

Innovation and investment strategies to intensify the potential modernization and to increase the competitiveness of microeconomic systems

Svitlana Tulchynska¹, Olha Vovk², Olha Popelo³, Stanislav Saloid⁴, Olena Kostiuuk⁵

¹ National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Kyiv, Ukraine

² National Aviation University, Kyiv, Ukraine

³ Chernihiv Polytechnic National University, Chernihiv, Ukraine

⁴ National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ukraine

⁵ National Aviation University, Kyiv, Ukraine.

Summary

Within the article, strategic guidelines for the modernization of microeconomic systems are identified. Modernization levels of the potential implementation are formalized for enterprises: contractile, extensive technical, technological, progressive, adaptive, steady, intensive, creative, absolute and leader modernization. This allowed to specify the directions and tasks of the enterprise modernization at different management levels. Accordingly, the conditions and criteria for selecting resource tools are set. It is proved that the strategies of the potential modernization of enterprises must be carried out at four main management levels: first, at the enterprise level; secondly, for a particular type of product / service; third, by functional directions of modernization of separate spheres of the enterprise activity or responsibility, fourth, at the level of structural units of the enterprise. It is substantiated that in the processes due to the activation of the potential modernization, the resources are transformed into the results of the innovation implementation and the investment strategies modernization. A system of tasks for the corporate strategies implementation in order to modernize microeconomic systems has been formed. Key vectors of the activation determine the nature and properties of investment resources and necessary innovations to enhance the modernization potential. Therefore, the system of innovation and investment strategies' modernization, based on the vector and resource provision of the modernization process, is specified:

Key words:

Investment and Innovation Strategies, Microeconomic System, Modernization, Investment Activity, Innovative Development.

1. Introduction

At the present stage of globalized innovation and development processes, the main goals of the economic systems modernization are to increase innovation, efficiency and competitiveness. This allows the company to become a leader in the markets of resources, technologies and infrastructure services.

In microeconomic systems, strategic guidelines for modernization are aimed at:

- logistical regulation and flows optimization of resources, information;
- creating conditions for the cognitive influences standartization of employees on product quality;
- creation of corporate culture, moral principles and the team's standards;
- orientation of the organizational structure on the functional division of responsibilities;
- formation and provision of cybersecurity of the closed type information system;
- formation of the centers of creative technologies, creation of innovative environment.
- formation of a fully functional management system structure;
- strengthening interaction and coordination of work with stakeholders, institutions of state innovation stimulation;
- ensuring the increase of staff competencies for the development or creation of innovative developments.

Therefore, to ensure creative, leadership modernization, it is necessary to ensure communication activity in the external environment and to optimize the areas of internal restructuring. The implementation of the specified purpose is possible provided the system of resource supply and sufficient modernization potential is available.

2. Literature Review

Many scientists have devoted their research to studying various aspects of the formation of innovation, information and investment strategy of the enterprise, in particular: Aseev S.M., Katsumoto M. (2020) [1]; Butko M., Pishenin I. (2019) [2]; Ivanova N., Samiilenko G. (2020) [3]; Chen G., Mao L.L., Pifer N.D., Zhang J.J. (2020) [4]; Downer B., Welch C., Swinney R.W. (2017) [5]; Häckel B., Pfosser S., Stirnweiß D., Voit C. (2018) [6]; Kholiavko N., Djakona A., Zhavoronok A., Lavrov R.

(2020) [7]; Khudolei V., Bespalov M. (2021) [8]; Lazarenko I., Saloid S., (2020) [9]; Liu G., Cao H., Zhu G. (2021) [10]; Madiyarova D., Łuniewski A., Ibraeva A. (2019) [11]; Minaeva E., Lastochkina V., Gusev V., Fadeev A., Manukhina L. (2018) [12]; Garafonova O. (2021) [13]; Dubyna M. (2021) [14]; Purkayastha, A. (2018) [15]; Revko A. (2020) [16]; Shkarlet S. (2019) [17]; Voytolovskiy N., Pogodina V., Ivanova M. (2020) [18]; Wang T.-Y., Li J.-J., Li Y.-L. (2021) [19].

The purpose of the scientific work of Voytolovskiy N., Pogodina V. and Ivanova M. is to develop a strategy for managing innovation and investment activities of industrial enterprises at different stages of its life cycle. A methodological approach to assessing both meso- and macroeconomic effects of the enterprise transformation depending on the stage of the life cycle and the algorithm for determining the optimal development strategy are proposed [17].

