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CONCEPTS OF ENTERPRISE DEVELOPMENT IN ECONOMY 5.0

The research's relevance stems from the growing market dynamism, the shift from Economy 4.0 to Economy 5.0, and the interpretation of this transition as a pivotal stage in enterprise production processes and their socio-economic role. It is worth noting that in Economy 5.0, the focus of enterprises is increasingly shifting from simple automation and optimization of production processes to creating a shared space for collaboration between robots and humans (facilitated by a range of specific concepts). The purpose of the article is to identify and systematically characterize the concepts of enterprise development in Economy 5.0. Within the research, the identification of the distinctive features of key aspects of change accompanying the transition of enterprises from Economy 4.0 to 5.0 has been carried out. The study realizes the definition of the characteristics of transforming enterprises into active participants in socio-economic relations in Economy 5.0. The research identifies and describes fundamental characteristics of components as concepts of enterprise development in Economy 5.0.

Keywords: concept, human capital, activity adaptability, open communication, social responsibility.

JEL Classification: D29, F20, F23, F41

КОНЦЕПТИ РОЗВИТКУ ПІДПРИЄМСТВА В ЕКОНОМІЦІ 5.0

Актуальність дослідження зумовлена початком переходу від економіки 4.0 до економіки 5.0, а також зміщенням фокусу підприємств з простої автоматизації та оптимізації виробничих процесів на створення якісно нового простору співпраці роботів та людей (що забезпечується за допомогою ряду специфічних концепцій). Відтак, метою статті є визначення та системна характеристика концептів розвитку підприємства в економіці 5.0. При цьому у межах дослідження проведено визначення особливостей прояву ключових аспектів змін, які супроводжують перехід підприємства від економіки 4.0 до 5.0. У дослідженні визначені особливості перетворення підприємства в активного учасника соціально-економічних відносин в економіці 5.0. У дослідженні реалізоване визначення та опис базових характеристик складових, які можуть бути інтерпретовані як концепти розвитку підприємства в економіці 5.0. У межах дослідження доведено, що з переходом підприємства від економіки 4.0 до економіки 5.0 відбувається зміна акцентів з технологічного прогресу та цифрової трансформації на гармонійний інноваційний та креативний розвиток за сталим використанням ресурсів. Доведено, що серед ключових ознак переходу підприємства від економіки 4.0 до економіки 5.0 наступні: загальне розширення фокусу на розвиток людського капіталу; перехід до інноваційності та креативності у виробничих процесах; загальна гнучкість та адаптивність діяльності; співпраця людей та машин; відкрита комунікація між різними структурними підрозділами та креативними фахівцями та їх командами; соціальна відповідальність. Окреслені вище зміни призводять до того, що підприємство, як активний учасник соціально-економічних відносин, прагне до формування стійкого та прогресивного економічного середовища, яке концептуально вирізняється: осядливим, адаптивним виробництвом; щільною співпрацею роботів і креативних особистостей; розширенням меж виробництва; господарською діяльністю, яка не порушує стан місцевої екосистеми. За результатами дослідження окреслені компоненти середовища інтерпретовані як концепти розвитку підприємства в економіці 5.0.

Ключові слова: концепт, людський капітал, адаптивність діяльності, відкрита комунікація, соціальна відповідальність.

Statement of the problem. The research's relevance stems from the shift from Economy 4.0 to Economy 5.0 and enterprises' focus moving from basic automation to a new collaborative space between robots and humans, facilitated by specific concepts. For instance, Volkswagen AG, which manufactures automobiles using cutting-edge technologies aligned with the principles of Economy 4.0, successfully implemented automated production lines and data exchange systems in 2019. It allowed for a 60% increase in productivity and a 55% reduction in costs. However, in 2023, despite enhanced automation, Volkswagen AG began encountering issues with innovation deficiency (posing a risk to the competitiveness of its products), lack of flexibility (as the implemented automated systems proved inflexible in managing production changes), and absence of human-machine collaboration (it turned out that instead of utilizing technology to improve collaboration and foster creativity, the company was limited to automated processes only). Hence, the outlined experience vividly demonstrates that in the new circumstances, established business activity models cease to meet the demands of the time and lose their effectiveness. Enterprise management is compelled to review existing value-creation methods and seek out new business strategies. Exactly, to resolve Volkswagen AG's challenges, it must transition to Economy 5.0. It entails developing the capacity to leverage creativity and innovation for value creation while establishing an environment that fosters collaboration between robots and workers.

