



LEADING APPROACHES FOR THE IMPLEMENTATION OF SYNERGIC ECONOMIC EFFICIENCY FOR ENTERPRISE INNOVATION AND DEVELOPMENT STRATEGY

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ABSTRACT

This paper develops a methodological approach for assessing leading synergetic effects from using the strategy of the economic innovation mechanism development (SEIMD) at enterprises. This approach is based on the formation of emergence between the parameters, components, elements of the development strategy, levers, tools, subsystems of the innovation mechanism, support units and components of innovation activity systems given the action of the market environment factors in order to increase the expected effect to large volumes. The approach is grounded on the use of system and phased approaches and aims at providing financial, economic, innovation and investment, technological, production and marketing effects caused by use of a certain type of development strategy.

We postulate that the usage of this methodological approach would allow achieving a cumulative effect of synergy, improving the enterprise's position, stabilizing its development, organizing production and economic, financial activities in the medium and long term. It was established that the advantage of the synergetic effect assessment based on the use of SEIMD lies in the possibility to strengthen synergetic relations between the components of the development strategy; achieve certain types of effects based on the enterprise's performance; calculate the total synergetic effect; take into account the effects of external and internal factors that affect the development strategy; determine the dynamism of the economic mechanism and innovation activity, that is, variability of their constituent elements in the course of time; shape the methods to counter the threats of the market environment. The proposed methodological approach means that it is possible to determine the SEIMD efficiency, level of its stability, expected types of synergetic effects given the changes in the market factors' affect in order to provide the stability of the enterprise's development. In addition, the assessment of the synergetic effect is aimed at determining the efficiency of the selected SEIMD, which is implemented at the enterprise, feasibility of its use, role in the activities and development of the industrial enterprise as well as at calculating the effects of its implementation.

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1. INTRODUCTION

Currently, the prosperity of industrial enterprises hinges on the growth of their innovation activity in the unstable market environment and increased influence of internal and external factors. The premise for development of industrial enterprises is their activities' modernization and introduction of innovations to obtain the desired financial effect. It is an increase in the efficiency of innovation activity that will contribute to the resumption of financial and economic, production activities and, in turn, allow achieving better performance of the enterprise, provided that the economic mechanism (EM) of development of innovation activity (IA) is applied. We established that EM is aimed at organizing and regulating the IA implementation process. At the same time, an important role in the use of EM is played by the enterprise's strategy of the economic innovation mechanism development, which will contribute to the establishment of its activities

and create conditions for the overall strategy implementation. Accordingly, the development strategy contributes to the EM formation and implementation, allows determining the main areas of innovation activity, achieving the main objectives of the activity, making rational decisions by management, assessing the effect of environmental factors, organizing activities given the use of methods and tools. The development strategy of the innovation economic mechanism at the enterprise is used to achieve the desired level of innovation development, which is possible through combining scientific and technical, innovation, production and information factors which lead to a synergetic effect. The synergetic effect allows establishing close relations between the SEIMD components, strengthening this interaction and receiving the corresponding level of effect. Therefore, the assessment of the synergetic effect of the selected development strategy in the activities of enterprises is important, as it enables

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revealing the achieved positive or negative level of effect. Net profits and a level of profitability are proof of a sufficiently high level of synergetic effect in the enterprise's activity. It should be noted that the advantage of assessing the synergetic effect of the development strategy lies in the possibility of achieving a greater expected effect of the individual components interaction rather than a result of these elements separate functioning.

2. PREREQUISITES AND MEANS FOR SOLVING THE PROBLEM

Nowadays, it is the strategies of innovation-driven development or innovation strategies that is a premise for the economic growth not only of industrial enterprises but also of the state as a whole; they shall contribute to the growth of the population living standard, improvement of welfare, technical development, national security, gaining advantages over competitors. Simultaneously, the main goal of the innovation strategy is a comprehensive development of the enterprise in order to gain advantages over competitors in the long term but not temporary perspective. The relevance of the problem is caused by the fact that enterprises are experiencing difficulties and have low development indices; as well, the development of any enterprise is associated with the use of innovation strategies that will allow solving a number of urgent problems and help stabilize innovation activity.

That is the reason for our focusing on the analytical review of the existing approaches by domestic and foreign scientists to the interpretation of the concept of "innovation strategy", given its role in the economic development and activities of industrial enterprises. It should be noted that the concept of innovation strategy is interpreted in different ways, namely as: a development strategy of the enterprise, innovation policy, strategy of innovation, investment and innovation strategy, innovation development strategy, which are considered to be similar.

