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# **FORMATION OF ENTREPRENEURSHIP MODEL BY INNOVATION ACTIVITY OF INDUSTRIAL ENTERPRISES**

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## **ABSTRACT**

*The proposed set of indicators for assessment of innovation activities in combination with the developed classification of factors that affect their significance will allow enterprise managers to adequately identify the effectiveness of the entrepreneurship system of innovation activities of the enterprise and to establish causal relationships between the factor and performance characteristics that characterize the effectiveness of the system. The proposed methodical approach to a decision-making process on the choice of a method for the development of innovation activities at the enterprise will allow managers to streamline their efforts for justification of the development and implementation of organizational measures aimed at raising the level of creativity in solving managerial problems.*

**Keywords:** Innovative Activity, Leadership Style, Organizational Skills, Entrepreneurship System, Organizational Measures.

**JEL Classifications:** I2, F6

## **INTRODUCTION**

The assurance of the competitiveness of machine-building products requires the introduction of innovations from enterprises, in particular the upgrading of process equipment, which would be more energy-efficient and allow the production of high-tech products. Execution of this task is extremely risky, as it requires a significant amount of investment and continuous study of changes in consumer demand.

In order to determine the areas of development of the management system of innovation activity, it is necessary to determine the real level of development of this system. The underdeveloped management system cannot qualitatively perform the management functions in the required volume, which is the reason for the failure of the production and economic activity of the enterprise. Excessive number of management staff and unjustifiably high costs of its

maintenance have a negative impact on the financial and economic performance of the enterprise. The main goals of the innovation management system are the goals of the enterprise itself. The development of an innovation management system should be aimed at the implementation of these goals.

## REVIEW OF PREVIOUS STUDIES

Sople (2016) proves that under the development of a management system it is necessary to understand the following changes in its elements, links between them, and functions (from the bottom to the top in terms of complexity), which are aimed at elimination of the emerging significant differences (between elements of the control system and the object management), which ensure achievement of maximum end results by the object of management with minimal costs and in the shortest possible time that are consistent with the objectives of higher-level systems with respect to this object. Also, authors Tetiana et al. (2018) studied that the constant development of the management system is a process of structural, quantitative and qualitative changes in the entire set of its elements (the elimination of old ones, transformation of those existing, the emergence of new ones) in order to bring this system in line with the level of development of productive forces and industrial relations. Also, the authors believe that the process of development of the control system is most significantly effected by: achieved level and pace of development of productive forces; change in structure and production relations (Brulin & Svensson, 2016); more complete consideration of objective factors of economic development, due to the presence of internal contradictions (discrepancy between subject and object of management, insufficient level of optimal correlation of centralization and decentralization of management) (Rekonen & Björklund, 2016); increase in the degree of conscious use of economic laws and regulatory patterns (Ferraris et al., 2017).

## METHODS

The following research methods are used in the paper: systematization and generalization, induction and deduction-during the selection of components of the management system for innovative activity of the machine-building enterprise and the definition of conceptual foundations for the formation and evaluation of management systems for innovative activity of machine-building enterprises; method of expert assessments and index method-during the building of a set of indicators that characterize the effectiveness of the innovative activity management system of machine-building enterprises, the analysis of the effectiveness of management systems for innovation activities of machine-building enterprises and the evaluation of factors that affect the management systems of innovation activities.

Within the framework of the research, an expert survey was carried out by questionnaires during 2018. The expert survey was collective (group), and experts were selected according to certain criteria (experience of work in the system of management of innovative activity of the enterprise not less than three years, experience in development and making of managerial decisions). Taking into account the requirements for the selection of experts, it has been determined that the number of potential experts may be 12 persons out of 16 enterprises. In order to determine the volume of a simple irreversible sampling, with a probability of 0.99, the marginal error does not exceed 10%.

## RESULTS AND DISCUSSION

The researchers conducted showed that the process of development of innovation activity management of the enterprise is a combination of organizational measures aimed at increase of the level of creativity in solving managerial and engineering-technological problems and ensuring the growth of the number of product and technological innovations, the expected consequences of which are increase in the competitiveness of finished products. The effectiveness of management processes for the development of enterprise innovation activities is characterized by a number of indicators that reflect the effectiveness of implemented innovative decisions.

