FORMATION OF A MECHANISM FOR DEVELOPING THE ECONOMIC POTENTIAL OF ENTERPRISES IN THE CONTEXT OF DIGITAL TRANSFORMATION AND POST-WAR RECONSTRUCTION OF UKRAINE'S ECONOMY

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Abstract.
The article substantiates a mechanism for the development of the economic potential of the enterprise under conditions of digital transformation and post-war recovery of Ukraine. The research clarifies the essence and structure of economic potential and interprets it as a dynamic combination of production, financial, human, innovation, digital and organizational components. An integrated system of indicators and a fuzzy-logic model are developed to diagnose the state of these components, identify structural imbalances and classify enterprises into development trajectories: active growth, adaptive development, compensatory stabilization or conservative survival. Particular attention is paid to the digital component as a cross-cutting factor that reinforces all elements of economic potential and increases resilience to war-related shocks. A multi-level mechanism is proposed that combines enterprise-level diagnostics and fuzzy modeling with meso- and macro-level instruments of digitalization and SME support policy, providing a practical toolkit for aligning internal development strategies with national post-war recovery priorities.

Keywords: economic potential of the enterprise, digital transformation, fuzzy-logic development mechanism, post-war recovery of Ukraine, SME resilience; multi-level strategic management

1. Introduction

The full-scale digital transformation of business and the post-war recovery of Ukraine have brought the issue of developing the economic potential of enterprises to the forefront of economic research and policy agendas [6;16]. In conditions of heightened uncertainty, physical destruction of assets, disrupted value chains and structural shifts in demand, enterprises must not only restore their resource base but also qualitatively modernize it through digital technologies, innovative business models and new forms of integration into global value chains [4;14;16]. The economic potential of the enterprise in such circumstances is no longer limited to a static set of resources; it is interpreted as a dynamic combination of tangible, financial, human, organizational, innovative and digital capabilities that determine the firm’s ability to generate value and ensure long-term resilience [2;3;14].

Classical and contemporary studies of enterprise potential emphasize that sustainable competitive advantages arise from a coherent system of resources and competences, including production capacity, financial stability, human capital and management systems that support strategic adaptation and innovation [2;3;16]. Recent works substantiate the need to structurally distinguish functional components of economic potential and to evaluate them using integrated indicator systems, econometric models and multi-level diagnostic approaches. At the same time, the literature increasingly highlights the role of innovation and creative capital, arguing that the transition to a digital and creative economy requires enterprises to develop new forms of knowledge generation, collaboration and customer-centric value creation [8;14;17]. These trends necessitate a revision of traditional mechanisms for managing economic potential in favour of more flexible, process-oriented and strategically aligned frameworks [4;10;11;16].

Digitalization fundamentally changes both the structure and mechanisms of enterprise economic potential development [2;3;6]. Research on digital potential shows that it has become a basic element of overall economic potential, encompassing the ability of firms to create, implement and securely use digital technologies and innovations [3;4;6]. Empirical studies of small and medium-sized enterprises demonstrate that digital maturity strongly correlates with productivity, competitiveness and resilience to shocks, including those caused by war and global crises [2;3;6;9]. Methodological approaches proposed in recent works suggest constructing integral indices of digital potential, applying statistical and expert methods, and using interval or fuzzy evaluations to monitor the dynamics of digitalization and identify "growth points" in business development [2;3;5;9;12].

Ukraine's post-war recovery context adds specific constraints and opportunities that directly influence the economic potential of enterprises [4;14;16]. National and international strategic documents underline that digital transformation is one of the key drivers of resilience, productivity growth and accelerated modernization, particularly for SMEs that were heavily affected by war-related disruptions [4;6;14;16]. The Draft Ukraine Recovery Plan and related policy reports propose comprehensive measures to restore digital infrastructure, expand e-services, and design targeted programmes to support SME digitalization and innovation. At the same time, studies on Ukraine's digital integration with the European Union stress that aligning with EU digital markets and standards opens up additional channels for technology transfer, investment and integration into regional value chains, thereby expanding the development space for enterprise economic potential.

