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VECTOR MANAGEMENT OF ENTERPRISE DEVELOPMENT IN AN UNSTABLE ENVIRONMENT

ВЕКТОРНЕ УПРАВЛІННЯ РОЗВИТКОМ ПІДПРИЄМСТВА В НЕСТАБІЛЬНОМУ СЕРЕДОВИЩІ

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Controlled and uncontrolled changes are becoming increasingly common around the world today. The global Internet economy operates 24/7, creating a new competitive environment where traditional boundaries between markets are blurred and decision-making speed is a critical success factor. Demographic changes and mass customization are leading to a need to revise product release programs, as consumers of different generations have radically different preferences and expectations for products and services. E-business allows the consumer to see all their choices, which completely changes the competitive environment of the enterprise and makes the market position vulnerable to instant comparisons with alternatives. Business is becoming global, as all phases of the purchase, from receiving advertising to product delivery, are collected for the consumer on a single digital platform.

The emergence of bifurcation points in the economic environment, when systems find themselves faced with a choice of radically different trajectories of further development, leads to even greater uncertainty. This may be the emergence of new technologies, in particular the development of artificial intelligence and the actualization of digital currency, the emergence of new players with innovative business models on the market, and on the other hand, there may be a change in consumer preferences and various types of crises: political, economic, pandemics or resource depletion. A fairly thorough analysis of decision-making processes at bifurcation points of financial and economic systems is presented in the scientific work of A. Prishchenko, which focuses on the causes, consequences and ways to reduce the level of uncertainty at such critical moments in the development of systems [1].

The experience economy is transforming the very nature of competition, shifting its focus from the

Пушкар О.І., Татаринцева Ю.Л. Векторне управління розвитком підприємства в нестабільному середовищі. Науково-методична стаття.

Векторне управління розвитком підприємства в умовах невизначеності є інноваційною концепцією, що поєднує системний аналіз, кібернетику та стратегічне управління. Дослідження вирішує проблему відсутності універсальних підходів, які дозволяють підприємствам змінювати напрям розвитку, перерозподіляти ресурси та коригувати цілі, зберігаючи стабільність у динамічному середовищі. Це критично важливо для освітніх та інноваційно-орієнтованих підприємств, що адаптуються до ринків знань і технологій. Дослідження розробляє метод векторного управління шляхом адаптації технічних концепцій до економічних систем, використовуючи вектори як інтегральні показники напряму розвитку, визначені внутрішніми/зовнішніми факторами та стратегічними пріоритетами. Механізм забезпечує контрольовані переходи між економічними парадигмами, зберігаючи цілісність системи та конкурентоспроможність. Класифіковано типи векторних переходів (адаптивний, трансформаційний, інноваційний, компенсаційний) та розроблено базову модель управління, що включає діагностику, моделювання, оцінку, корекцію та консолідацію. Практичне застосування продемонстровано на прикладі переходу ХНЕУ до інноваційно-орієнтованої стратегії в умовах цифровізації освіти.

Ключові слова: векторне управління, економіка вражень, розвиток підприємства, стартап, цифрова трансформація, стратегічне управління розвитком, мінімально життєздатний продукт

Pushkar O.I., Tataryntseva Yu.L. Vector Management of Enterprise Development in an Unstable Environment. Scientific and methodical article.

Vector management of enterprise development under uncertainty is an innovative concept combining systems analysis, cybernetics, and strategic management. The research addresses the lack of universal approaches enabling enterprises to redirect development, redistribute resources, and adjust goals while maintaining stability in dynamic environments. This is crucial for educational and innovation-oriented enterprises adapting to knowledge and technology markets. The study develops a vector management method by adapting technical concepts to economic systems, using vectors as integral indicators of development direction determined by internal/external factors and strategic priorities. The mechanism enables controlled transitions between economic paradigms while preserving system integrity and competitiveness. Key vector transition types (adaptive, transformational, innovative, compensatory) are classified, and a basic management model is developed including diagnostics, modeling, evaluation, correction, and consolidation stages. Practical application is demonstrated through KhNEU's transition to innovation-oriented strategy under educational digitalization.

