Models of State Clusterisation Management, Marketing and Labour Market Management in Conditions of Globalization, Risk of Bankruptcy and Services Market Development

Oleksii Prokopenko[1], Olga Martyn[2], Olha Bilyk[3], Olga Vivcharuk[4], Mykola Zos-Kior[5], Iryna Hnatenko[6]

[1]Luhansk National Agrarian University, Slovyansk, Ukraine
[2]Lviv State University of Vital Activity Safety, Lviv, Ukraine
[3]Technical Professional College of Lutsk National Technical University, Lutsk, Ukraine
[4]Ivan Franko National University of Lviv, Lviv, Ukraine
[5]Poltava State Agrarian University, Poltava, Ukraine
[6] Kyiv National University of Technologies and Design, Kyiv, Ukraine

Summary

The article defines the problems of forming the models of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and services market development. The clustering models based on the optimal partner network cooperation were proposed in order to ensure the strategic development of territories, to attract budget leading enterprises and to support small businesses. A descriptive model of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 was determined.

Key words:
labor market, globalization, bankruptcy, institutional environment, business, marketing management

1. Introduction

The problems of modeling of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 have always been under the careful attention of scientists. Kaklauskas et al. (2011) analyzed the features of crisis management in construction and real estate under the conditions of globalization of financial markets. Wu et al. (2007) identified the models of managers' competencies required to implement the effective government regulation in a globalized economy. Kearney (2012) examined the problems of clustering modeling in the market in the context of globalization. Suh and Chow (2021) offered tools for using digital marketing in the mixed business enterprise models. The important research for modeling government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 are the works of Martínez-Marín et al. (2020). The authors modeled the clustering of the economy, identified areas of improving innovation, financial,

organizational and commercial management. The article also details the factors which stimulate the clustering of the economy under the conditions of dynamic digitalization and globalization. Carneiro and Brenes (2014) offered the ways to improve the competitiveness of firms in Latin America. They defined marketing and managerial policies for their development. The directions of the configuration of marketing activities at the international level were proposed by Schmid et al. (2016). The suggestions for providing an adaptive marketing policy in the context of globalization were outlined. Wei et al. (2012) carried out spatial modeling of clustering of production systems at the regional level under the condition of comprehensive tecnification of production and globalization of the economy. Morosini (2004) analyzed the processes of knowledge exchange within a cluster. The author also determined the level of cluster productivity, labor market synergies, and the quality of personnel training. Durana et al. (2020) used the mathematical modeling to calculate a wide range of statistical data for the study of the behavioral incentives of managers in the process of innovative entrepreneurship. Griffith (2010) determined the influence of the institutional environment of a state on the market development. The author suggested a marketing strategy that should be used in the global market. The scientist modeled a system of managerial decisions in the marketing behavior in the context of globalization. The work of Kipnis et al. (2019) where modeling of marketing management within a cluster under active globalization of markets is carried out at a high level is relevant for our research. The authors profoundly analyzed the influence of cultural identity on the formation of the cluster model of a particular territory. Substantial research was conducted by Islamutdinov and Semenov (2012), Brockova et al. (2021), Gryshchenko et al. (2021), Lozhachevska et al. (2021), Semenov et al. (2021), Zherdetska et al. (2021), Hnatenko (2018, 2020) who

offered the methods of government regulation of clustering, innovation entrepreneurship, marketing management, labor resources and innovation potential in the context of globalization and services market development. Not diminishing the depth and significance of the reseach of these scientists, it should be noted the superficial discussion of particular issues devoted to the problems of modeling government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and services market development.

2. Methodology and Results

The understanding of preconditions of origin and peculiarities of development of the most effective network structures in the market environment of the highly effective economies of the world, mechanism of their functioning, the idea of organizational moments of cluster functioning, is an important element of forming the model of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19.