The analysis of analytical materials of machine-building enterprises has shown that managers of the innovation activity management system, during the development of the management system, should: monitor the state of the system and achievement of its goals; prepare operational data for top-level managers regarding the state and level of system development; accumulate and generalize information concerning the factors of the system's development; organize the information exchange between the employees of the system; develop for the company's management possible strategies for the development of the innovation activity management, taking into account existing goals and objectives; substantiate regulatory decisions and develop recommendations for their implementation; evaluate the possible consequences of the implementation of regulatory decisions related to the development of the management system; monitor the implementation of regulatory decisions and analyze the reasons for not fulfilling these decisions.

The innovation management system, like any other system, is characterized by certain parameters that carry information about the properties, status, size of the system, and the efficiency of its functioning.

The summing of the review of scientific literature (Aydalot & Keeble, 2018; Hilorme et al., 2018; Tetiana et al., 2018a) and the analysis of materials of machine-building enterprises made it possible to distinguish the following factors of influence on the enterprise's innovation activity management system: the level of material and financial resources; socio-psychological climate; leadership style (leadership and staff interaction); personnel potential of the system (structure and level of personnel qualification, organizational skills, discipline, creative activity); a system for evaluation of the results of work and incentives (motivation for staff); the level of flexibility and mobility of the innovation management system (rapid response to change); communication processes and information system of the system (information support, structure of the information system, violations of information flows, information noises); the level of implementation of managerial and regulatory decisions.

This socio-psychological climate is the result of the joint activity of people and their interpersonal relations. It manifests itself through mood and collective opinion, individual well-being in a team, and relationships between members of the team. The positively formed socio-psychological climate encourages employees of the innovation activity management system to effectively fulfil their duties. On the other hand, unfavourable socio-psychological climate is the cause of conflict situations, and unhealthy competition among colleagues, etc. The conflicts and contradictions can cause ineffective fulfilment of tasks by employees.

A rather important factor of influence on the innovation activity management system is the style of leadership (the style of the manager's behaviour with its subordinates), which varies depending on the situation, covers the subjective psychological characteristics of the manager and is aimed at achievement of the objectives. The style of leadership affects the motivation of

employees, their attitude to work, desire and encouragement to perform the tasks. In this case, it is important what the methods and techniques are used by managers. These methods should be such as to encourage workers to do their best when performing their duties.

The next factor of influence is the human potential of the innovation activity management system. Personnel potential represents a set of workers who have the necessary level of professional knowledge, certain skills, abilities and opportunities for innovation.

If the innovation activity management system is made up of skilled personnel, the efficiency of innovation activity at the enterprise will be at the proper level. The ability of an innovation management system to respond quickly and adapt to changing environment is a very important factor. The sooner this management system is capable to adapt itself to changes, the less is the risk of damages or loss of competitive position.

The information support at the present stage of society's development necessitates the adoption of adequate managerial decisions in the conditions of dynamic changes and external influences. The complete, reliable and timely information ensures taking of an effective decision and its implementation at an appropriate level.

Another factor influencing the innovation activity management system is the level of implementation of managerial decisions. Any decisions in the innovation management system should be carried out at the highest possible level, which makes it possible to avoid unpredictable mistakes and inadvertences. Insufficient attention to the accomplished tasks can have unpredictable consequences.

Labour and motivation result evaluation systems are a very important factor. It should be remembered that workers, who receive a well-deserved reward for fulfilling their tasks, work more efficiently.

Motivation of staff is one way to improve staff productivity. Among the selected factors of influence, it is necessary to determine those who have the greatest influence on the management system, and also it is necessary to determine the trend of this influence (the influence of factors is positive or negative). Having identified factors that have a positive impact on the innovation activity management system, it is necessary to take measures that will increase this impact, as well as to reduce the impact of those factors that have a negative impact.

In order to determine the influence of factors on the innovation activity management system, a survey was conducted among employees of the innovation activity management systems of machine-building enterprises that carry out innovation activities and agreed to participate in the questionnaire survey.

Since the experts at the enterprises under study evaluated not only the force of influence but also the nature of this influence, it is necessary to calculate the coefficients of significance for the factors of positive and negative influence. The results of calculations are presented in Table 1.