Keywords: vector management, experience economy, enterprise development, startup, digital transformation, strategic development management, minimum viable product

functional characteristics of products to the emotional experience of consumers interacting with brands. The anomalous events that Nasim Taleb called "black swans", demonstrating the limitations of traditional strategic planning methods based on extrapolation of past experience [2]. The merger of the network economy with e-business creates a new reality where consumers become co-creators of value through social media platforms and digital ecosystems. We are entering the age of reason, the essence of which is to develop tools for finding relevant information in an ocean of digital noise and making quick decisions in conditions of information overload. There is a spread of modeling skills among new workers with a cyber-mentality, for whom reality manifests itself through the screens of digital devices, and who are becoming key players in the business arena thanks to the ability to conduct computer simulation experiments. New models of human information perception, described by Howard Gardner, and the growing role of intuition and emotions in decision-making require enterprises to radically rethink their approaches to interacting with customers [3].

Among the main provisions of the concept of enterprise development management under uncertainty are the following critical elements. The enterprise is presented as interconnected systems of functioning and development that carry out mutual reflexive management, where each system influences the other through feedback. To solve the problem of managing the strategic development of the enterprise, a special subsystem of development management is allocated, which functions autonomously from operational management. The mechanism for implementing development at enterprises is the development and implementation of innovations that are carried out in the process of transformational changes in organizational systems. A high level of uncertainty leads to the fact that the tasks of strategic development that are solved by enterprise managers are poorly formalized tasks that do not have unambiguous algorithmic solutions.

The process of system development is inextricably linked with its change, and in the course of system change, the parameters that determine its current state are transformed, similar to how a person as a system evolves through a sequence of physiological, psychological and social transformations.

Analysis of recent research and publications

Modern scientific research is increasingly focused on the analysis of processes of uncertainty, environmental turbulence and instability of socio-economic systems. A significant contribution to understanding the nature of unpredictability was made by N. Taleb, who in his works substantiated the concept of black swans as rare, unpredictable, but system-forming events that radically change the course of history, the structure of markets and the logic of strategic thinking [2, 4]. His approach demonstrates the limitations of linear predictive models and the need to find alternative flexible and nonlinear adaptation mechanisms in conditions of constant shocks and bifurcations.

In the context of the transformation of economic consciousness, the ideas of G. Gardner are of particular importance, as he proved that modern man not only perceives information differently, but also involves multiple types of intelligence, combining logical, emotional, visual and social channels of data processing [3]. His concept of multiple intelligence allows us to explain the change in consumer behavior patterns, the emergence of clip thinking, the growing role of intuition, symbols and images in decision-making, as well as the formation of a new type of user in the environment of tablets, gadgets and social networks.

The issues of the economy of impressions in the conditions of digitalization, oversaturation of the market with goods and information are thoroughly considered in the works [5-7]. In the study of the evolution and transformation of economic paradigms, it is proposed to consider the economy as one that shifts from goods to meanings, emotions and individual experience, and also substantiates the change in the role of the enterprise as a creator of impressions and semantic structures [5]. In subsequent publications, the authors clarify the conceptual apparatus of the economy of impressions in the digital marketing system, revealing the mechanisms of managing not the material characteristics of the product, but its emotional and symbolic content [6]. The results of the study on the economic evaluation of digital marketing management in the enterprise are also significant, proving the effectiveness of integrating intangible parameters into strategic planning [7].

The concepts of dynamic capabilities of enterprises are considered as a critical factor of competitiveness in the era of technological gaps [8,9]. The role of digital technologies in the transformation of business models and the creation of new sources of competitive advantages is analyzed from the perspective of the formation of digital ecosystems [10, 11]. Research on strategic management under uncertainty is presented in works that analyze the mechanisms of adaptation of organizations to rapid changes in the market environment [12, 14]. Startup methodologies and approaches to testing innovative hypotheses through minimally viable products are described in the context of lean startup concepts [15, 16].

The founders of the concept of the economy of impressions, Pine and Gilmore, argued that the object of value is not the product as such, but the experience of interacting with it [17]. Castells as a theorist of the network society [18] and Toffler as a researcher of the waves of civilizational transformation [19] confirm that enterprises operate in a fundamentally new reality, where traditional tools for analysis, forecasting and development planning are limited. Thus, the analysis of scientific sources indicates the formation of a powerful theoretical basis for understanding the problem of enterprise development in turbulent conditions, however, the issue of vector management as a transfer of the technical concept to the plane of strategic management remains insufficiently researched and requires further comprehensive justification.