The paper of Wang T.-Y., Li J.-J. and Li Y.-J. from China explores how manufacturers' investment in innovation affects a retailer's information exchange strategy in a two-tier supply chain involving two competing manufacturers and a regular retailer. According to the results, for example, when investment efficiency of producers is the same, if the investment efficiency is low, the retailer has no incentive to share information; if competition between two producers is less intense (intense) and investment efficiency is high (moderate), the retailer always seeks to apply a complete distribution strategy [19].

The study of the authors Madiyarova D., Łuniewski A. and Ibraeva A. from Kazakhstan is devoted to the mechanism of the formation of competitive advantages and competitive factors influencing the industrial production competitiveness. Analyzing the views of foreign and domestic researchers on the competitive advantages formations of industrial enterprises, the authors consider the diversification of industrial enterprises for intracluster optimization, as well as ways to increase economic efficiency of industrial optimization and innovation and investment potential [11].

The article of Minaeva E., Lastochkina V., Gusev V., Fadeev A. and Manukhina L. revealed modern scientific and practical features of innovation and investment activities of economic entities, proposed a methodological approach to determining the probability of transition to an innovative type of the enterprise development, developed an algorithm determination of the most optimal strategy of the innovation and investment activity based on the analysis of its expected stability. The result of the study is the formation of an approach to the analysis and evaluation of the strategy effectiveness of the innovation and investment development of the enterprise at different stages of its life cycle [12].

The aim of the study of Chinese scientists Liu G., Cao H. and Zhb G. is to study the impact of far-sighted and short-sighted behavior of competing companies on the consumer perception of environmental friendliness of goods on their pricing and innovative investments, strategies and profits [10].

The authors Aseev S.M. and Katsumoto M. developed a new dynamic model of optimal investment and production in research and development for a technology leader who competes with many of the same followers in the technology products market. The model is formulated as a problem of stochastic optimization of an infinite time horizon. The article also presents numerical simulations and economic interpretations [1].

A study by Chinese and American researchers Chen G., Mao L.L., Pifer N.D. and Zhang I.I. aimed at studying the effectiveness and suitability of the China's innovation policy, which encourages sports companies to invest in research and development. Using a series of multiple linear regression models, this study identified the direct and interactive impact of innovation policies and firm characteristics on R&D investment for sports [4].

The purpose of the paper of Purkayastha A. from Australia is to study the existing mechanism by which the companies affiliated with business groups in emerging markets continue to operate more efficiently. The researchers used preliminary statistical modeling, a causal analysis of intermediation, to separate direct and indirect effects of business group membership on EM on the results of internationalization and investment in innovation by the companies associated with business groups as intermediary variables [15].

German researchers Häckel B., Pfosser S., Stirnweiß D. and Voit C. argue that a cost-effective investment strategy is crucial for creating a competitive advantage by investing in new IT innovations, as the time and volume of investment significantly determine the associated risk profile. and profitability. The study notes that tight investment strategies are often unprofitable, and the size of the investment budget affects the expected NPV of innovation. At the same time, the company's innovations have a strong influence on the distribution of the innovation budget [6].

The paper of scientists Downer B., Welch C. and Swinney R.W. from France and United Kingdom compares the innovation and investment strategies of different companies currently in the process of developing reusable launch vehicles in the commercial sector. Based on the results of quantitative assessment of various investments, the article presents an analysis of relevant investment strategies [5].

3. Methodology

By conducting a scientific search, the authors used general scientific methods of scientific research, as well as specific methods that allow to explore modernization potential of microeconomic systems. Namely, the following was used: a dialectical method - to formalize and distinguish the relationships and patterns of the microeconomic systems development; a method of analysis and synthesis - to identify the system of strategic levels of the potential modernization of microeconomic systems and gradual processes of resource support and transformation of the enterprises assets during the implementation of modernization goals; a method of abstraction and formalization - to substantiate conceptual foundations of the modernization management of microeconomic systems in terms of innovative development. In addition, a complex approach to the

object of research that gave the chance to consider features of microeconomic systems, innovative development, modernization aspects of the enterprises. The basis of this study is the innovation-cognitive paradigm, which makes it possible to apply coherence to scientific research to emphasize innovative development of microeconomic systems and to form the imperatives of the enterprises modernization.