**Table 1**  
**VALUES OF COEFFICIENTS THAT CHARACTERIZE THE INFLUENCE OF FACTORS ON THE INNOVATION ACTIVITY MANAGEMENT SYSTEM OF THE ENTERPRISE**

No	Factors	K1*	K2*	Experts									
				1	2	3	4	5	6	7	8	9	10
1	Level of support with material and financial resources	0.52	-0.3	0.8	0.4	0.2	0.6	0.8	0.4	0.2	0.6	-0.4	0.4
2	Socio-psychological climate	0.53	-0.33	0.6	-0.4	0.4	-0.4	0.6	-0.2	-0.4	0.8	0.2	0.6
3	The style of leadership	0.51	-0.36	0.6	0.2	-0.4	0.6	0.4	0.4	-0.2	0.8	-0.6	0.4
4	Personnel potential of the system	0.47	-0.4	0.8	-0.4	-0.6	0.4	0.6	0.4	0.4	0.8	0.2	0.4
5	Systems for assessment of work results and incentives	0.25	-0.44	-0.6	-0.8	-0.4	-0.4	0.2	-0.2	-0.6	0.4	-0.2	0.2
6	Level of flexibility and mobility	0.31	-0.2	0.4	0.2	0.2	0.4	0.6	0.2	0.2	0.2	0.4	0.4
7	Communication processes and information support of the system	0.35	-0.27	0.2	-0.2	0.4	0.2	0.4	-0.2	-0.2	0.4	0.2	-0.4
8	Level of implementation of managerial and regulatory decisions	0.44	0	0.4	0.6	0.4	0.2	0.8	0.4	0.6	0.8	0.2	0.4

Note: K1\*: The arithmetic mean of the factor of the positive influence of the factor n on the innovation activity management system of the enterprise. K2\*: Is the arithmetic mean of the factor of the negative influence of the factor n on the innovation activity management system of the enterprise.

As can be seen from the table above, the same factors affect different enterprises in different ways. The sign "+" means that a certain factor influences the innovation activity management system positively, and the sign "-" indicates the negative influence of the factor. Among the factors that have a positive impact on a particular group of companies and have the highest coefficients of significance are the socio-psychological climate, level of financial and material resources, leadership style and staffing potential. We also highlighted the factors that have a negative impact on certain enterprises. The most important of these are the following factors: a system for evaluation of the results of work and incentives, the human resources management system, and the leadership style. It should be noted that the calculations are generalized and these factors in individual enterprises may have different power of influence in comparison with other factors. The socio-psychological climate in certain enterprises has a strong positive impact. That is, the set of psychological conditions that have developed in certain enterprises promote joint productive activities and the overall development of the individual in the group. At the same time, in other enterprises, these conditions have developed in such a way that impedes effective performance.

The next factor that has a fairly strong impact on most of the companies under investigation is the level of material and financial resources support. This suggests that the managers of these enterprises provide the employees of the innovation management system with the necessary resources for the effective implementation of innovation activities. The negative impact of this factor indicates an inadequate financing of innovation activity. In order to reduce the negative impact of this factor, it is necessary to analyse the adequacy of the financial and material resources management system and determine the amount of resources that will ensure the lossless implementation of innovation activities.

The results of our study complements the existing study. Also, the authors believe that the process of development of the control system is most significantly affected by: achieved level and pace of development of productive forces; change in structure and production relations (Brulin & Svensson, 2016; Kita & Šimberová, 2018); more complete consideration of objective factors of economic development, due to the presence of internal contradictions (discrepancy between subject and object of management, insufficient level of optimal correlation of centralization and decentralization of management) (Rekonen & Björklund, 2016); increase in the degree of conscious use of economic laws and regulatory patterns (Ferraris et al., 2017).

## CONCLUSIONS

It is proved that the actual state of the innovative activity management systems of machine-building enterprises was formed under the influence of a number of factors (level of support with material and financial resources, socio-psychological climate, leadership style, personnel potential of the system, systems for evaluation of the results of work and incentives, flexibility and mobility, communication processes and the information support of the system; level of implementation of management and regulatory decisions), which have different levels of significance and unequal impact on the innovation activity management system.

## RECOMMENDATIONS

The style of leadership of managers of the innovation activity management system in the majority of investigated enterprises creates favourable conditions for the effective performance by employees of all their duties. At the same time, at some enterprises, the behaviour of managers of the management system does not meet their professional obligations and is the reason for non-fulfilment of the tasks assigned by other employees. To solve this problem it is recommend either to change the behaviour of managers, or to appoint more responsible and professional people to this post within the short term.

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