Analysis of recent research and publications. Industry 5.0 marks a shift in enterprise development approaches. Specifically, some researchers exploring these issues (including Nagara M.B., Leong Y.K., Tan J.H., Chew K.W., Show P.L.) note that the transition of an enterprise from Economy 4.0 to 5.0 entails significant changes in its production processes, as well as a transformation of its role in socio-economic relations. Research on enterprise development in the Fifth Industrial Revolution context is primarily conducted by scholars like S. Ambrosetti, G. Jonker, Y. Leong, F. Longo, S., and others. Currently, scholarly sources provide insufficient elaboration on the paradigms or strategic directions for enterprise development in Economy 5.0.

Objectives of the article. The article aims to define and systematically characterize the concepts of enterprise development within the framework of Economy 5.0. To accomplish the stated objective, the following research tasks must be addressed: 1) define the characteristics of the key aspects of changes that accompany the transition of enterprises from Economy 4.0 to 5.0; 2) identify the transformational features of enterprises as they become active participants in socio-economic relations within Economy 5.0; 3) determine and describe the fundamental characteristics of components that can be interpreted as concepts for enterprise development in Economy 5.0.

Summary of the main results of the study. Economy 4.0 and 5.0 are terms, that describe different stages of economic development, particularly considering the influence of technology and digital transformation. It is worth noting that currently, enterprises are transitioning from Economy 4.0 to Economy 5.0 due to qualitatively new development and utilization of artificial intelligence, the Internet of Things (IoT), data processing, and so on. Economy 4.0 is primarily characterized by automation and

digital technologies that make production and business processes more efficient and productive. Economy 5.0 signifies the next stage of development where not only technological progress is considered but also social and environmental aspects. It entails a greater focus on sustainable development, consideration of societal needs, and preservation of the environment. Thus, among the key features of the transition of an enterprise from Economy 4.0 to Economy 5.0 [3] are increased focus on human capital, transition to innovation and creativity in production processes, overall flexibility and adaptability of operations, collaboration between humans and machines, open communication between different structural units and creative experts and their teams; social responsibility. Including the above, it is evident that the characteristics of each of the identified aspects of change (Table 1) necessitate the enterprise's departure from the role of a passive participant in socio-economic relations, in favor of being an active creator or catalyst of change in its environment.

According to the above, it is evident that the transformation of an enterprise into an active participant in socio-economic relations, acting as a catalyst for change in its environment, implies that such a participant:

1. Supports leadership in innovation (demonstrates an innovative approach and a readiness for change that inspires other market participants to implement innovative approaches and technologies [3–4]).
2. Promotes sustainable development and addresses social issues in its environment (accounted for ecological, economic, and social aspects in its activities [6]).
3. Creates a positive impact on its surroundings (acts as a catalyst for change by creating jobs, developing the local economy, and supporting local initiatives [1]).
4. Engages other market participants in collaborative efforts to address important issues and achieve common goals.

Given that "Economy 5.0" is an extension of the Fourth Industrial Revolution concept (Economy 4.0) but with a focus on sustainable development, human interaction with nature, and social responsibility, the outlined changes lead to the enterprise, as an active participant in socio-economic relations, being responsible for shaping a sustainable and progressive economic environment. This environment conceptually distinguishes itself by: learn adaptive production; close collaboration between robots and creative individuals; expansion of production boundaries; economic activities that do not disrupt the state of the local ecosystem.

The outlined components, interpreted by us as concepts for enterprise development (specifically as paradigms or strategic directions for enterprise development in Economy 5.0), thus their essence and specific formation need to be identified and systematically studied.