4. Results

We propose to single out the main groups of strategic alternatives to modernization depending on the type of modernization. This will justify the methods of strategic analysis of the enterprise and the choice of innovation and investment strategy, environment, take into account the competitive status and industry characteristics (Fig. 1).

Level of the potential modernization	<i>Directions and ways of the potential implementation</i>
Leadership in innovative development	Implementation of intellectual capital, monopolization of individual innovation markets
Absolute modernization in accordance with innovative progress in the economy	Strategic adjustment of long-term development goals, accumulation of potential
Creative modernization to find new competitive advantages	Potential implementation, search for new markets, personnel development
Intensive modernization	Implementation of an aggressive market strategy, increasing resource efficiency, social responsibility and building competencies
Sustainable modernization in accordance with dynamics of the innovations commercialization	Ensuring the competitiveness of products; building economic potential
Adaptive modernization in accordance with the availability of innovations	Search for resources and innovations, formation of innovation strategies, restructuring of the management system
Progressive modernization	Introduction of technical and technological innovations at the enterprise
Technological modernization	Implementation of technical innovations, development of production potential
Extensive technological modernization	Regressive economic trends provoke protective strategies and reduced investment; the potential is distributed to other activities
Contractile modernization	Intensive development of the enterprise provokes a reduction of assets and lack of resources for renewal

Fig. 1. The system of strategic levels of the potential modernization in the context of the competitiveness increase

Source: developed by the authors

The level of the potential modernization of microeconomic systems may include:

- leadership in innovative development at the level of microeconomic systems;
- absolute modernization in accordance with innovative progress in the economy;
- creative modernization to find new competitive advantages of microeconomic systems;
- intensive modernization;
- sustainable modernization in accordance with dynamics of the innovations modernization of microeconomic systems;
- adaptive modernization of microeconomic systems in accordance with the availability of innovations.

Among the areas and ways to implement the potential implementation of microeconomic systems, the following ones should be noted:

- implementation of intellectual capital, monopolization of the market of innovations of a separate branch;
- strategic adjustment of long-term development goals, potential accumulation of microeconomic systems;
- implementation of modernization potential, search for new markets, development of personnel, its intellectual and creative direction;
- implementation of an aggressive market strategy, increasing resource efficiency, social responsibility and building competencies;
- ensuring the competitiveness of products; increasing economic potential of microeconomic systems;
- search for resources and innovations, formation of innovation strategies, restructuring of the system management;
- implementation of technical innovations, development of production potential of microeconomic systems;
- regressive management trends provoke protective strategies and reduced investment; potential is distributed to other activities;

- intensive development of the enterprise provokes reduction of assets and lack of resources for renewal.

Depending on the modernization level of the macroeconomic system potential, the direction of its implementation is determined for each individual unique microeconomic system.

Substantiation of the strategy of the enterprise' potential modernization should be carried out at four main management levels:

- at the enterprise level - a corporate strategy is developed, which is focused on systematic, comprehensive modernization of all spheres of activity.
- for a certain type of products / services - a business strategy of gaining market positions and promotion in the markets is substantiated.
- according to the functional directions of the modernization of certain spheres of activity of the enterprise or responsibility - functional strategies are formed.
- at the level of structural units of the enterprise - operational strategies of the enterprise are formed, which implement the current tasks of implementing certain modernization projects.

At the corporate level of strategic management, the following directions are provided by modernization potential (Table 1):

- formation and use of competitive modernization potential of the enterprise;
- ensuring positive synergies between units and contractors; elements of the system of creation and provision of innovative services;
- transformation of resources in the processes of modernization into the results and competitive advantages of the enterprise;
- definition of priorities of the competitiveness increase and directions of the economic resources use within the modernization process.