Topicality. The relevance of the topic lies in the fact that modern enterprises operate in conditions of high uncertainty, market turbulence and rapid technological changes. In these conditions, traditional methods of development management are not effective enough, which necessitates the introduction of new approaches. Vector development management allows an enterprise to quickly change the direction of resources and strategic efforts, ensuring adaptability and proactivity. Internal autonomous startups act as catalysts for innovation and stimulate changes along all axes of the organization. The use of analysis, modeling and digital technologies increases the effectiveness of decision-making in complex conditions. Thus, the study of the principles of vector management of enterprise development is extremely relevant for ensuring competitiveness and sustainable growth.

The aim of the article is to develop and substantiate a method of vector control of enterprise development under conditions of uncertainty based on an analogy with vector control in complex dynamic systems. To achieve the goal, the following tasks have been set:

- to substantiate the conceptual provisions of vector control;
- analyze and adapt the principles of vector control from aviation to enterprise management;
- implement minimum viable product (MVP) testing to correct the strategic development vector.

The main idea of the publication is based on a number of hypotheses.

Hypothesis 1. Improving the efficiency and quality of enterprise development management in conditions of uncertainty can be achieved by using the vector management method, which is based on transferring the technical concept to the management plane based on the analogy between complex technological systems and the enterprise as a set of business processes.

Hypothesis 2. The method of vector development management should contain a mechanism for translating development management policy into a different (compared to the current) economic paradigm.

Hypothesis 3. The implementation of the mechanism can be directed at the product or service sold by the enterprise, or at the consumer through the marketing system, which also occurs on the basis of vector management.

The object of research – is the process of enterprise development management.

The subject of the study is – the method of vector management of enterprise development and a set of methodological recommendations that ensure the support, development and implementation of this method at enterprises of various industries.

Research methods. To address this scientific issue, the following methods were used: the method of analogy; comparative analysis and synthesis; system method; structural method; abstract-logical generalization.

The main part

1. Conceptual provisions of vector control;

We are entering the "century of reason". Its essence is – the development of tools for searching for

information in an ocean of noise. In this context, there is a spread of modeling skills: new workers with a cyber -mentality, for whom reality – is a screen, are becoming key players in the business arena, and for them the ability to conduct experiments in computer simulation is becoming a key function. At the same time, the process of system development is inextricably linked with its change: in the course of these changes, the states of the system and the parameters that determine its functioning (for example, a person as a system) change. Development – is an irreversible, directed, regular change of material and ideal objects (language, culture, values). Only the simultaneous presence of all three of these properties distinguishes development processes from other changes. Irreversibility protects the system from cyclical repetition, that is, from constancy, and directionality provides the possibility of accumulation of changes and the emergence of a new quality. In the absence of regularity, we have no development, but only chaos – a simple, causeless and infinite set of cases [5].

Among the main provisions of the concept – are the following: the enterprise is presented as an interconnected system of "Functioning" and "Development", which carry out mutual reflexive management. To solve the problem of managing the strategic development of the enterprise, a special subsystem of development management is allocated. The mechanism for implementing development at enterprises is the development. The high level of uncertainty leads to the fact that the tasks of strategic development, which are solved by enterprise managers, are poorly formalized development tasks, which requires an adaptive, flexible approach and the ability to quickly respond to environmental changes.

The method of vector management of enterprise development will be formulated as a list of provisions containing local hypotheses or statements regarding the requirements for objects and processes of the subject area, with further substantiation of each conceptual provision. This allows creating a systemic basis for making management decisions in conditions of high uncertainty and turbulence of the market environment.

Position 1. The enterprise operates in conditions of uncertainty. Therefore, the decision to change the direction of development is based on purely expert conclusions and results in – the transfer of its part to the plane of another economic paradigm with subsequent formalized actions and management decisions arising from this paradigm. As the basic criterion of the paradigm, we propose to use the competitiveness factor and the limitation/reason for the transition, since they most closely reflect the logic of the evolution of economic paradigms [5].