Despite the growing body of research, several important gaps remain. First, many studies focus either on the theoretical structuring of economic potential or on isolated aspects such as financial, innovative or digital components, without proposing an integrated mechanism that connects these elements under conditions of large-scale shocks and recovery [2;3;8;14;15;16]. Second, there is insufficient consideration of how post-war reconstruction priorities, state support instruments and external integration processes reshape the configuration and trajectories of enterprise economic potential in Ukraine [4;6;14;16]. Third, methodological approaches to assessing and managing economic potential often remain detached from practical tools that enterprises can use to design and implement development programmes under conditions of digital transformation [2;3;9;15;16]. Building on earlier work on fuzzy modeling and strategic management of enterprise potential, there is a need to adapt and extend these approaches to incorporate digitalization, resilience and post-war recovery requirements into a holistic development mechanism.

2. Materials and methods

The research methodology is designed to develop and substantiate a mechanism for the development of the economic potential of the enterprise under conditions of digital transformation and post-war recovery, combining classical approaches to potential assessment with modern tools of fuzzy modeling and digital diagnostics. The study is structured in several successive stages: conceptualization of economic potential and its components; construction of an integrated assessment system; development of a fuzzy-logic-based mechanism for potential development; and adaptation of methodological tools to the specific conditions of Ukrainian enterprises in a post-war and digitally transforming economy [1;2;3;10;15].

2.1. Conceptual and structural analysis of economic potential

At the first stage, the research employs methods of theoretical and logical analysis, comparison and synthesis to clarify the essence of the economic potential of the enterprise and its structure. The resource, functional, efficiency and strategic approaches to defining economic potential are generalized, allowing identification of its key components: production (operational), financial, human, innovative, information-digital and organizational-managerial potential [2;3;8;14;16]. Special attention is given to the dynamic interpretation of economic potential, taking into account the enterprise life cycle, which makes it possible to

distinguish starting, developing, productive and exhausted potential and to link them with stages of origin, growth, maturity and decline of the enterprise [2;14;17]. This conceptualization forms the basis for identifying "bottlenecks" and reserves in the development of potential at different stages of the life cycle.

2.2. System of indicators and integrated assessment

The second stage focuses on building an integrated system of indicators to assess the economic potential of the enterprise and its development dynamics. The method of system analysis, economic-statistical analysis and multidimensional evaluation is used to select and group indicators for each structural component of economic potential (production, financial, human, innovative, digital and organizational) [2;3;9;16]. For each component, a set of quantitative and qualitative indicators is formed (for example, production capacity utilization, liquidity and solvency ratios, staff qualification level, R&D intensity, degree of digitalization of processes, maturity of management systems), which are normalized and aggregated using weighted coefficients based on expert assessment [1;2;5;12]. This enables the construction of partial indices and an integrated index of economic potential, as well as the identification of critical components that constrain development in the context of digital transformation and recovery.

2.3. Fuzzy modeling of potential development

Given the high uncertainty and incomplete formalization of information in the post-war environment, methods of fuzzy set theory and fuzzy logic are used to model the development of economic potential [5;6;7;10;11;13;18;19]. Linguistic variables and triangular fuzzy numbers are applied to represent expert assessments of the importance of factors and expected changes in the key indicators of economic potential, which makes it possible to adequately take into account ambiguity and subjective judgments in strategic decision-making [5;7;11;18]. On the basis of fuzzy inference rules, a model is constructed that links the current state of each component of potential, the intensity of digital transformation and the external environment constraints with alternative development trajectories (active growth, adaptive development, compensatory or conservative strategies) [5;6;10;13;18]. This fuzzy model serves as the core element of the proposed mechanism, allowing simulation of various scenarios for the development of economic potential under digital transformation and post-war shocks.