Table 1: System of tasks for the corporate strategies implementation of the microeconomic systems modernizations in order to increase competitiveness

Areas of implementation	Survival strategy	Stabilization strategy	Growth strategy
Modernization of the management system	Hierarchical structure, administrative management	Coherence, interaction of the team, units to achieve development goals	Flexible corporate system of motivation, profit sharing, the only corporate idea
Ensuring competitiveness	Preservation of existing advantages and niches of activity	Increasing competitive advantages in already developed markets	Participation in international conglomerates, cooperation with innovative funds
Assets modernization	Current repairs and restoration of production facilities	Capacity upgrade projects	Introduction of innovative technologies of repair works, energy efficiency
Logistics of flows at the enterprise	Execution of functional purpose of divisions	Development of production programs	Application of logistics concepts for flow management
Management of supply and provision of services / sales	Execution of the current technical update	Development of strict requests to suppliers and own system of contracts	Long-term cooperation projects
Modernization of management quality standards and service / product quality	Application of domestic quality certificates	Application of world quality standards	Projects to develop new standards and forms of management

Source: suggested by the authors.

The areas of the implementation of the target system of the strategies for the microeconomic systems modernization should include:

- modernization of the management system;
- ensuring competitiveness;
- asset modernization;
- flows logistics at the enterprise;
- management of supply and provision of services / sales;
- modernization of management quality standards and service / product quality.

Implementation strategies for the potential modernization of microeconomic systems should include

survival, stabilization and growth strategy. The application of certain strategies for the implementation of the potential modernization must correspond to the paradigm of innovation and cognitive development and be adapted to spatio-temporal patterns and principles. In the process of modernization, resources are transformed into modernization potential. This is done by ensuring resource efficiency, institutionalization and intellectualization. The transformation of resources into capital, and then into the enterprises' potential is carried out through managerial influence and strategic guidelines for intensifying innovation and investment strategies (Fig. 2).

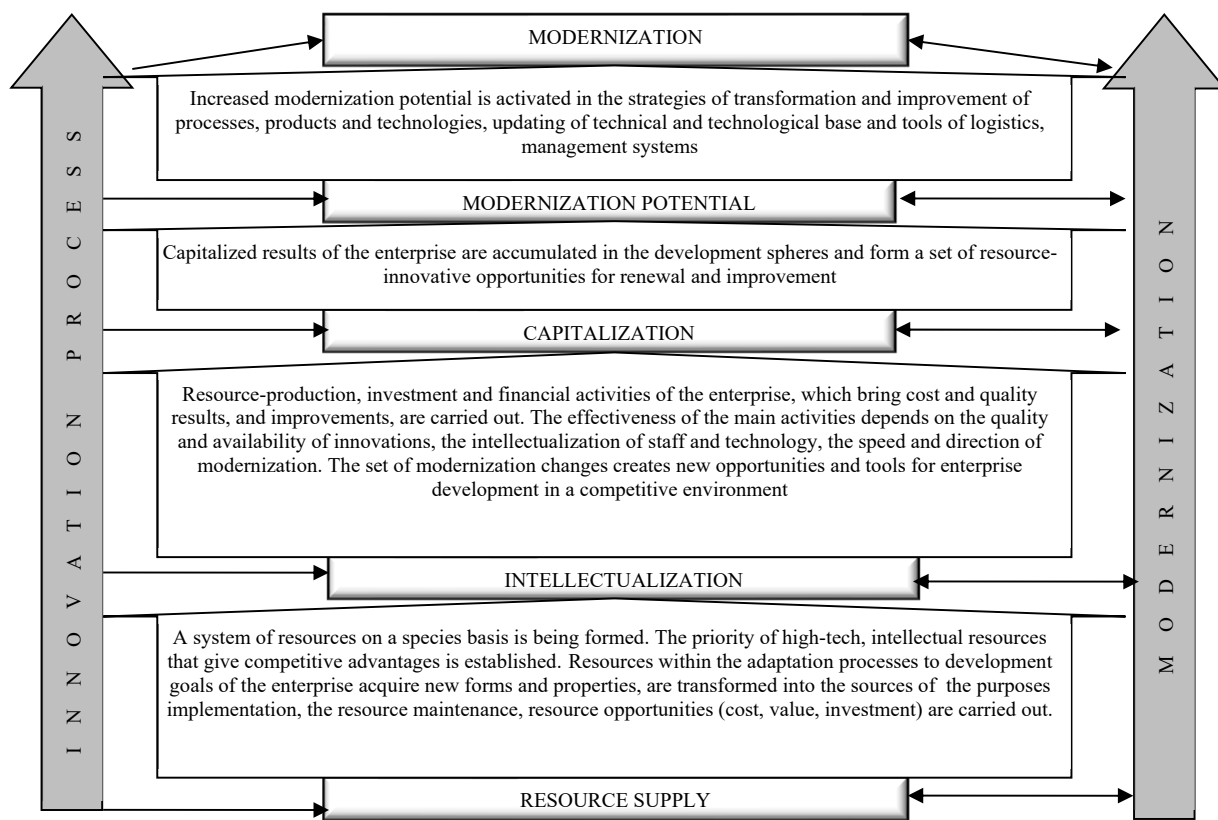


Fig. 2. Processes of resource support and transformation of assets during the implementation of modernization goals at the enterprise in order to increase competitiveness **Source:** developed by the authors