Position 2. The process of "shifting" into the zone of a new economic paradigm and enterprise management in conditions of uncertainty should be carried out on the basis of vector control, which is formed using the analogy between vector control in aviation and enterprise management. Vector control in aviation assumes that the thrust vector – is a force that moves the aircraft forward and has a direction. Systems

of changing the thrust vector (Thrust Vectoring System) can direct the jet of gases from the engine in the desired direction, regardless of the position of the aircraft itself, which allows to improve maneuverability and control, especially at low speeds and high angles of attack [23]. The pilot can change the direction of thrust regardless of the position of the aircraft in space and control its movement in the event that traditional control mechanisms lose their effectiveness (elevators and rudders); maneuverability increases and the take-off distance is reduced, a more controlled descent is provided. This analogy allows us to understand how an enterprise can adapt to rapid changes in the external environment and direct resources to the desired strategic vector.

Position 3. Vector development management for an enterprise is a transition from a reactive to a proactive, adaptive and flexible model that is able to constantly adjust the necessary direction of efforts. Such a model should include organizational mechanisms for the rapid redirection of enterprise resources in conditions of chaos and uncertainty. By analogy with a fighter jet: the goal – is not to survive in turbulence, but to use it to seize the initiative and enter new growth trajectories. This requires the enterprise to have the ability to quickly respond to changes in the market, technologies and consumer preferences, using the information received to promptly adjust the strategy [8, 23].

Provision 4. A large enterprise – a manufacturer of a product or service with a hierarchical management structure – creates a small autonomous startup ("traction vector") within itself to develop an innovative product. This product may be oriented

towards a different economic paradigm than the base one in which the enterprise exists. The startup uses all the resources of the parent company, but is not subject to all its bureaucratic procedures, which allows it to quickly maneuver in the market. Without waiting for the development of an ideal product, the enterprise releases a minimum viable product (MVP) to test the hypothesis in the market. If necessary, the enterprise redirects the development vector. Another development option involves applying vector management to the enterprise's marketing subsystem oriented towards a given product or service.

The main tasks of decision-making in development management are proposed: choosing a development direction, choosing a form of obtaining resources and choosing a type of development. Choosing a direction includes alternatives: developing a vision, mission, strategies; developing a business culture; developing the company's competencies and business processes; developing technological structures, equipment and employee competencies. Choosing a form of obtaining resources involves: internal resources, exchanging resources, creating strategic alliances, acquiring and selling enterprises. Choosing a type of development includes: innovative development, reengineering, restructuring, anti-crisis development and combinations of these types. Considering Provision 4, the development directions should include the development of a new product or service and modification of processes in the marketing subsystem, and the type of enterprise development should include an – internal autonomous startup [5].