The nature, importance, types and characteristic features of innovation strategies are profoundly examined in the works by many scientists. For example, Tulpa (2005, p. 137) considers innovation strategy as a company's capability of manufacturing new products, improving product quality, boosting consumer demand by gaining leadership in the technology market. Under these conditions, the introduction of an innovation strategy will allow the company to use modern scientific achievements, apply new developments within the manufacturing process and respond to changes in the technological environment given the enterprise's financial capacity. Thus, in the context of this definition, the author focuses on the technological aspect of the enterprise, process of goods manufacturing and promotion but does not take into account the interaction of all activity areas.

An interesting approach to the interpretation of the essence of the investment strategy concept was suggested by Khaustova (2015, p. 184). The author interpreted investment strategy as a means of increasing in the company's prosperity and entering new markets provided the investment policies are reviewed and variability of environmental factors are considered, and as a tool to achieve the goals set. We believe that the author mostly focused on the financial aspect of the enterprise that is saving resources, making profits, increasing competition as well as on the introduction of new technologies, but did not identify the relation between the innovation strategy and the

major strategy of the enterprise, neither did she determine the need to assess the threats of the market environment.

Similar to other scientists, Krasnokutskaya (2003, p. 154) took the same view and stated that an innovation strategy for each individual enterprise is a means of attaining the objectives and goals on condition of innovations introduction. Of course, for each company it is advisable to develop an individual innovation strategy, but it is necessary to take into account the area of activity, degree of resources availability, needs of the external market, risks of the investment market, as well as the experience of foreign enterprises in implementation of innovations.

Moreover, Yokhna and Stadnyk (2005) carried out a detailed analysis of the nature, role and features of innovation implementation and organization. The authors emphasized on the global nature of innovation strategy aimed to rearrange the enterprise's financial activity. In addition, the choice of an innovation strategy should be justified, since it affects success of the enterprise's development.

In his research, Pavlenko (2006, p. 95) considered the innovation strategy as an element of the overall strategy of the enterprise, which allows shaping goals, setting objectives, determining development priorities, choosing more effective directions, developing a set of methods that will help to achieve the goals, taking into account the innovative direction of the enterprise, variability of the technology market development and changing needs of consumers. We assume that the author is of the opinion that the innovation strategy is a set of goals, objectives and a way to achieve them, but does not take into account the impact of the competitive environment and investment component. In another work of his, the author analyzed the essence of the innovation strategy concept, which he identified with the concept of innovation policy and argued that the innovation strategy is a premise for introduction of modern equipment, manufacturing of competitive products, and also a set of actions to perform tasks (Pavlenko, 2007, p.46). However, innovation policy is a way of managing innovation-driven development and cannot be considered to be a process of achieving the enterprise's goals, technology introduction, innovation organization and, therefore, it is not appropriate to compare this concept with the innovation strategy.

In addition, Volkov (2006) stated that the research effort development, logistics and personnel management processes are associated with innovation strategy. Thus, the author narrowed the concept of investment strategy to researches only and did not take into account the peculiarities of the enterprise functioning, set strategic goals, potential of economic development, dependence on the volume of investment resources, which indicates the definition incompleteness.

According to the interpretation given by Maiorova (2009), innovative activities are to be understood as a totality of actions for development of innovation technologies and their implementation into production with the aim of manufacturing high-quality and competitive products which meet the needs of consumers. A similar point of view was held by Denysenko and Ryzhenko (2007, p. 12), who stated that the basis of innovation is in the development of innovation technologies, introduction of research at the enterprise, manufacture of products with new properties and adjustment of the technological progress. Thus, the authors take into account the

technological orientation of the enterprise, desire to attract innovations but do not determine a degree of interaction between the enterprise and the state, a mechanism of research work organization, the need to attract investment.

The law of Ukraine "On innovation activity" (2002) says that manufacturing of new products, an increase in goods competitiveness and a rise in consumer demand are only possible on condition of adopting the scientific developments, which is provided by the development of innovation activities. Therefore, the approaches to the interpretation of the concept of "innovation" lack consistency in defining it.

A detailed analysis of the concept of "innovation strategy" was carried out by Yurynets (2016, p. 36), who considered it as a way to introduce innovations and improve the functioning of all areas by updating technologies; as a tool for achieving the goals with the aim of promoting economic development. However, like other approaches, that of the author does not consider the degree of risk, environmental factors, variability of the situation in the technology market, investment potential of the enterprise in the interpretation of the concept of investment strategy.