Quality and structure, availability and acceptability of innovations for the enterprise form the effectiveness of modernization through phasing: "resource supply" - "intellectualization" - "capitalization" - "modernization potential" - "modernization".

Resource provision implies that a system of resources is formed on the basis of species. At the same time, the priority of high-tech, intelligent resources that provide competitive advantages is established. Resources in the process of adaptation to the development goals of the

enterprise acquire new forms and properties, are transformed into sources of the purposes implementation, the optimization of resource maintenance, resource opportunities (cost, value, investment) carried out.

Along with intellectualization, there is the implementation of resource-production, investment and financial activities of the enterprise, which brings cost and quality results and improvements. The effectiveness of the main activities depends on the quality and availability of innovations, intellectualization of staff and technology, the

speed and direction of modernization. The set of modernization changes creates new opportunities and tools for the enterprise development in a competitive environment.

The capitalized results of the enterprise's activity accumulate in the development spheres and form a set of resource-innovative opportunities for renewal and improvement.

Increased modernization potential is activated in the strategies of transformation and improvement of processes, products and technologies, updating of technical and technological base and tools of logistics, management systems.

In this process, the modernization potential of enterprises is seen as a set of resources and means (opportunities) to activate them in the modernization process with subsequent innovative renewal of assets, technical support, service technologies and enterprise systems management, which in the synergy of effects forms the effectiveness of economic development.

The system of exclusive innovation and investment strategies proposed by the authors to activate modernization potential of microeconomic systems is presented in Fig. 3.

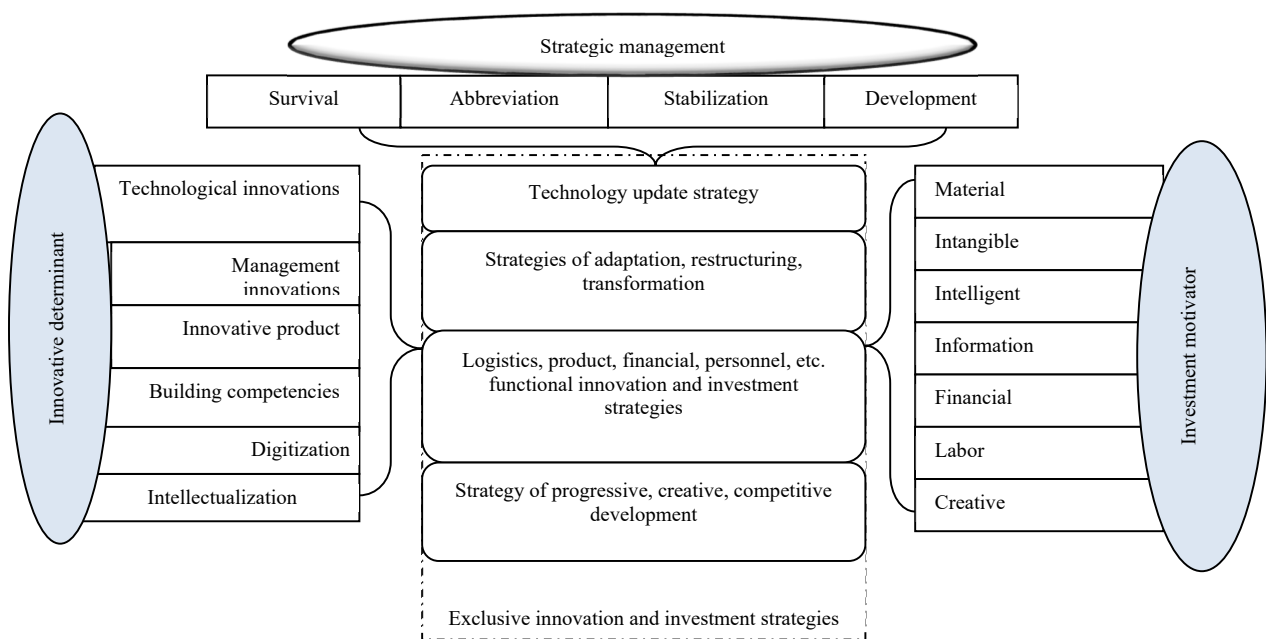


Fig. 3. The system of innovation and investment strategies to enhance the modernization potential and to increase competitiveness at enterprises **Source:** developed by the authors