The study of these aspects firstly provides a more complete and accurate idea of this phenomenon in terms of theory and practice; secondly, it will help to form a detailed platform for management actions in the area of formation of government support for clustering economy in the context of globalization, business bankruptcy risk and services market development. The positive effect of clustering in the national economy can be achieved only when the power of the interconnected "four" sectors: government, private, public and scientific is used. The government has a leading role in creating innovation clusters. This role should be provided on the principles of corrective and target-oriented, liberal and soft administrative influence on the networks. The state on the basis of dialogue with participants of any cluster is able to: define innovation priorities of its development; offer types of goods and services that can be the subject of a state order; encourage mechanisms of market self-organization in the innovation sphere; stimulate attraction of big capital into innovation projects; organize

expertise and analysis of innovation projects. The state is the leading participant in financing clustering process under the conditions of globalization, business bankruptcy risk and services market development. Funding for innovation projects and innovation activities in general can be carried out on the basis of public funds, venture companies, alliances and business associations. The state resources can be used to make strategic investments in research centers, educational and training programs, incubators, industrial parks as well as to enhance their strongest scientific perspectives. Thus, the state can fundamentally create a national platform for the emergence of any cluster by developing and applying the effective mechanism of government regulation. In addition, by means of state influence, it is possible to make clusters a central component of future economic development planning; to focus strategic investments on clusters of national importance; to establish effective communication within the government administration to facilitate regional cooperation, etc.

With the predominance of regulatory institutions in the institutional environment of entrepreneurship, clustering of marketing management and labor market in the context of globalization, the risk of business bankruptcy and Covid-19 can be realized in the direction of "creation of innovation-industrial cluster". Such direction of clustering is characterized by government regulation under the conditions of the developed national scientific potential and powerful sphere of industrial entrepreneurship. Therefore, in the clustering direction of "creation of innovation-industrial cluster", clusters are formed on the basis of "cores" – research and production enterprises, industrial budgetary companies or with the involvement of foreign partners. Innovation-industrial clusters are developed taking into account the specifics of organization and technological specialization of territories, as well as the characteristics of the potential and resources at the location of the cluster. The most common model of clustering according to the principle of "creation of innovation-industrial cluster" is the modern model of "radial" districts "Hub-and-Spoke" and "State Anchored/State centered"(Fig.1).
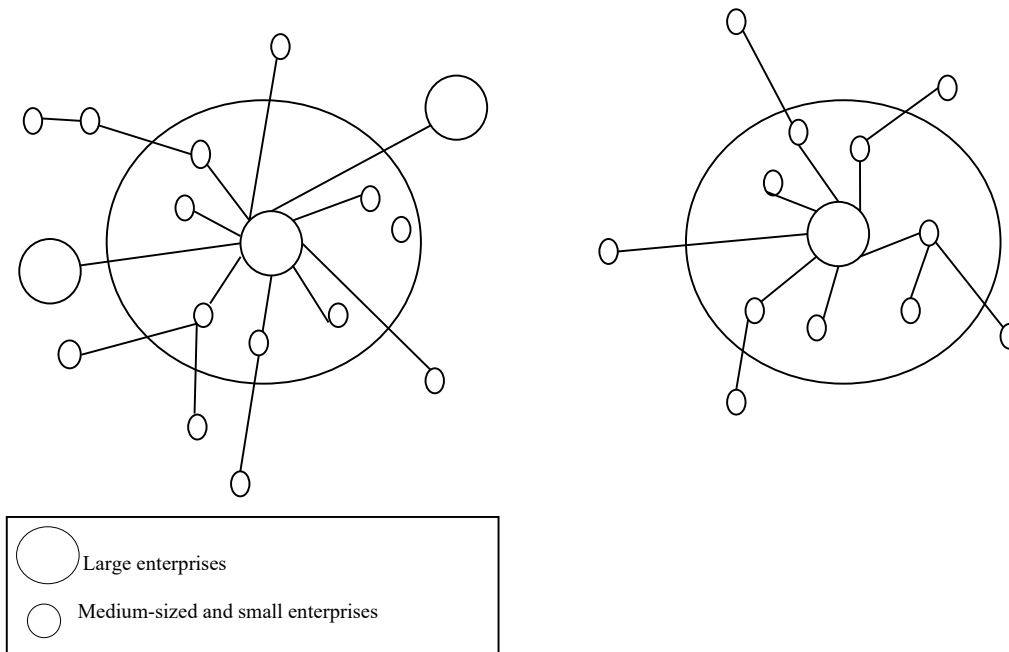
Fig. 1 Interpretation of "Hub-and-Spoke" and "State Anchored/State centered" innovation cluster configurations

Such cluster model implies the presence of one or more cores and developed cooperation within the cluster. According to figure 1, the creation of innovation-industrial clusters in the context of globalization, business bankruptcy risk and Covid-19 is carried out due to the dominance of large research and production enterprises – "cores" of the cluster including active implementation of subcontracting and outsourcing. Such cluster configurations involve the association of traditional and innovative enterprises with a clearly defined hierarchy of relations between the "center" of the cluster and its participants.