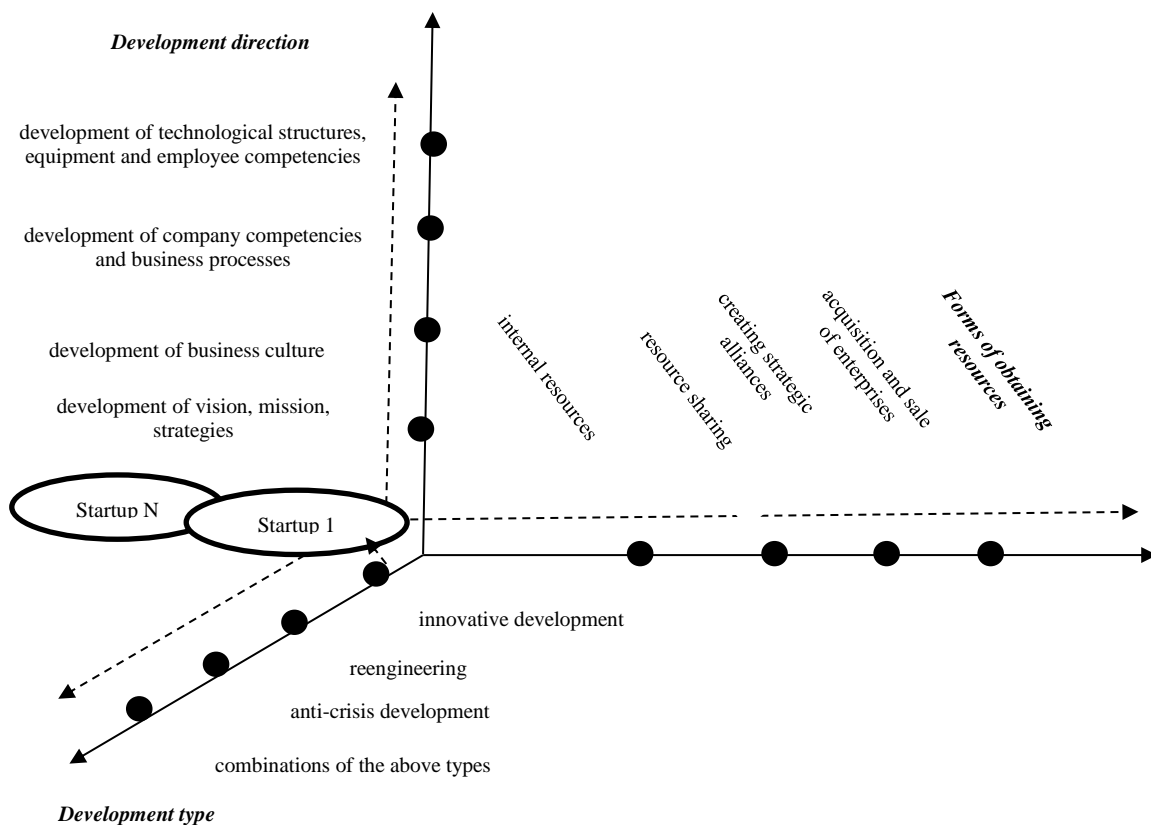


Figure 1. Vector management of enterprise development

Source: authors' own elaboration

Furthermore, the internal startup functions as a flexible experimental platform where new business models, technologies, and customer interaction tools can be tested with minimal risk for the core enterprise. This approach allows the organization to combine the stability of a large structure with the adaptability of a small innovation-driven team. The "traction vector" concept also supports rapid feedback collection, enabling real-time adjustment of strategic decisions based on market response. As a result, management gains more accurate data for scaling successful solutions or discontinuing ineffective ones. This model strengthens the enterprise's resilience in an unstable environment by diversifying its development trajectories. In addition, it stimulates intrapreneurship among employees, increasing motivation and creative engagement. Consequently, vector management transforms uncertainty from a threat into a controlled space for strategic experimentation and sustainable growth.

A large enterprise can create an internal autonomous startup [5], which acts as a "traction vector" for the development of the organization. A new startup is able to bring the company to a new level of competitiveness and efficiency, generating innovative products or services that are oriented towards other economic paradigms than those operating in the basic structure of the enterprise. Its activities trigger a process of change along all axes of management: strategic orientation, business processes, organizational structure, marketing, resources and personnel competencies.

Startups, by their very nature, require a recharge of the enterprise on all axes, as their success requires flexibility, adaptability, and rapid redirection of resources. This "recharge" means a simultaneous transformation of strategic goals, processes, and management systems, ensuring the synchronous development of all components of the enterprise.

Even if an internal startup does not achieve the expected results or turns out to be commercially unviable, the company does not stop its development. An unsuccessful project is transformed into valuable experience, which allows you to adjust strategic approaches, clarify innovation vectors and improve decision-making processes. Based on the conclusions obtained, the next N-th startup is initiated, which takes into account previous mistakes and acquired competencies. Thus, a continuous cycle of experimentation, learning and improvement is formed, which ensures the evolutionary, rather than discrete, nature of the company's development and supports its long-term competitiveness.

Thus, the creation of an internal startup ensures the constant evolutionary development of the enterprise, where each new product or service acts as a catalyst for change and stimulates the organization's adaptation to conditions of uncertainty, market turbulence and technological breakthroughs. As a result, the enterprise gains the ability not only to respond to external changes, but also to proactively shape its own development trajectories, creating conditions for stable growth and innovative leadership.

Provision 5. Regardless of the current orientation of the enterprise strategy, existing business processes, structures, products, the enterprise produces a minimally viable product (or service) in a short time. The conducted market testing allows you to accept the idea, proceed to modernization or reject it. Such feedback allows you to adjust the vector of enterprise development, ensuring operational flexibility, or, as they say, "maneuverability regardless of orientation".

Vector management of enterprise development – is an approach in which a company can quickly change the direction of its energy (resources) to achieve strategic goals, regardless of its current "orientation", i.e. existing business processes, structures and products [5].