Indeed, the fundamental concept for enterprise development in Economy 5.0 is lean adaptive production, which defines an approach to organizing production processes that account for changes in market conditions and technological capabilities. Essentially, the main characteristics of lean adaptive production include flexibility, efficiency, adaptability, innovation, and resilience (Figure 1). The main idea of lean adaptive production is to create a flexible and efficient production system capable of quickly adapting to changing market

Table 1

The manifestations of key aspects of change accompanying the transition of an enterprise from Economy 4.0 to 5.0

Key aspect of change	Nature of manifestation of key aspect	The foundation for changing roles in socio-economic relations
Expanded focus on human capital	Involves training, skill enhancement, fostering creativity, and personal development. Enterprises create conditions to support a work-life balance for their employees	Enterprises in Economy 5.0 invest in the development of their employees.
Transition to innovation and creativity in production processes	Involves incentivizing employee creativity and focusing on finding new ways to improve products and services.	Enterprises in Economy 5.0 utilize innovative technologies and methods to enhance their production processes
Flexibility and adaptability	Involves transitioning to production systems that allow for quick adaptation to new products, technologies, or markets	Enterprises in Economy 5.0 are characterized by high flexibility and the ability to quickly adapt to changes in the production environment and market conditions
Collaboration between humans and machines	Utilizing technologies to streamline employees' work and enhance their productivity and creativity	Enterprises in Economy 5.0 have automated production processes that create conditions for effective collaboration between humans and machines
Open communication	Utilizing technologies for idea exchange, developing new projects, and ensuring swift response to changes	Enterprises in Economy 5.0 actively promote open communication between different departments and teams
Social responsibility	Implementing ethical standards, adhering to transparency standards in management and production, as well as developing corporate social responsibility programs	Enterprises in Economy 5.0 understand the importance of their role in society and pay attention to social responsibility

Source: formed based on [1; 3-4; 6]

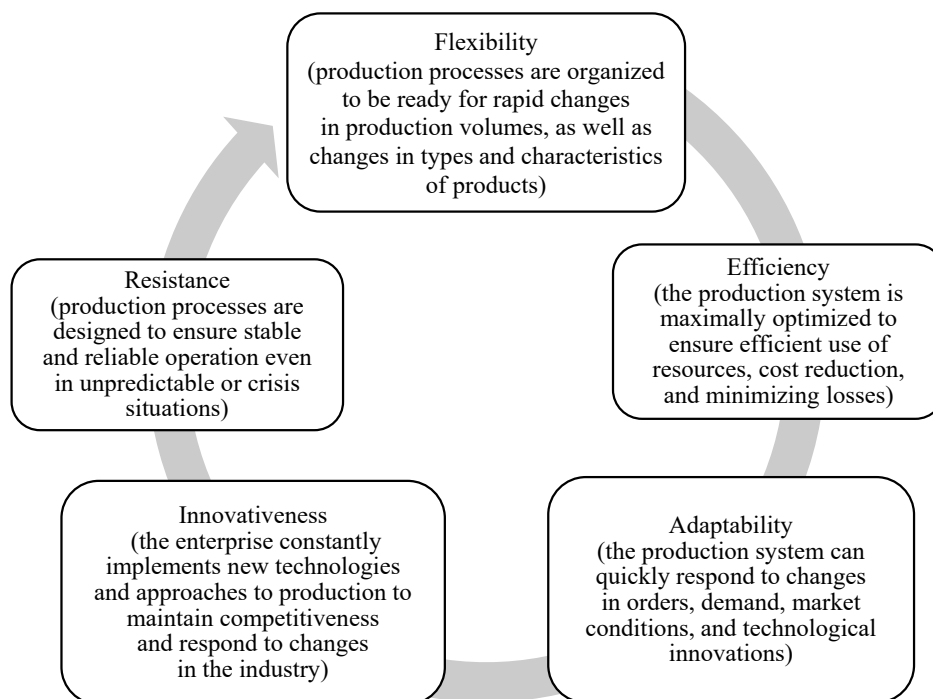


Figure 1. The main features of the Lean Adaptive Production Concept in Enterprise Economy 5.0

Source: formed based on [1; 4-6]

conditions and demands, which is possible through flexible production processes and the implementation of circular production.