2.4. Methods for assessing digital transformation and SME readiness

To capture the role of digital transformation in the development of economic potential, the research integrates methods for assessing the digital maturity of enterprises, especially small and medium-sized enterprises (SMEs). Content analysis and benchmarking of international and national frameworks for digital maturity assessment are used, as well as survey and expert evaluation methods for determining the level of digital readiness of Ukrainian enterprises [1;3;4;6]. A system of indicators is formed to characterize the digital component of economic potential (availability of digital infrastructure, integration of digital technologies into key processes, digital skills of personnel, use of data analytics and e-services), which is then incorporated into the overall index of economic potential [1;3;4]. The conceptual model of an online platform for expert evaluation and analysis of SME digital transformation in Ukraine is used as an applied tool to collect and process data on digital maturity and to generate recommendations for enhancing the digital component of economic potential [1;3;4].

2.5. Expert, comparative and scenario analysis

The final methodological block combines expert, comparative and scenario analysis to substantiate and test the mechanism for developing the economic potential of enterprises. Expert surveys are conducted among managers and specialists of Ukrainian enterprises to determine weights of indicators, evaluate the importance of digital and recovery factors, and validate fuzzy rules and thresholds of potential development levels [1;2;5;12;16]. Comparative analysis is used to benchmark the state and trajectories of economic potential development of enterprises with different levels of digitalization and different degrees of war-related damage [2;3;9;15]. Scenario analysis is employed to model alternative paths of potential development (baseline, accelerated digital transformation, delayed recovery) and to assess how combinations of internal managerial

decisions and external policy measures influence the transition between these scenarios [4;10;11;13;18;20]. The combination of these methods provides a comprehensive and flexible toolkit for designing and justifying a mechanism for the development of enterprise economic potential that is adequate to the conditions of digital transformation and post-war recovery of Ukraine.

3. Results and discussion

3.1. Diagnostic results of enterprise economic potential

Application of the proposed indicator toolkit revealed, in our opinion, a significant differentiation of the level and structure of enterprises' economic potential depending on the degree of digitalization and the scale of war-related losses. Enterprises with a relatively preserved production base but low digital maturity demonstrate strong production potential under simultaneously constrained innovation and information-digital components, which limits their ability to reconfigure business models and enter new markets in the post-war period. By contrast, firms that, despite partial physical damage, invested in digital technologies show higher adaptability, faster recovery of sales channels and more effective use of remote work and online services, which increases the integral index of economic potential.

3.2. Structural profiles of economic potential

On the basis of the obtained data, we grouped enterprises by dominant components of economic potential, which made it possible to identify several typical profiles: production-oriented, financially-oriented, human-capital-oriented, innovation-digital-oriented and balanced enterprises, summarized in Table 1. In our opinion, such a typology allows operationalizing the multidimensional nature of economic potential and linking structural characteristics to possible development trajectories.

As Table 1 shows, production-oriented enterprises concentrate resources in their material and technical base, but without adequate development of digital and innovation potential they become constrained in terms of modernization and diversification [2;3;8;14]. We substantiate that the target benchmark should be a transition to a balanced profile, when none of the components acts as a bottleneck and the digital and innovation potentials reinforce the production, financial and human blocks.

Table 1: Structural components of enterprise economic potential and key indicators

Component of economic potential	Typical indicators (examples)	Dominant enterprise profile	Expected effect of development
Production (operational)	Capacity utilization, output per employee, equipment wear level [2;3]	Production-oriented firms	Increased volume and efficiency of production, ability to meet post-war demand [2;3;9]
Financial	Liquidity ratios, solvency, profitability, access to credit [10;16]	Financially-oriented firms	Higher investment capacity, shock absorption, support for innovation and digitalization [10;16]
Human capital	Share of highly skilled staff, training intensity, staff turnover [8;17]	Human-capital-oriented firms	Greater adaptability, innovation capacity, effective use of technologies [8;17]
Innovative	R&D intensity, share of innovative products, cooperation with R&D institutions [1;3]	Innovation-digital-oriented firms	Faster product and process renewal, entry into new markets [1;3]
Digital (information)	Digital maturity index, share of digitized processes, use of cloud/AI/analytics [1;3;4;6]	Innovation-digital-oriented firms	Resilience to disruptions, scalability, integration into global value chains [4;6]
Organizational-managerial	Quality of strategic planning, flexibility of structures, use of data-driven management [5;10;11]	Balanced firms	Coordination of all components of potential, strategic coherence [5;10]