2 Adaptation of vector control principles from aviation to enterprise management.

The principles of vector control from aviation can be effectively adapted to managing an enterprise under conditions of uncertainty, allowing the company to act flexibly, quickly respond to market changes and optimally use its resources. The most important is the principle of "shooting at the target without turning the entire body towards it", which in aviation means the ability to change the direction of the aircraft without completely reconfiguring all systems, and in business – the ability of the enterprise to direct resources to key goals without blocking other processes. An example of the application of this principle is the release of a minimum viable product (MVP): instead of developing an ideal product for many years, the company quickly tests the hypothesis on the market and redirects the development vector based on the feedback received.

At the same time, the enterprise does not lose its strategic integrity, as the change of direction occurs not chaotically, but within a clearly defined vector of development. Unlike traditional rigid planning models, vector management assumes the possibility of multiple alternative trajectories, each of which can be activated depending on external conditions. This ensures a balance between stability and adaptability, which is crucial for long-term competitiveness in an unstable environment. The management focus shifts from maintaining a fixed structure to continuously adjusting the direction of motion according to environmental signals. In this way, flexibility becomes not a deviation from the plan, but an integral element of the planning process itself. The enterprise begins to operate as a dynamic system capable of reorientation without losing internal coherence. Thus, the aviation approach to vector control forms a conceptual basis for a new model of strategic enterprise management.

Vector management of enterprise development is defined as an approach in which a company can quickly change the direction of its energy (resources) to achieve strategic goals, regardless of its current "orientation" – of existing business processes, structures or products. This allows the enterprise to move from reactive to proactive management, adapting its actions to changing market conditions and turbulence, similar to how aviation thrust vectoring systems allow an aircraft to maneuver in difficult flight conditions. Such an approach increases the level of

organizational resilience by reducing dependence on rigid hierarchical decision-making models. It also promotes faster innovation cycles, as managerial attention is focused on dynamic goal adjustment rather than static control. In addition, vector management

supports the synchronization of strategic and operational levels of the enterprise. The main principles of flight stabilization and their business analogies can be presented in Table 1.

Table 1. Basic principles of flight stabilization and their business analogies

Flight stabilization principle	Analogy in enterprise development management
Continuous disturbance monitoring	Continuous monitoring of market changes, competitive environment, demand and technological trends
Quick course correction	Rapidly adjust strategy and operational plans in response to market changes
Maintaining balance	Supporting operational resilience and business process continuity
Autopilot maintains trajectory regardless of turbulence	Transforming reactive management into proactive management in conditions of chaos and uncertainty
Orientation independence, maneuverability	Flexibility in resource allocation, the ability to quickly redirect them to key projects without a complete restructuring of the organization
Engine thrust direction and force	Concentration of resources on achieving the strategic goal (capital investment, human resources, operational capacity, marketing)
Thrust vectoring system	Adaptive organizational structure, creation of internal startups, cross-functional teams, decentralization of authority
Technical mechanisms for changing the vector	Organizational mechanisms for resource redirection and project management
Stabilization and control system	Feedback and analytics, regular short meetings, use of AI to predict market trends and adjust strategy
Turbulence compensation	Development of crisis scenarios, formation of reserves, support of several business areas to reduce risks

Source: authors' own elaboration

Thus, the principles of vector control, borrowed from aviation, allow enterprises in conditions of uncertainty to maintain high operational stability, quickly change the direction of development, effectively use resources, and remain competitive in a dynamic market.

3. Testing the minimum viable product (MVP) to correct the strategic development vector.

As an illustration of how the transition between economic paradigms occurs, let us consider the example of the development of the Kharkiv National Economic University named after S. Kuznets (KHNEU named after S. Kuznets). A university is an organization that provides educational services that consist in promoting the development of a certain set of competencies within a particular specialty. The university's activities take place in a competitive environment, where several institutions are actively competing for the consumer (applicant) of educational services.

The educational service for each program is based on three components:

- A. The body of knowledge and ways of organizing it.
- B. Organizational and technological components of the educational process management mechanism.
- C. Communication mechanism for interaction between teachers and students during the implementation of the educational process.

Each of these components has its own range of implementations, which corresponds to a certain factor of competitiveness. In the early 2000s, almost all higher education institutions opened specialties in economics, management, marketing and international activities, which led to a significant increase in competition in the market of educational services in

these areas, which were basic for KhNEU named after S. Kuznets. The decision of the administration was to create an internal startup to develop a digital implementation of component A in the form of personal learning systems (PLS), which could be placed on the university servers with access via the Internet.