Among the factors affecting the innovation strategy there were: the mechanism of innovation management; development and implementation of new ideas; control over innovation development; variability of the external market needs; possibility of introducing technological developments in the enterprise; use of motivational incentives. It should be noted that the study neither covers the role of investment activity in the development of innovation activities, nor it determines the long-term nature of the strategy and prospects for the development of the enterprise's innovation area.

Despite the significant contribution of scientists to the research of the synergetic effect, the problems of assessing the synergetic effect caused by using the strategy of the economic innovation mechanism development at enterprises and its practical importance in the activities of industrial enterprises, determining the possible types of synergies from the development strategy implementation, taking into account the synergetic relations between the components of SEIMD (Cherep and Korniev 2016) have been investigated insufficiently.

When assessing the synergetic effect from the SEIMD use, it is advisable to adhere to a systematic, phased implementation of this analysis to improve the reliability and accuracy of the resulting calculations. Therefore, the assessment of the synergetic effect based on the results of the SEIMD use was conducted in the following sequence: a comprehensive analysis of the financial and economic activities of engineering enterprises; study of the selected enterprise's innovation activity efficiency; research of the selected strategies for the economic innovation mechanism development; determination of the main parameters of SEIMD; making the list of expected synergetic effects from SEIMD; selection of assessment components for each synergetic effect; analysis of the indices for each respective component of the synergetic effect; calculation of the financial, economic, innovation and investment, technology, production and marketing effects; finding the total synergetic effect from the SEIMD use; approval of the methodological approach in the activities of engineering enterprises; assessment of the total synergetic effect. The sequence of all the stages and compliance with the interaction of their constituent elements will allow

conducting a thorough analysis and correctly determining the total synergetic effect.

3. SOLUTION OF THE PROBLEM UNDER CONSIDERATION

As the role of synergy is growing in business' activities, scholars pay more attention to the synergistic effect's study, phenomena of synergy in business activities, assessment of innovative processes' synergistic effect. It is worth noting the scholars who investigated the synergistic effect. Among them: Chesbrough, H. (2003), Crescenzi, R. (2005), Dodgson, M., Gann, D. and Salter, A. (2008), Dosi, G., Freeman, C., Nelson, R., Silverberg, G., Soete, L. (eds) (1988), Dragisa, Obradovic and Dragan, Obradovic (2016), Dunnell, K. (2009), Eesley, C.E., Hsu, D.H. and Roberts, E.B. (2014), Franz, M. and Lamberg, R. (2008), Freeman, C. (1982).

According to the sequence of the stages, the first and second stages involve a comprehensive analysis of the financial and economic activities and research of the innovation activity efficiency of the enterprise under assessment in order to determine the level of independence, self-sufficiency and position of the company in the international market and to make a list of threats to its development.

At the third stage, the study of the strategy of the economic innovation mechanism development implemented at the enterprise is carried out; the strategy is developed in accordance with the methodological approach to assessing the efficiency of the development strategy we proposed and used. The necessity for this stage is determined by the need to clarify the correctness and implement the selected types of development strategies at the enterprise, determine a list of factors of the external and internal environment that affect the process of their implementation, analyze the prospects for further development.

The fourth stage involves determination of the main SEIMD parameters. Based on the results of the use of the developed scientific and methodological approach, the company will be able to obtain a growing expected effect, provided the interaction of the parameters of the development strategy are taken into account, namely: financial parameter – assessment of profitability, the level of availability of information, debt and independence, rational use of financial resources; economic parameter – study of the social level of the enterprise's development, that is, the correspondence between the production volume and level of wages, meeting the needs of staff, productivity, profitability of innovation; technological parameter – analysis of the modern equipment availability at the enterprise, dynamics of innovation, adequacy of investment funds, level of the equipment deterioration; innovation and investment parameter – research of innovation activity, innovation performance, level of the enterprise's innovation security, appropriate investment in innovation development, frequency of financing the enterprise's innovation projects; production parameter – determination of the functioning capacity, rhythm, energy intensity of the production process, rate of production of high-quality innovation goods, level of slowdown in production due to depreciation of fixed assets; marketing parameter – analysis of the marketing service effectiveness with regard to the use of new methods of goods promotion to the market, new methods of disseminating information about the innovation

products manufacturing, adequacy of funding this Department's work.

At the fifth stage, based on the results of establishing the relations between the parameters of the development strategy, the expected synergetic effects from SEIMD are formed, including as follows: financial, economic, innovation, investment, technological, production, marketing effects (Cherep 2011a, pp. 96-101; 2012i, pp. 107-108).