3.3. Fuzzy-logic development trajectories

Given the high uncertainty of the post-war environment, a fuzzy-logic model has been developed by us which integrates assessments of the state of economic potential components and external environment

characteristics into generalized development trajectories (Fig. 1). In our opinion, the use of linguistic variables ("low", "medium", "high" level of potential; "favourable", "neutral", "adverse" environment) makes it possible to adequately account for expert judgments and vaguely defined factors in the strategic decision-making process.

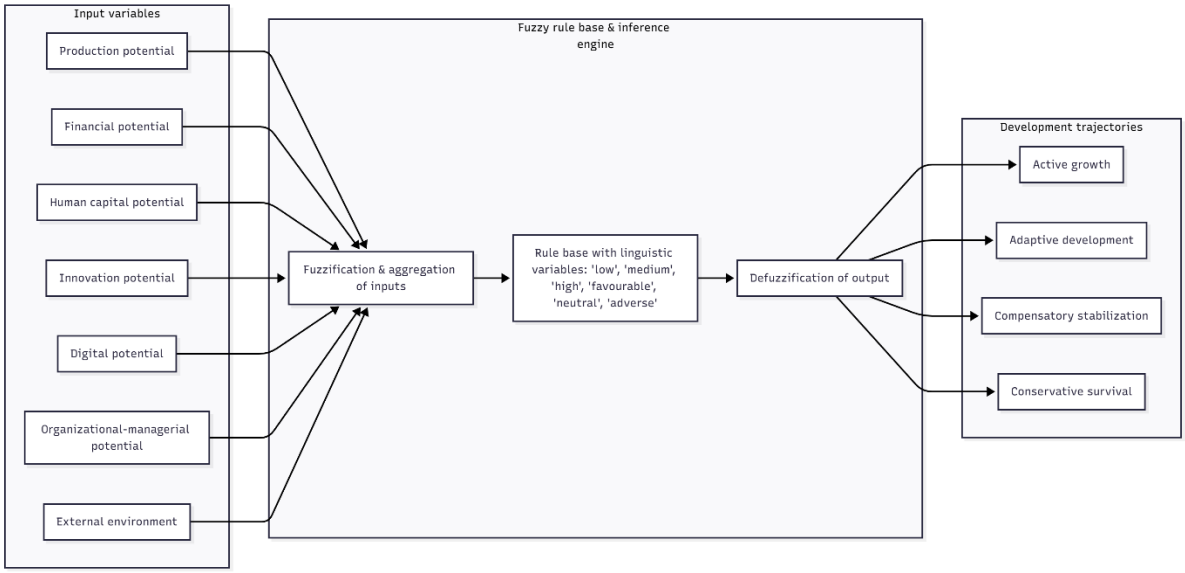

Figure 1: Fuzzy-logic based model of enterprise economic potential development trajectories

In the model developed by us, the input variables are the state of the main components of potential (production, financial, human, innovation, digital and organizational-managerial) and parameters of the external environment, while the output is one of four trajectories: active growth, adaptive development, compensatory stabilization or conservative survival. In our view, the novelty of the approach lies in combining the assessment of economic potential with the classification of strategic development trajectories in a fuzzy environment, which is particularly important for wartime and the post-war period.

