify development challenges by limiting the effectiveness of digital transformation and sustainability policies [4].

This figure illustrates the interaction between sustainability pillars (economic, social, environmental), digital transformation as a conditional instrument, institutional capacity as a mediating variable, and fragility as a structural modifier shaping rural development outcomes.

Conclusion. The study demonstrates that sustainable rural development requires an integrated methodological framework combining general scientific and specialized research methods. The complexity of rural systems, particularly under conditions of fragility and digital transformation, necessitates a mixed-methods approach capable of capturing both structural patterns and institutional dynamics [2; 3]. The proposed conceptual framework highlights the central role of institutional capacity as a mediating factor and emphasizes that digital transformation alone cannot ensure sustainable outcomes. Instead, development depends on the interaction between governance systems, livelihood conditions,

and environmental constraints. These findings provide a methodological basis for empirical research and policy design aimed at achieving sustainable rural development in fragile contexts.

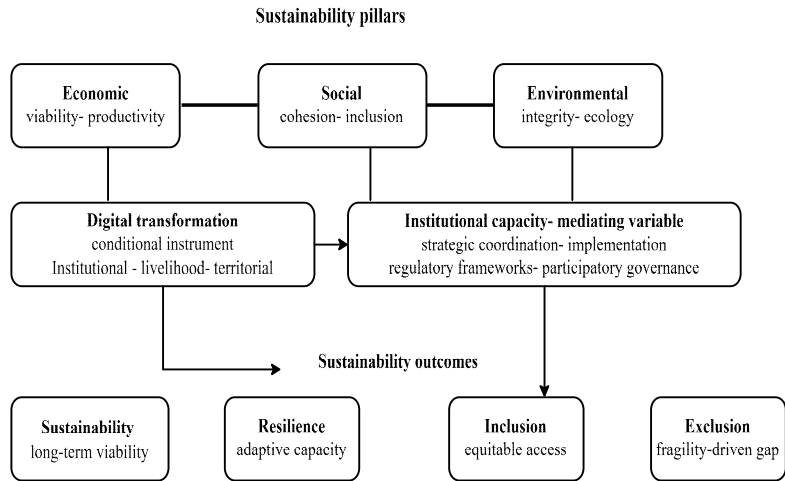


Figure. Conceptual Framework of Sustainable Rural Development in the Context of Digital Transformation

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ZERO BUDGET AND ZERO INSTITUTIONAL BACK-UP: DISCIPLINED DIGITAL PLATFORM FOR AGRICULTURE IN LEBANON

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Ключевые слова: управление сельским хозяйством, инновационная экономика, транзакционные издержки, институциональный разрыв, управление с нулевым бюджетом, цифровая трансформация, Ливан, устойчивость.

Key words: agricultural management, innovative economy, transaction costs, institutional gap, zero budget management, digital transformation, Lebanon, resilience.

Аннотация: В данной статье рассматривается мировой кризис, который повлиял на эффективность функционирования сельскохозяйственного сектора Ливана. Проблема исследования возникает из-за кризиса централизованной координации и роста транзакционных издержек вследствие ослабления институциональной роли государства. Подход к решению этой проблемы включает в себя смешанные методы. Исследование предлагает подход сетевого управления с нулевым бюджетом, основанным на модели «четверной спирали», которая устанавливает синергетическую связь между исследованиями, практиками бизнеса, гражданским обществом и электронным управлением.

Summary: This article examines the global crisis that has impacted the performance of Lebanon's agricultural sector. The research problem arises from the crisis of centralized coordination and rising transaction costs due to the weakening of the state's institutional role. A mixed-methods approach is used to