4. ANALYTICAL MODEL THE SEIMD

In order to measure the generated synergetic effects, we selected the assessment components for each synergetic effect, which will help determine the desired values of each effect. Proceeding from the above stated, a financial synergistic effect from the SEIMD use allows us to characterize the growing level of financial stability, financial independence, profitability, economic growth, sharing information on the development of the technology market which is achieved by strengthening the synergetic relations between its constituent elements, namely: the increase in the information support of the enterprise (ISE), increase in the enterprise's solvency and manufacturing activity efficiency (ESMAE), increase in the rational use of enterprise's resources (RUER), increase in the level of the enterprise's financial development (LEFD). In turn, the economic synergetic effect from the SEIMD enables analyzing the profitability from innovation introduction, growth in the labor efficiency of personnel, level of satisfaction of the workers' needs and is calculated based on the interaction of its following components: increase in profitability of the enterprise's innovation activity (PEIA) and improvement of the enterprise's social and financial state (ESFS). The technological synergetic effect from the SEIMD use helps evaluate a growing or declining level of innovation technologies implementation at the enterprise and the frequency of conducting scientific and research work; the synergetic relation is established between the following components: increase in the financing the process of the enterprise's technology renovation (FpETR) and increase of the technology availability at the enterprise (TAE). Innovation and investment synergetic effect from the SEIMD use consists in the possibility to determine the level of innovation development efficiency, level of innovation activity of the enterprise as a whole by strengthening the synergetic relations between the following components: rise in the efficiency of the enterprise's innovation activity (EEIA) and increase in the innovation and investment activities of the enterprise (EIIA). The production synergetic effect from the SEIMD use is a reflection of the efficiency of production activities, regularity of pace of new products manufacturing, level of depreciation of fixed assets; it is determined by the following components: increase in the innovation availability and rate of their use at the enterprise (IAE). Marketing synergetic effect from the SEIMD use allows assessing the effectiveness of the Marketing Department in promotion of a new product that affects the sales volume and amount of moneys received; it is determined on the basis of establishing the synergetic relation between the following components: rise in the efficiency of the enterprise's marketing activity (EEIA) and increase in the innovation element of the Marketing Department (IEMD).

At the seventh stage, the selection and analysis of indicators for each component of synergetic effects are made. This stage is carried out in order to consider the indices and coefficients, which, when calculating, have a greater effect on the desired value of the corresponding component and allow it to be calculated with a high level of accuracy and reliability; as well, they contribute to the determination of each type of effect.

5. SIMULATION RESULTS

At the next stage, the calculation of financial, economic, innovation and investment, technological, production and marketing effects based on the analysis of the total value of the indices and components of each effect over a specified period is made according to the following formulas (1-7):

$$\Delta FSE^{seimd} = \sum_{i=1}^t ISE + ESMAE + RUER + LEFD \quad (1)$$

where ΔFSE^{seimd} – financial synergetic effect from the SEIMD use, UHA;

t – quantity of periods for calculating the desired components according to the indices (year);
 i – number of the relevant period;

$$\Delta ECE^{seimd} = \sum_{i=1}^t PEIA + ESFS, \quad (2)$$

where ΔECE^{seimd} – economic synergetic effect from the SEIMD use, UHA;

$$\Delta TSE^{seimd} = \sum_{i=1}^t FpETR + TAE, \quad (3)$$

where ΔTSE^{seimd} – technological synergetic effect from the SEIMD use, UHA;

$$\Delta IISE^{seimd} = \sum_{i=1}^t EEIA + EIIA, \quad (4)$$

where $\Delta IISE^{seimd}$ – innovation and investment synergistic effect from the SEIMD use, UHA;

$$\Delta PSE^{seimd} = \sum_{i=1}^t IAE, \quad (5)$$

where ΔPSE^{seimd} – production synergetic effect from the SEIMD use, UHA;

$$\Delta MSE^{seimd} = \sum_{i=1}^t EEMA + IEMD, \quad (6)$$

where ΔMSE^{seimd} – marketing synergetic effect from the SEIMD use, UHA

Every component of the relevant type of the synergetic effect is determined as the total value of target indices and coefficients over the period under analysis and calculated according to the following formula (7):

$$K_i^t = \sum_{i=1}^t P_i \cdot K_i^t, \quad (7)$$

where K_i – component of the relevant type of the synergetic effect of i-period;

P_i – total value of the indices and coefficient of the relevant type of the synergetic effect of i-period;

t – period of calculating the desired components and indices (year).