Simulation results show that enterprises with high or medium-high innovation-digital and human potential, given at least moderate financial resources, are predominantly allocated to the active growth trajectory, especially in sectors with strong reconstruction-driven demand. By contrast, a significant share of production-oriented enterprises with insufficient digitalization falls into the adaptive development group, where we substantiate the priority of measures aimed at rebalancing the structure of potential through investments in digital technologies, process automation and human capital development. For enterprises on the compensatory stabilization trajectory, the model indicates the need to combine internal organizational-managerial changes with external support (grants, concessional finance, digitalization programmes) in order to prevent a shift to the conservative trajectory with a high risk of exiting the market.

3.4. Role of digital transformation in potential enhancement

In our opinion, one of the key results of the study is empirical confirmation that digital transformation acts not as a separate component but as a cross-cutting factor that reinforces all elements of economic potential. Comparative analysis shows that enterprises with higher digital maturity indices outperform less digitalized peers in terms of revenue recovery, cost optimization, access to new markets and job preservation during war and recovery.

Importantly, we found the effect of "fragmented" digitalization to be limited, when individual technological solutions are implemented without integration into core processes and management systems, sometimes even complicating coordination and increasing costs. In our view, sustainable growth of economic potential is ensured only when digital tools are linked to clearly defined strategic goals, supported by human capital development and embedded in adaptive management mechanisms based on data and scenario analysis. This understanding of digital transformation is embedded in the architectonics of the mechanism presented in Fig 2.

3.5. Architectonics and implementation of the development mechanism

We substantiate the architectonics of the mechanism for the development of enterprise economic potential as a multi-level closed-loop system that combines regular monitoring, fuzzy-logic diagnosis, strategic and project management (Fig. 2). In our opinion, the principal novelty of the proposed mechanism consists in synthesizing: (1) structural diagnosis of potential by components; (2) fuzzy classification of development trajectories; (3) explicit embedding of digital transformation as a mandatory block of all trajectories; and (4) alignment of internal decisions with available instruments of post-war recovery and SME support policy.