Based on the "Hub-and-Spoke" model, the following innovation clusters were created: "Cosmetic Valley" (France), "Silicon Valley", "Boing" (USA); "Sassuolo" (Italy), "m4" (Germany); "El Valles" (Spain); Toyota City (Japan), "IT Cluster" (RF); "Biotechnology and Molecular Medicine" (Austria), etc. "Titanium Valley" (RF), "Innovative Territorial Aerospace Cluster" (RF); "Volkswagen" (Germany); "Nokia" (Finland) were created on the basis of the model "State Anchored/State centered".

Taking into account the advantages and disadvantages of the considered models of cluster formation in the context of the innovation economy, combined models of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 can be offered. They are based on the effective territorial networking to ensure strategic development of territories, attract budget-forming leading enterprises and support small businesses. Such models must function on the basis of "wheel and spoke" configurations and satellite platform under active government intervention in their creation, as well as involve partner foreign companies or large transnational holding companies and institutional elements in the form of infrastructure organizations in the cluster (Fig. 2).
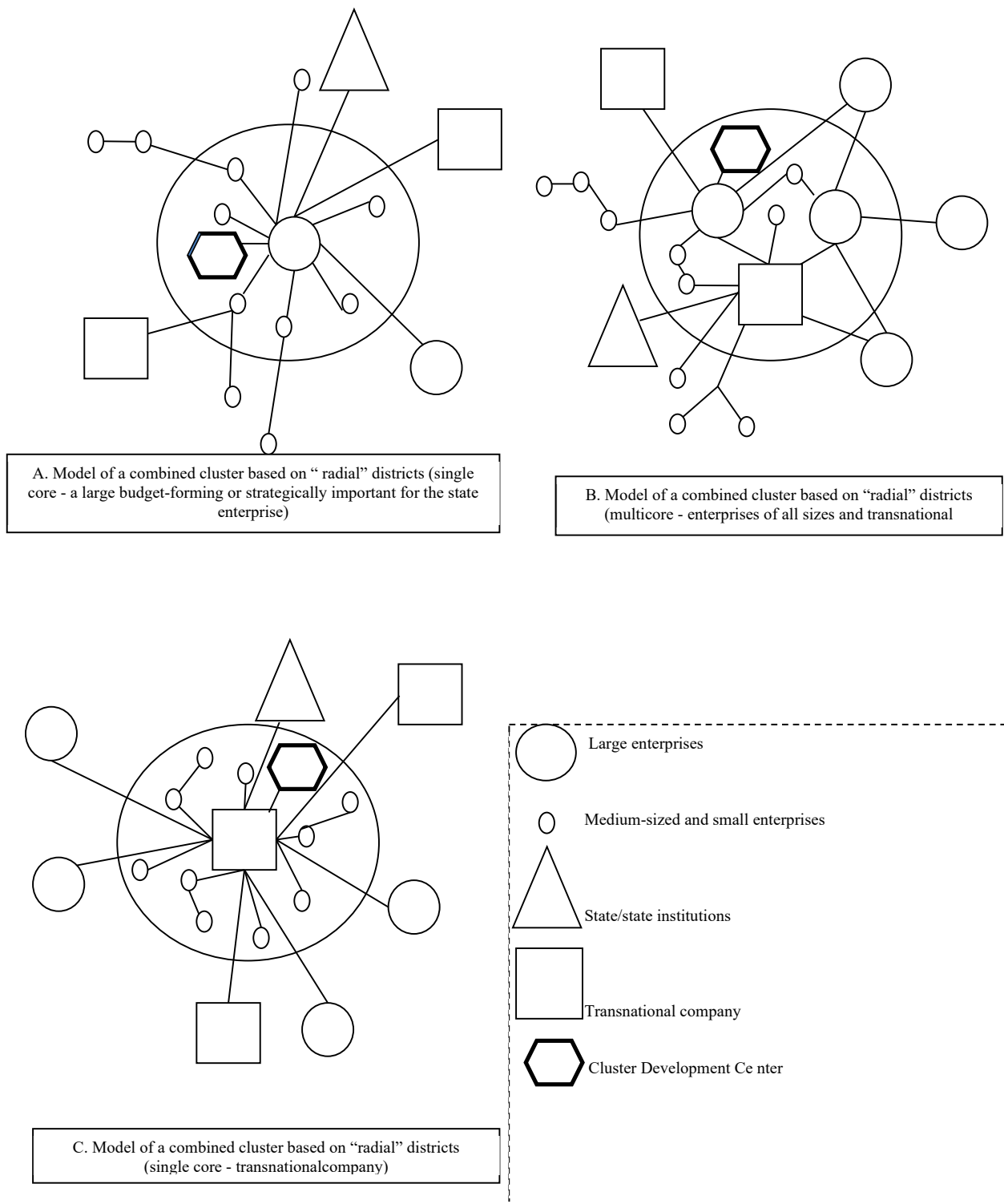
A. Model of a combined cluster based on " radial" districts (single core - a large budget-forming or strategically important for the state enterprise)