Having determined the desired synergetic effect for each type of effect, we compare the results for the selected period, determine the size of their increase or decrease, analyze the dynamics of change. Next, we move on to the ninth stage – finding the total synergetic effect from the SEIMD use taking into account the results of the calculation of the expected types of effects, which is

calculated as the total value of all effects according to formulae 8-9 that follow:

$$\Delta TSE^{seimd} = \sum_{i=1}^t ((\Delta FSE^{seimd} + \Delta ESE^{seimd} + \Delta TSE^{seimd} + \Delta IISE^{seimd} + \Delta PSE^{seimd} + \Delta MSE^{seimd}) / n) - \sum_{i=1}^t ((CIA^{seimd} + IR^{seimd} + TP^{seimd} + BF^{seimd}) / n), \quad (8)$$

or

$$\Delta TSE^{seimd} = \sum_{i=1}^t (DCE^{seimd} / n) - \sum_{i=1}^t (R^{seimd} / n), \quad (9)$$

where ΔTSE^{seimd} – total synergistic effect from the SEIMD use, UHA;

t – total quantity of periods for calculation of synergetic effects (year);

i – number of the relevant period;

n – quantity of synergetic effects;

CIA^{seimd} – costs of innovation activities implementation, UHA (for all types of effects);

IR^{seimd} – investment resources allocated for the IA and development strategy, UHA (for all types of effects);

TP^{seimd} – share of tax payments from IA execution, UHA (for all types of effects);

BF^{seimd} – total amount of borrowed funds for IA execution, UHA (for all types of effects);

DCE^{seimd} – totality of all types of synergetic effects over the calculation period, UAH;

R^{seimd} – expenditure part of the development strategy of the economic innovation mechanism over the calculation period, UAH.

According to the above given formula, it can be noted that the calculation of the total synergetic effect is based not only on obtaining financial resource saving, certain components, indicators of the corresponding effects, but also on making overall benefit from the formation of synergetic relations between the components and indices of the effects. The total synergetic effect will be achieved in the following cases: increase in availability of information, increase in the efficiency of resource use, solvency and overall level of development; increase in the amount of income from IA, improvement of the social climate in the team; increase in the level of availability of modern equipment at the enterprise, the rate of the process of obsolete equipment depreciation; development of innovation potential, increase in the innovation and investment activity; growth of new products manufacturing and provision of the production process with new technology; improvement of the Marketing Department efficiency with regard to goods sale; reduction in the total expenditure of the enterprise; reduction (increase) of the costs of innovation activities implementation; increase in the investment resources allocated for the IA and development strategy; reduction of the share of tax payments from IA execution. The proposed method of calculating the total synergetic effect allows us to find the desired value more accurately, as the results of the company's activities in all areas are taken into account.

The penultimate stage is approbation of the scientific and methodological approach in the activities of the selected engineering enterprises, that is, calculation of indices, components, desired synergetic effects and the total synergetic effect. Next comes determination of the nature of the total synergistic effect, that is whether it is positive or negative (eleventh stage). Accordingly, the standard value

for the negative effect will have the form of formula 10; for the positive effect, the standard value is expressed by formula (11):

$$\Delta TSE^{seimd} < \Delta FSE^{seimd}; \Delta ESE^{seimd}; \Delta TSE^{seimd}; \Delta IISE^{seimd}; \Delta PSE^{seimd}; \Delta MSE^{seimd} \quad (10)$$

$$\Delta TSE^{seimd} > \Delta FSE^{seimd}; \Delta ESE^{seimd}; \Delta TSE^{seimd}; \Delta IISE^{seimd}; \Delta PSE^{seimd}; \Delta MSE^{seimd} \quad (11)$$

6. CONCLUSIONS

6.1. Overall, a negative synergistic effect will be obtained if its total value reduces over several years under analysis compared to the value of the individual effects obtained. Due to the negative effect, there is an increase in costs, reduction in indices of innovation and other indicators which are to see a positive trend.

6.2. The reason for the negative effect is inefficiency of the implemented development strategy, developed economic mechanism as well as adverse impact of environmental factors. If a positive effect is obtained, the growth of the total effect is faster than the growth of individual effects, and the enterprise will enjoy an increase of all performance indices.

6.3. The acquisition of this effect is caused by the efficiency of the company's management in selecting a development strategy, using the economic mechanism, forming the areas of innovation, which has enabled the desired results achievement.

6.4. Determination of the overall synergetic effect of the SEIMD use will allow obtaining financial, economic, innovation, investment, technological, production, marketing effects when using the selected development strategy and improve the functioning of the selected enterprise and promote its development in the innovation area.

6.5. In this case, the company will be able to achieve the total synergetic effect only on the basis of emergence between the elements of the development strategy, EM tools, functional units of the IA, as, otherwise the company will obtain a much lower synergetic effect.

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