Moreover, the flexible production process entails that all workstations or production lines can be quickly reconfigured to produce different types and modifications of products using software and robots (this can occur

depending on customer orders [5]). For example, if there is an increase in demand for certain product modifications, all available workstations can be reconfigured to produce them, and then, if the demand changes, the stations can quickly adapt to incorporate changes or add new features, properties, or characteristics to the existing product.

The implementation of circular production entails creating manufacturing processes that efficiently utilize resources, minimize waste, and ensure the sustainable recycling and reuse of materials. For example, this can be achieved by using recycled materials (such as recycled plastic [4]) in the production process or by repurposing waste from other manufacturing processes (for instance, plastic trimmings or scraps from previous production could serve as a source of secondary materials [4]). Therefore, the concept of lean adaptive manufacturing enables enterprises to remain competitive in Economy 5.0, particularly by responding to changes in the environment and ensuring sustainable production of goods amidst uncertainty.

The concept of tight collaboration between robots and creative individuals involves close interaction between automated systems (robots) and employees with advanced creative skills. This concept entails that robots and humans work together as a team, complementing each other in implementing ideas and knowledge to achieve common goals. This concept is shaped by the following factors (Figure 2): the execution of routine operations and repetitive tasks by robots (freeing humans from monotonous work and allowing them to focus on more creative aspects of production); the role of workers as sources of creativity and innovation (who can complement and improve products [1]); mutual learning (through programming and machine learning [1]); joint projects and initiatives (where people and robots can work together on joint projects or initiatives [4-5]).

Such collaboration between humans and robots not only facilitates the transition to flexible production processes (with the ability for quick reconfiguration to manufacture various types of products [1]) and agile value creation

chains but also creates the conditions for implementing on-demand manufacturing through the use of 3D printing technology for producing certain complex or unique parts as needed, rather than mass production.

The concept of expanding the boundaries of production entails a shift from the classical model of production (focused solely on manufacturing specific goods or services [1; 3]) to more flexible and expanded approaches (oriented towards changing market demands, technological capabilities, and sociocultural trends [1]).

This concept is shaped by (Figure 3): diversification of manufactured products; expansion of production geography; development of new markets and exploration of new product applications; and utilization of modern technologies and innovations. The expansion of production boundaries aims to broaden market opportunities and enhance production efficiency, enabling enterprises to adapt to changing market conditions and ensuring sustained growth and development for the enterprise.

The concept of economic activity that does not disrupt the local ecosystem involves conducting activities that do not harm the environment and natural resources, but rather contribute to their preservation, restoration, and sustainable use. This concept is shaped by (Figure 4): focusing economic activity on ecosystem sustainability (which involves preserving the diversity and structure of ecosystems [2]); focusing on sustainable resource use in economic activities; minimizing emissions and waste; social responsibility; economic efficiency that does not lead to environmental degradation or depletion of natural resources.

It is envisioned that this concept is based on the principles of sustainable development and balanced