At the second stage, component B was improved: general information on the structure and organization of training for each discipline (syllabus, work programs, technological maps) was added to the PNS. The PNS was integrated with the ZOOM system, which allowed for distance learning.

The third stage involved the introduction of tools into the PNS for students to upload the results of laboratory and practical work and for their evaluation by teachers in a remote mode, with the possibility of interactive interaction. An exam module was also implemented, and the PNS became an interactive learning system.

At the fourth stage, an agreement was concluded on the use of the full functionality of the ZOOM system, including recording classes in the cloud and the ability to edit them. Teachers were given the opportunity to create their own YouTube accounts to post video recordings of lectures and practical classes, and applicants received access to a large amount of video content via the PNS.

The fifth stage involved personalization of educational content to take into account the individual characteristics of applicants and the formation of educational impressions, which allows for maximum use of adaptation tools [20]. Thus, the third, fourth and fifth stages of the startup's development were associated with fundamental changes in component C, – the communication mechanism of interaction between teachers and applicants during the implementation of the educational process.

Characteristics of the dynamics of economic paradigms within which the startup of the KhNEU named after S. Kuznets was formed and developed were defined on the basis of a generalization of the approaches presented in [5] and adapted to the educational and innovative environment of the university. The correspondence of the stages of the startup's development to specific economic paradigms makes it possible to trace the evolution of its value proposition – from an orientation to the provision of services to the formation of an adaptive, data-driven and transformational model. Each stage is characterized by its own peculiarities in the organization of activities, the degree of penetration of digital technologies, the level of interaction between participants in the educational process and the dominant factor of competitiveness.

Such a gradation of stages allows us to identify how the role of technologies, data and human capital within the startup structure changed over time. The sequence of transition from one paradigm to another indicates a gradual complication of the value creation model and an increase in the requirements for the flexibility of management decisions. At the same time, each subsequent stage does not deny the previous one, but rather integrates its key elements, forming a multidimensional development system.

This approach confirms the systemic and evolutionary nature of the startup's activities in the context of the general transformation of both the educational and economic environment. It also

demonstrates the ability of the university startup to adapt to changing external conditions while preserving continuity in its development trajectory.

In this context, the startup can be viewed as a dynamic mechanism for testing and implementing new educational, technological and managerial solutions within the university ecosystem. Its development not only reflects the general trends of economic paradigm shifts, but also acts as a catalyst for institutional transformation, stimulating the renewal of curricula, teaching methods and interaction formats. Through the integration of data-driven approaches, network interaction and personalization tools, the startup contributes to the creation of a more flexible and student-oriented learning environment. At the same time, the accumulated experience of operating in different paradigms forms a unique set of competencies that strengthen the university's innovative potential. This allows the institution to position itself more confidently in the competitive market of educational services. In addition, such a model of development creates prerequisites for scaling successful solutions beyond the internal environment of the university. As a result, the startup becomes not only an object of research, but also a practical instrument for testing modern models of economic and educational development. A summary of these characteristics is presented in Table 2, which reflects the consistent shift in the startup's focus in accordance with current trends in the development of the economy and society.

Table 2. Stages of development of the S. Kuznets KhNEU startup and corresponding economic paradigms

Stage	Economic paradigm	Startup characteristics	Competitiveness factor
0	Service economy	–	Service price
1	Digital economy	Using digital technologies and data to build competencies in applicants	Personalization and effective use of data for innovation and optimization of the learning process
2	Interaction Economy	Competencies are formed through the interaction of people and technology; emphasis on shared processes, platforms and networks	The effectiveness of network interactions, the ability to stimulate cooperation and joint achievement of results
3	Transformation Economy	Focus on profound changes in learners through personalized experiences that change behavior and mindset	The quality and uniqueness of the transformational experience, the ability to change the content and structure of the educational process
4	Data Economy	Using big data to shape and organize the learning space	Personalization of products and services, optimization of the learning process
5	Adaptive Economy	Rapid response to change and uncertainty	Flexibility and ability for evolutionary development, rapid adaptation to changes

Source: authors' own elaboration

Analysis of the stages of development of the startup of the S. Kuznets KhNEU shows that the introduction of digital technologies and personalized learning systems allows the university to gradually move between economic paradigms, ensuring increased competitiveness. Each stage corresponds to a certain paradigm: from the service economy to the adaptability economy, and the implemented changes concern all components of the educational service – of knowledge, organizational and technological mechanisms and communications. Thus, the startup plays the role of an

internal engine of innovation, which allows the university to quickly adapt to changes, increase the efficiency of processes and create new competencies in applicants.