B. Model of a combined cluster based on "radial" districts (multicore - enterprises of all sizes and transnational

C. Model of a combined cluster based on "radial" districts (single core - transnationalcompany)

○ Large enterprises

○ Medium-sized and small enterprises

△ State/state institutions

▢ Transnational company

⬡ Cluster Development Ce nter

Fig. 2 Optimal models of clustering of marketing management and labor market in the context of globalization, business bankruptcy risk and services market development

These can be clusters with one "core" - a budget-forming or strategically important enterprise, a transnational company, or with several "cores". Of great importance in the functioning of such models of innovation cluster is the entrance to their network - the Center for Cluster Development which effectively cooperates with the individual cluster participant (conductor) in order to retransmit cluster initiatives both within and outside the cluster. The relevant issue is to represent such a variable process mathematically by means of recurrence relations and differential equations, in which the modeling process can take place in several iterations. A descriptive model of this variable process can be used for any object/economic entity (in our case public authority) making decisions regarding the model of regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid -19. This considers the economic and temporal development context $n \geq 1$ (sequentially changing one-to-one clustering environment) for the planned horizon T, fixed and unpredictable (unknown).Then the dynamics of the development of i-th environment of the cluster (its life cycle) can be described by the following differential equation:

$$\dot{X}_i(t) = \{y_i(x_{i-1}(t_i), u_i(t))x_i(t)[Q_i - x_i(t)]\} I(t \geq t_i), \tag{1}$$

where $I (...)$ – function-indicator;
$t \in [0; T]$, $u_i (.)$– measures of government regulation of clustering, marketing management and labor market in the context of globalization, the risk of business bankruptcy and services market development; $Q_1 \leq Q_2 \leq \ldots \leq Q_n$ - known critical levels of development of the cluster environment (variation levels 1…3);
$i \in N = \{1,2 \ldots n\}$ – regulated by the most environment;
$t_i = 0 \leq t_2 \leq \ldots \leq t_{\text{п}} \leq T$ - final sequence of moments of "switching"- transition from one clustering environment to other.

The initial and final conditions are given as:

$$x_i(0) = x_0 \geq 0, \ x_i(t) = 0, t \in (t_{i+1}, T), i \in \{1,2 \ldots n-1\},$$
$$x_i(t_i) = max [x_0, x_{i-1}(t_i) - q_i], i \in N, \tag{2}$$

The moments of time $\{t_i\} \in N$ correspond to the "switching" , the transition to the new environment, the values $\{q_i\} \in N$ correspond to the losses associated with the transition $u_i (.) \geq 0$ to the dynamics of changes in the resources invested in the environment transformation, $i \in N$. The dynamic of i - th environment is described by a generalized logistic equation with the growth rate described by the function $y_i(x_i(t_i), u_i(t))$, depends on the level $x_i(t_i)$ of development already achieved at the previous stage (more specifically, the initial "starting" level for this stage (1) and the amount of resources $u_i (.)$.