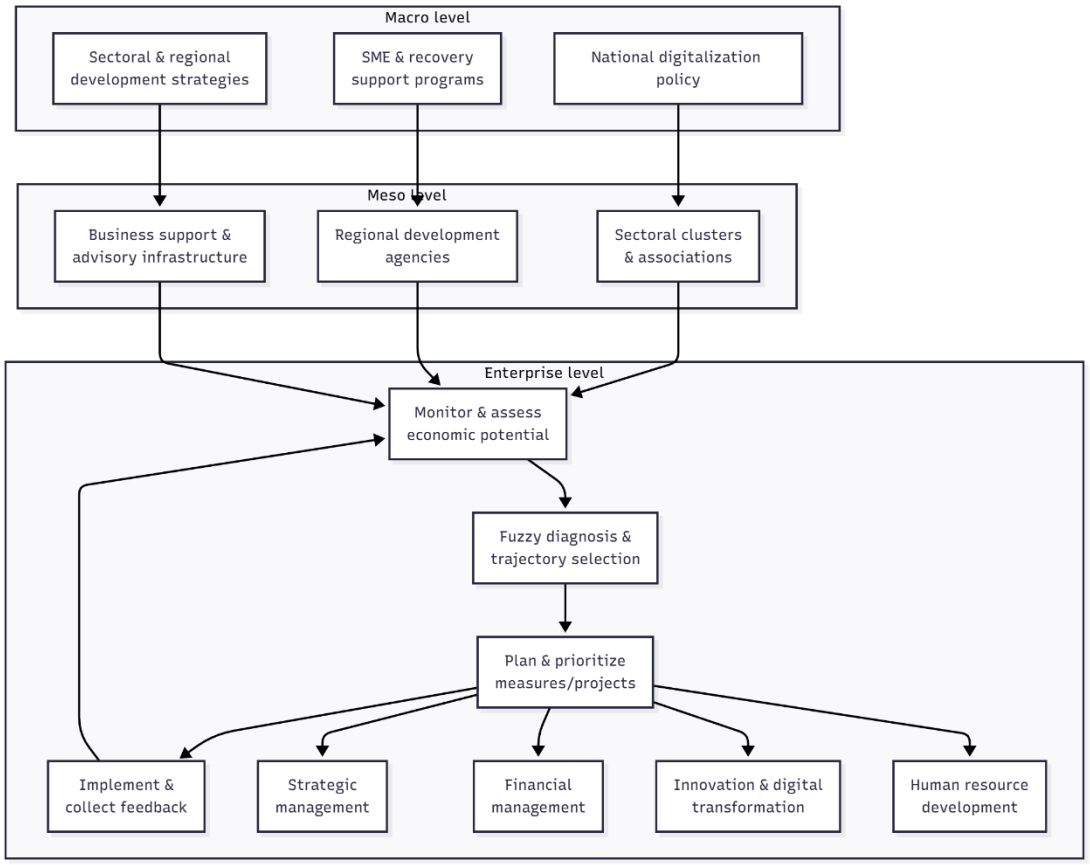

Figure 2: Architectonics of the mechanism for enterprise economic potential development under digital transformation and post-war recovery

Figure 2 shows three interconnected levels of the mechanism – enterprise, meso (sectoral/regional) and macro (national policy) – between which, in our opinion, vertical coherence of goals and instruments should be ensured. At the enterprise level, key subsystems are distinguished: strategic management, financial management, innovation and digital transformation management, and human resource development; their operation is coordinated via a shared "Monitor → Diagnose (fuzzy) → Plan & Implement → Feedback" cycle, ensuring the adaptability of the mechanism to environmental changes. At the meso and macro levels, the mechanism is integrated with sectoral programmes, regional strategies and national documents on digitalization and SME development, which, in our view, allows internal efforts of the enterprise to be reinforced by external financial, institutional and knowledge resources.

3.6. Practical implementation and originality of the approach

In practical terms, we propose an implementation sequence for the mechanism: initial diagnosis by structural components (using the toolkit of Table 1), formation of the enterprise profile and identification of the current trajectory based on fuzzy-model results (Figure 1), and construction of a target trajectory and project portfolio within the architectonics of the mechanism (Figure 2), taking into account available state and donor support instruments [1;2;5;9;12;16]. In our opinion, this logic makes it possible not only to assess the state of economic potential but also to directly transform assessment results into actionable management decisions oriented towards digital transformation and post-war recovery.

We substantiate that the proposed approach has at least three elements of scientific originality: first, structural, dynamic and trajectory-based interpretations of enterprise economic potential are integrated; second, a fuzzy-logic model has been developed that links potential assessment with strategic development trajectories under persistent uncertainty; third, digital transformation is treated as a system-forming factor of the potential development mechanism in the context of post-war recovery [5;6;10;13;18;19]. In our opinion, this creates a methodological basis for adapting the mechanism to different sectors and regions of Ukraine and for its practical use by enterprises seeking to combine recovery, modernization and integration into the European digital space.

4. Conclusion.

The conducted research has made it possible to clarify the essence and structure of the economic potential of the enterprise and to link its development with the processes of digital transformation and post-war recovery in Ukraine. An integrated system of indicators and a fuzzy-logic-based model have been developed, which together enable the assessment of the current state, identification of structural imbalances and selection of development trajectories (active growth, adaptive development, compensatory stabilization or conservative survival) under conditions of high uncertainty.

The results confirm that digital transformation acts as a cross-cutting factor that strengthens all components of economic potential, with higher levels of digital maturity associated with greater resilience, faster revenue recovery and more effective adaptation of enterprises to war-related shocks. At the same time, the effect of fragmented digitalization is limited, which underscores the need for its integration into strategic and operational management, human capital development and innovation processes.

The proposed multi-level mechanism, which combines structural diagnostics, fuzzy trajectory classification and alignment with national digitalization and SME support policies, provides a practical toolkit for enterprises seeking to simultaneously restore, modernize and internationalize their activities in the European digital space. This approach can be further adapted and refined for specific sectors and regions, as well as extended through deeper empirical studies and the incorporation of advanced AI-based analytical instruments.

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