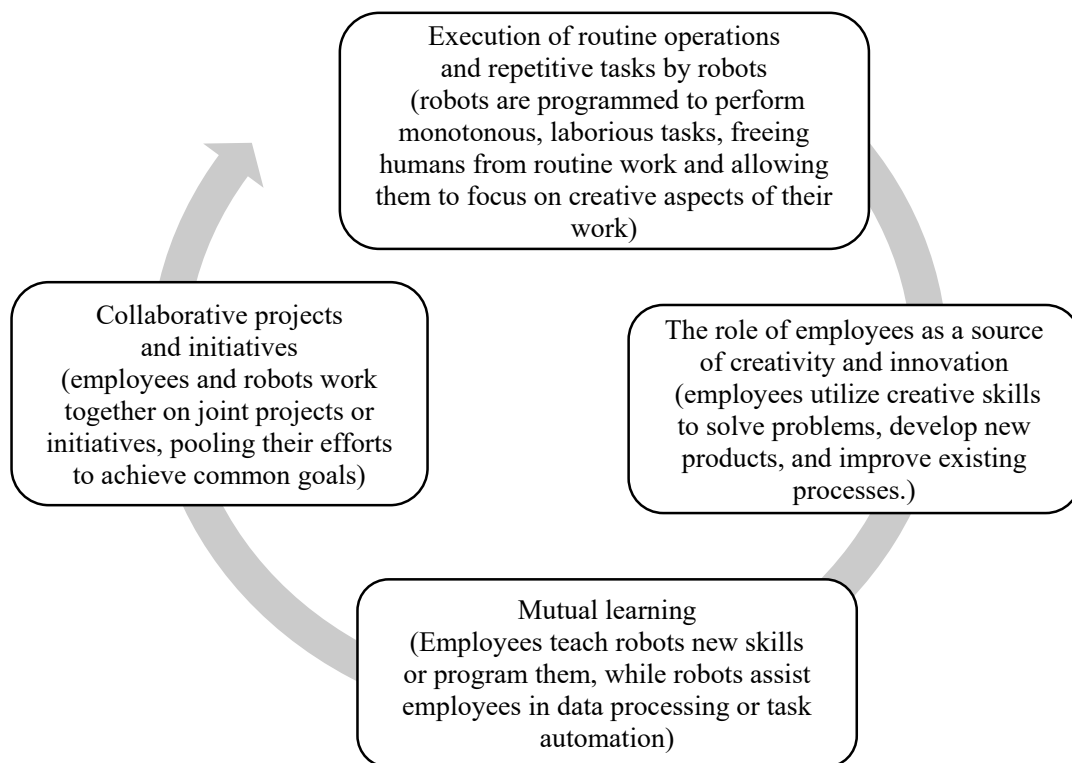


Figure 2. The main features of the concept of close collaboration between robots and creative individuals in the Economy 5.0 enterprise

Source: formed based on [1; 4-5]

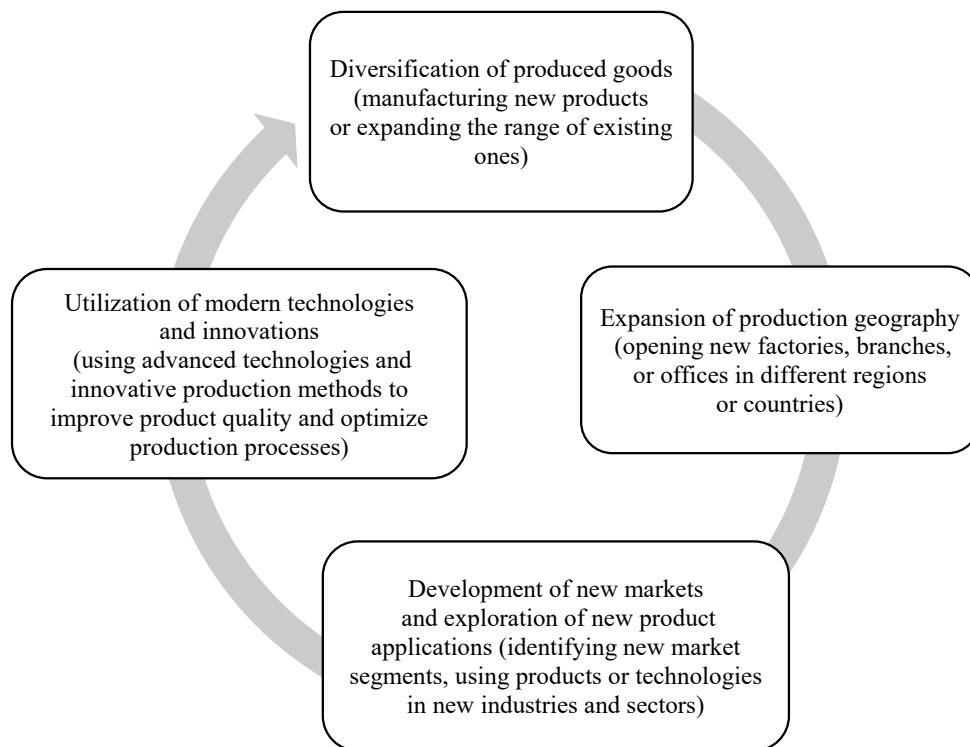


Figure 3. The main features of the concept of expanding production boundaries in Enterprise 5.0 economy