Activation of modernization potential in the concept of strategic management should be based on long-term resource provision, which is aimed at ensuring key vectors: profitability; competitiveness; intellectualization and digitalization; quality; security; integration. Key vectors of activation determine the nature and properties of investment resources and necessary innovations to enhance the modernization potential. Therefore, it is necessary to formalize a system of exclusive innovation and investment strategies, which, on the one hand, are determined by vectors, and on the other - the resource capabilities of enterprises.

The groups of exclusive innovation and investment strategies for activating the modernization potential of microeconomic systems include:

- strategy of progressive, creative, competitive development;

- logistics, product, financial, personnel and other functional innovation and investment strategies;
- strategies of adaptation, restructuring, transformation;
- technology update strategy.

Innovative determinants of the activation of innovation and investment strategies of the modernization potential activation of microeconomic systems include: technological, managerial innovations, innovative product, competence building, digitalization and intellectualization.

Investment drivers are tangible, intangible, intellectual, informational, financial, labor determinants of activation of modernization potential of microeconomic systems.

5. Conclusions

Scientific novelty, which has an applied aspect for microeconomic systems, is the system of exclusive innovation and investment strategies developed by the authors to intensify the modernization potential, which, in contrast to the existing ones, is built taking into consideration:

firstly, the key vectors of the modernization potential activation in the concept of strategic management, based on long-term resource provision, as well as the properties of investment resources and necessary innovations to intensify modernization potential;

secondly, selected groups of strategic alternatives to the modernization of microeconomic systems depending on the type of modernization, taking into account competitiveness of the enterprise and industry characteristics;

thirdly, gradual modernization of microsystems, which includes "resource supply" - "intellectualization" - "capitalization" - "modernization potential" - "modernization";

fourthly, strategies for carrying out modernization potential of enterprises at different management levels (at the enterprise level, a particular type of product / service, by functional areas of modernization of certain areas of the enterprise or responsibility, structural units of the enterprise);

fifthly, task systems for the implementation of corporate strategies for the microeconomic systems modernization;

The system of innovation and investment strategies of the modernization potential activation and increase the competitiveness of microeconomic systems proposed by the authors is of practical importance, as it is based on the use of an integrated approach and innovation-cognitive paradigm, which ensures the effectiveness of modernization measures in relation to microeconomic systems.

Further scientific research of the authors will be devoted to the development of applied aspects of the resource provision of innovation and investment strategies for modernization and increase the competitiveness of microeconomic systems.