The trajectory $x(t) = x_i(t), t \in [t_i, t_{i+1}]$, $i \in N$ characterizes the dynamics of the development level of the regulation model of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19. The level of development of the environment $X (T)$ achieved by the end of the planned horizon T is determined by the formula:

$$X (T) = max \{ x_i (T)\}, \tag{3}$$

$i \in N$

In this case, the following can be given:
"effectiveness function" $H X (T))$, that reflects the investment efficiency of the regulation model of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 obtained at the end of the planned economic and time period (depends on the achieved level $X (T)$ of the environment development), then the "effectiveness" function has the following form (3):

$$F (x(.)) = \int_D^\sigma \int (x(t)) dt, \tag{4}$$

function of cost is represented as:

$$C(u(.)) = \int_D^\sigma 1 \sum_{i \in N} u_i(t) e^{-\delta(t)e} dt, \tag{5}$$

where $\delta(t) \in (0; 1]$ – discount coefficient;
$u (.) = (u_1 (.), u_2 (.), \ldots, u_n (.))$ – vector of resource dynamics that involves investment;
$\Theta = (t_1 = 0 \leq t_2 \leq \ldots \leq t_{\text{п}} \leq T)$ – vector of the time moment of the environment change, reflecting the investment policy.

In the function of cost, multiplier $e^{-\delta(t)e}$ means, that the so-called law of diminishing productivity of clustering of marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 operates in the intervals between the moments of environment transition.

Model limitation:
$$u_i(t_i) \geq c_i, u_i(t_i) = 0, t \notin [t_i, t_{i+1}), i \in N \tag{6}$$

Where, constants $\{c_i \geq 0\}$ can be interpreted as the investment in the clustering of marketing management and labor market in the context of globalization, business bankruptcy risk and services market development. The functions ($y_i (x_{i-1}, u_i)$ do not decrease for all variables, ($y_i (x_{i-1}, 0) = 0$, $i \in N$; the function $H (.)$ may not decrease either.

The effectiveness criterion of the regulation model of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 can be written in the form of the difference between revenues and costs, then the optimization problem takes the form: maximize the effectiveness criterion by choosing the sequence Θ of changes in the innovative business environment and vector u (.) of the dynamics of resources, i.e.

$$H X (T)) + F\left(x(.)\right) - C(u(.)) \to \max_{\Theta, u(.)} \qquad (7)$$

Provided that the dynamics of the environment of innovation entrepreneurship is described by the system of equations (1) with initial conditions (2), and resources satisfy the restriction (5).

The essence of descriptive model is in the mutual choice of government regulation of regulation model of clustering, marketing management and labor market in the context of globalization, risk of business bankruptcy and services market development (specifying at what points measures should be implemented, including management decisions on the target necessity for its implementation in general) and supporting investment policy. In our case, the meaningful interpretations of the described model can be different and used in the analysis of state policy to stimulate the transformation of regulation model of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and services market development or applied at the macro level by the enterprise to define a strategy of cluster development.

3. Conclusions

Thus, the modeling of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and Covid-19 should be based on the implementation of combined cluster models based on: " radial" districts (single core – a large budget-forming or strategically important enterprise); "radial" districts (multicore – enterprises of all sizes and a transnational company); and "radial" districts (single core – a transnational company). The mechanism of functioning under any model of government regulation of clustering, marketing management and labor market in the context of globalization, business bankruptcy risk and services market development must take into account the necessity for accumulation of two interrelated segments of tangible and intangible kind in a cluster. These should include the formation of: leading, budget-forming or strategically important institutions or enterprises based on knowledge and innovation; source of scientific knowledge;

specialized consulting services; cluster support; marketing and logistics; financing, etc.

References

[1] Brockova, K., Rossokha, V., Chaban, V., Zos-Kior, M., Hnatenko, I., & Rubezhanska, V. (2021). Economic Mechanism of Optimizing the Innovation Investment Program of the Development of Agro-Industrial Production. *Management Theory and Studies for Rural Business and Infrastructure Development*, 43(1), 129–136.

[2] Carneiro, J., & Brenes, E. R. (2014). Latin American firms competing in the global economy. *Journal of Business Research*, 67(5), 831-836.