Conclusions

The generalization of theoretical approaches and practical tools for managing enterprise development made it possible to form a holistic view of the mechanisms of organization adaptation in conditions of uncertainty, as well as to substantiate the feasibility of using the vector approach as a basis for strategic

management. The scientific novelty of the results obtained lies in the combination of the concept of vector management with the model of internal autonomous startups, which allows us to consider innovative activity not as an episodic process, but as a permanent element of the systemic development of the enterprise.

First, the concept of vector management of enterprise development provides a holistic, dynamic and scientifically sound approach to the functioning of the organization in conditions of high turbulence of the external environment. It creates opportunities for timely reorientation of the strategy based on constant monitoring of market changes, risk analysis and feedback, ensuring consistency between strategic goals, management decisions and real activities of the enterprise.

Secondly, the practical implementation of the principles of vector management, in particular the flexible redistribution of material, financial and human

resources, maintaining the stability of basic processes and the autonomy of individual areas of activity, forms the ability of the enterprise not only to respond to changes, but also to actively manage them. As a result, the adaptability of the organizational structure increases, business processes are improved and the internal consistency of management actions is strengthened.

Third, the creation of internal autonomous startups using the concept of a minimum viable product (MVP) is an effective tool for initiating and managing innovative changes within the enterprise. This approach ensures a continuous cycle of testing new ideas, transforming management, technological and organizational processes, developing personnel competencies and updating the value proposition, which together forms the evolutionary nature of the enterprise's development and strengthens its long-term competitiveness.

Abstract

Vector management of enterprise development in conditions of uncertainty is considered as an innovative management concept, formed at the intersection of systems analysis, cybernetics, complex systems theory and modern strategic management. The problem of the research is the lack of a universal theoretical and methodological approach that would allow enterprises to change the direction of development in a timely manner, redistribute resources and adjust strategic goals in accordance with dynamic changes in the environment, while maintaining the stability of functioning and controllability of the system in conditions of uncertainty. The relevance of the topic is due to the need to rethink classical approaches to strategic management and search for new tools for enterprise orientation in a multi-vector economic space, where the key factors are the speed of reaction, flexibility of organizational structures, information transparency and the ability to transform. This issue is of particular importance for educational, scientific and innovation-oriented enterprises that are forced to quickly adapt to changes in the knowledge and technology market.

The purpose of the study is to develop and substantiate a method of vector management of enterprise development under conditions of uncertainty based on an analogy with vector management in complex dynamic systems. In the process of the study, the adaptation of the technical concept of vector management to the economic and managerial environment was proposed by establishing an analogy between complex technological systems and the enterprise as a nonlinear, open socio-economic system. The feasibility of using the vector as an integral indicator of the direction of development, which is determined by a set of internal and external factors, strategic priorities and resource capabilities of the enterprise, was substantiated. It was proved that the vector redirection mechanism allows the enterprise to make a controlled transition between different economic paradigms, while maintaining the integrity of the system, its adaptability, competitiveness and orientation to long-term results.

The main types of vector transitions (adaptive, transformational, innovative, compensatory) were classified, and the key parameters of changing the trajectory of the enterprise's development were also determined. The factors of the development vector formation in the conditions of the data economy, the economy of impressions and the economy of transformations are systematized, the role of information and analytical support in making management decisions is determined and a basic model of vector development management is developed, which includes the stages of diagnostics, modeling, evaluation, correction and consolidation of a new strategic direction. The practical significance of the results obtained is confirmed by the example of the development of the KhNEU named after S. Kuznets as an educational enterprise, which has made a controlled vector transition from a traditional model of functioning to an innovation-oriented strategy in the conditions of digitalization of the educational space. The results of the study can be used in the activities of enterprises of various industries to increase the efficiency of development management in an unstable environment.

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