References

- [1] Aseev, S.M., Katsumoto, M. (2020). On optimal leader's investments strategy in a cyclic model of innovation race with random inventions times. *Games*, 11(4), pp. 1-21. <https://doi.org/10.3390/g11040052>.
- [2] Butko, M., Popelo, O., Pishenin, I. (2019). Innovations in Human Resources Management in Eurointegration Conditions: Case for Ukrainian Agro-industrial Complex. *Marketing and management of innovations*, 2, pp. 74-82.
- [3] Butko, M., Ivanova, N., Popelo, O., Samiilenko, G. (2020). Conceptual foundations of the regional industrial cluster formation based on European experience and leading world tendencies. *Financial and credit activity: Problems of theory and practice*, 1(32), pp. 319-329.
- [4] Chen, G., Mao, L.L., Pifer, N.D., Zhang, J.J. (2020). Innovation-driven development strategy and research development investment: a case study of Chinese sport firms. *Asia Pacific Journal of Marketing and Logistics*. <https://doi.org/10.1108/APJML-03-2020-0181>.
- [5] Downer, B., Welch, C., Swinney, R.W. (2017). Innovation and investment strategies of commercial sector reusable launch vehicles. 68th International Astronautical Congress 2017 (pp. 12504-12512).
- [6] Häckel, B., Pfosser, S., Stirnweiß, D., Voit, C. (2018). Determining optimal strategies for investments in an emerging IT innovation. In *Digitization - Facets of Socio-Technical Change*, ECIS 2018. https://aisel.aisnet.org/ecis2018_rp/200.
- [7] Kholiavko, N., Djakona, A., Dubyna, M., Zhavoronok, A., & Lavrov, R. (2020). The higher education adaptability to the digital economy. *Bulletin of the National Academy of Sciences of the Republic of Kazakhstan*, 4(386), pp. 294-306. DOI: <https://doi.org/10.32014/2020.2518-1467.130>.
- [8] Khudolei, V., Bespalov, M., Tulchynska, S., Tulchinsky, R., Kholivko, N. (2021). Fiscal stimulation of spatial development: the eu countries' cases. *Financial and credit activities: problems of theory and practice*, 1(36), pp. 124-132.
- [9] Lazarenko I., Saloid S., Tulchynska S., Kyrychenko S., Tulchinskiy R. (2020). Necessity of implementing data science course in economics curricula. *Information technologies and teaching aids*, 4(78), pp. 132-144. [10.33407/itlt.v78i4.3505](https://doi.org/10.33407/itlt.v78i4.3505).
- [10] Liu, G., Cao, H., Zhu, G. (2021). Competitive pricing and innovation investment strategies of green products considering firms' farsightedness and myopia. *International Transactions in Operational Research*, 28(2), pp. 839-871. <https://doi.org/10.1111/itor.12858>.
- [11] Madiyarova, D., Łuniewski, A., Ibraeva, A. (2019). Advancing competitiveness and developing the innovation and investment potential of industrial enterprises using cluster strategies. *Journal of Advanced Research in Law and Economics*, 10(8), pp. 2417-2428. DOI: [https://doi.org/10.14505/jarle.v10.8\(46\).20](https://doi.org/10.14505/jarle.v10.8(46).20).
- [12] Minaeva, E., Lastochkina, V., Gusev, V., Fadeev, A., Manukhina, L. (2018). Formation of the strategy of management of innovation and investment activity of the enterprise. *MATEC Web of Conferences*, 193(2). 05082. DOI: [10.1051/mateconf/201819305082](https://doi.org/10.1051/mateconf/201819305082)
- [13] Popelo, O., Butko, M., Revko, A., Garafonova, O., Rasskazov, O. (2021). Strategy of the Formation and Development of an Innovative Agroindustrial Cluster of the Region in a Context of Decentralization of the Authoritative

- Powers. *Financial and credit activity: problems of theory and practices*, 2(3), pp. 219-230.
- [14] Popelo, O., Dubyna, M., Kholiavko, N. (2021). World Experience In The Introduction Of Modern Innovation And Information Technologies In *The Functioning Of Financial Institutions*. *Baltic Journal of Economic Studies*, 7(2), pp. 188-199. DOI: <https://doi.org/10.30525/2256-0742/2021-7-2-188-199>.
- [15] Purkayastha, A. (2018). Performance of business group affiliated firms in emerging markets: Causal mediation analysis of internationalization and investment into innovation strategy. *International Journal of Emerging Markets*, 13(6), pp. 1538-1558. <https://doi.org/10.1108/IJoEM-09-2016-0243>.
- [16] Revko, A., Butko, M., Popelo, O. (2020). Methodology for Assessing the Influence of Cultural Infrastructure on Regional Development in Poland and Ukraine. *Comparative Economic Research. Central and Eastern Europe*, 23(2), pp. 21-39.
- [17] Shkarlet, S., Kholiavko, N., Dubyna, M. (2019). Information Economy: Management of Educational, Innovation, and Research Determinants. *Marketing and Management of Innovations*, 3, pp. 126-141.
- [18] Voytolovskiy, N., Pogodina, V., Ivanova, M. (2020). Management strategy for innovation and investment activities of an enterprise. In *E3S Web of Conferences*, 164, 10051. DOI: <https://doi.org/10.1051/e3sconf/202016410051>.
- [19] Wang, T.-Y., Li, J.-J., Li, Y.-L. (2021). Optimal information sharing strategy for retailer under competitive manufacturers' innovation investment. *Control and Decision*, 35(12), pp. 3006-3016.