[3] Durana, P., Valaskova, K., Vagner, L., Zadnanova, S., Podhorska, I., & Siekelova, A. (2020). Disclosure of strategic managers' factotum: Behavioral incentives of innovative business. *International Journal of Financial Studies*, 8(1), 17.

[4] Griffith, D. A. (2010). Understanding multi-level institutional convergence effects on international market segments and global marketing strategy. *Journal of World Business*, 45(1), 59-67.

[5] Gryshchenko, I., Ganushchak–Efimenko, L., Shcherbak, V., Nifatova, O., Zos-Kior, M., Hnatenko, I., ... & Martynov, A. (2021). Making Use of Competitive Advantages of a University Education Innovation Cluster in the Educational Services Market. *European Journal of Sustainable Development*, 10(2), 336-336.

[6] Hnatenko, I. (2018). Conceptual approaches to small business management in terms of the criteria of economic security and an enterprise life cycle. *Bulletin of the Kyiv National University of Technologies and Design. Series: Economic sciences*, 123(3), 47-56.

[7] Hnatenko, I. *Formation of state priorities of business development in the conditions of innovative economy*. (2020). Manuscript. Dissertation for the degree of a Doctor in Economics in specialty 08.00.03 – Economics and management of the national economy. Kyiv: National University of Technologies and Design, National Academy of Management, 516.

[8] Islamutdinov V., Semenov C. (2012). *Modeling of innovative behavior of economic agents.* Khanty-Mansiysk, UIP YUGU, 206.

[9] Kaklauskas, A., Kelpsiene, L., Zavadskas, E. K., Bardauskiene, D., Kaklauskas, G., Urbonas, M., & Sorakas, V. (2011). Crisis management in construction and real estate: Conceptual modeling at the micro-, meso-and macro-levels. *Land Use Policy*, 28(1), 280-293.

[10] Kearney, C. (2012). Emerging markets research: Trends, issues and future directions. *Emerging Markets Review*, 13(2), 159-183.

[11] Kipnis, E., Demangeot, C., Pullig, C., & Broderick, A. J. (2019). Consumer Multicultural Identity Affiliation: Reassessing identity segmentation in multicultural markets. *Journal of Business Research*, 98, 126-141.

[12] Lozhachevska, O., Navrotska, T., Melnyk, O., Kapinus, L., Zos-Kior, M., & Hnatenko, I. (2021). Management of logistics and marketing behavior of innovation clusters in territorial communities in the context of digitalization of

society and the online market. *Laplage em Revista*, *7*(3), 315-323.

[13] Martínez-Marín, S., Puello-Pereira, N., & Ovallos-Gazabon, D. (2020). Cluster competitiveness modeling: An approach with systems dynamics. *Social Sciences*, 9(2), 12.

[14] Morosini, P. (2004). Industrial clusters, knowledge integration and performance. *World development*, 32(2), 305-326.

[15] Schmid, S., Grosche, P., & Mayrhofer, U. (2016). Configuration and coordination of international marketing activities. *International Business Review*, 25(2), 535-547.

[16] Semenov, A., Kuksa, I., Hnatenko, I., Sazonova, T., Babiy, L., & Rubezhanska, V. (2021). Management of Energy and Resource-Saving Innovation Projects at Agri-Food Enterprises. *TEM Journal*, 10 (2), 751-756.

[17] Suh, T., & Chow, T. E. (2021). Developing a digital marketing tool for ethnic ventures' mixed business model and market-shaping: A design scientific approach of web demographics. *Industrial Marketing Management*, 93, 10-21.

[18] Wei, Y. D., Zhou, Y., Sun, Y., & Lin, G. C. (2012). Production and R&D networks of foreign ventures in China: Implications for technological dynamism and regional development. *Applied geography*, 32(1), 106-118.

[19] Wu, W. W., & Lee, Y. T. (2007). Developing global managers' competencies using the fuzzy DEMATEL method. *Expert systems with applications*, 32(2), 499-507.

[20] Zherdetska, L., Diatlova, Y., Diatlova, V., Derkach, J., Goncharenko, A., & Zos-Kior, M. (2021). Digital banking in the marketing mix and human resource management: improving the approach to the assessment as an innovative component. *Laplage em Revista*, *7*(3A), 111-119.