Source: formed based on [1; 3]

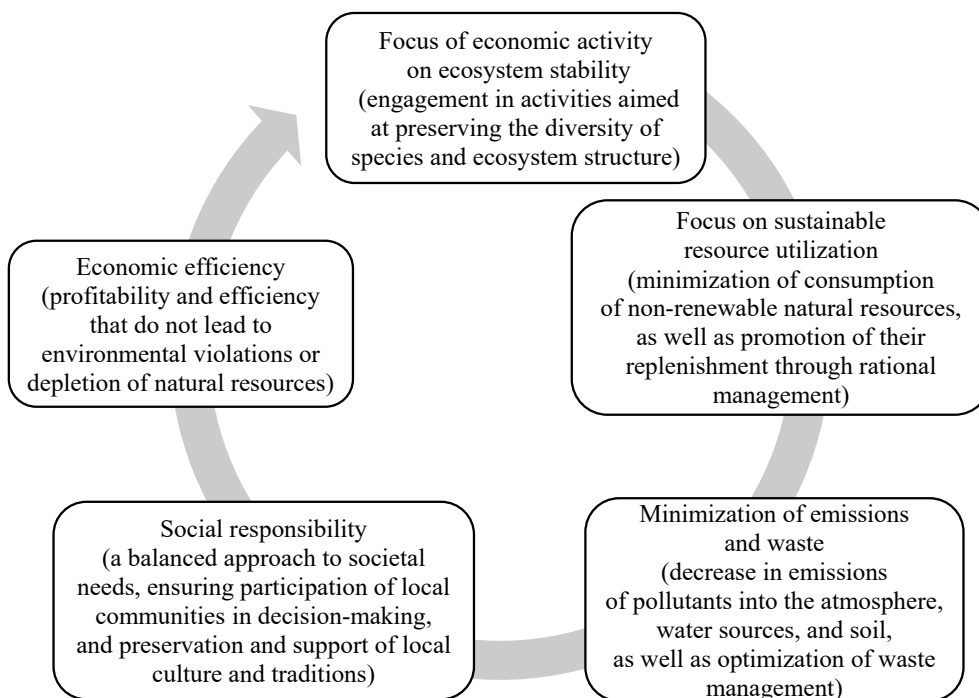


Figure 4. Main characteristics of the concept of economic activity that do not disrupt the local ecosystem

Source: formed based on [2; 3; 5]

resource utilization, aimed at preserving conditions for the long-term viability of ecosystems and conserving natural resources for future generations.

It should be noted that the combination of all the outlined concepts above forms the basis for enterprise development in the economy 5.0, as it balances technological progress achievements with attention to human needs, conservation of natural resources, and ensuring sustainable development.

Conclusions. Within the study, it has been demonstrated that as enterprises transition from economy 4.0 to economy 5.0, there is a shift in focus from technological progress and digital transformation towards harmonious innovation and creative development while ensuring sustainable resource utilization. The following conclusions have been drawn:

1. Among the key characteristics of the transition of an enterprise from economy 4.0 to economy 5.0 are a broader focus on human capital, a shift towards innovation and creativity in production processes, overall flexibility and adaptability of activities, collaboration between humans and machines, open communication between different structural units and creative professionals and their teams; social responsibility. Accounted for, it is evident that the

manifestations of each of the aforementioned key aspects of change lead to the enterprise relinquishing the role of a passive participant in socio-economic relations in favor of becoming an active creator or catalyst of change within its environment.

2. Considering that "economy 5.0" is an extension of the Fourth Industrial Revolution concept (economy 4.0) but with a focus on sustainable development, human-nature interaction, and social responsibility, the outlined changes lead to the enterprise, as an active participant in socio-economic relations, striving to ensure the formation of a stable and progressive economic environment. This environment conceptually features efficient adaptive production, close collaboration between robots and creative individuals, expansion of production boundaries, and economic activities that do not disrupt the state of the local ecosystem. The outlined components are interpreted by us as concepts for the development of enterprises in the economy 5.0.

Furthermore, prospects for further research include identifying strategies for the rapid implementation of concepts that form the basis for enterprise development in the economy 5.0.

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