

## The peculiarities of enterprise innovational activity management system

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**Abstract.** This article outlines the peculiarities of management system analysis by innovational enterprise activity. Having analyzed the sources we have outlined the options according to which it is appropriate to apply such analysis. We have also offered optional parameters of management system evaluation by innovational activity and the importance of their consideration has been grounded.

**Key words:** innovations, innovational activity, innovation activity management system, parameters.

### INTRODUCTION

An effective feature of a management system built by innovation activity are its acquiring stable competitive positions which are extremely important nowadays for both large and small enterprises of all the propriety forms.

Coordinated cooperation of all the elements of innovational activity system enables the rationality of the fulfillment of all the tasks. To exactly define the level of the innovational activity management system organization we need to analyze the system of enterprise management. In this case the necessity to define the ways and methods of innovational activity management system arises, since innovations and creative initiatives are the main vehicle of development and acquiring competitive preferences by the companies.

### MATERIALS AND METHODS

The issue of management and enterprise innovational activity efficiency rise was investigated by: [1, 4, 8, 17, 21, 23] etc. The issues connected to the realization of innovational activity at an enterprise have

been well developed in the works by the above mentioned researchers. These are organizational aspects of innovational activity formation, economy and innovational activity organization, methods and ways of innovational activity evaluation results. Despite wide range research of enterprise innovation activity research certain aspects remained untouched by the researchers. The issues connected to the formation and evaluation of the systems of innovational activity management need more detailed research. Some views on the evaluation of management system including the system of management of innovational activity have been highlighted by [3; 8, 10, 12, 13, 14].

It is worth noting that the above mentioned researchers have not fully revealed the issue of the enterprise innovational system evaluation management. Thereby, the previous research [5; 7] showed that such issues solution connected to the formation and analysis of innovational system management may be considered as a separate essential factor of the development of both innovational activity and an enterprise itself on the whole.

### RESULTS AND THEIR DISCUSSION

Every enterprise functions in harsh and changeable conditions. To survive and keep its positions at the market it is necessary to constantly analyze the activity of an enterprise on the whole and a management system which exists at a given enterprise as well. Innovational management system as any other system is characterized by certain parameters which contain the information

about the features, state and the given system dimensions. «A parameter is a criterion relatively to which the evaluation and characteristics are realized» [2].

R.Fathutdinov defined the following parameters of the systems: 1) the parameters of product or service output (what should be produced, according to which indexes of quality, what are the expenditures, who is the customer, what is the deadline, who is the customer for sale and what is the price); 2) the parameters of admission (what resources and information for the process are necessary); 3) the parameters of the outer environment (political, economic, technological, social-demographic, cultural environments of the country of the region under consideration). A feedback is a communicational channel from the customers of the system to («output») the producers of the product and suppliers («admission») of the system. When the consumer's demands, market parameters are changed and novelties in technology and organization appear the «admission» of a system and the system itself must react to these alterations and make respective changes into the parameters of functioning [23].

The research conducted enable us to define the totality of innovational activity management system elements which can be presented as the parameters of the given system – management object (innovational activity); management subject (the head of the innovational activity department, innovational activity managers, other employees who have managerial functions in the very department); admission (finances, information, raw stuff, materials, energy, license, labor resources, law and norm support); output (innovational production, creative ideas, innovational technologies); management mechanism (administration aims, management functions, managerial decisions); outer environment (consumers, suppliers, inferiors, competitors, investors, law acts, the level of machines and technology).

The object of management or an innovational activity as such works the resources of innovational activity management system over, these are its admission elements. It also consumes and transforms them into output results of the functioning system. In other words it works them out, applies and spreads innovational products and technologies at the market.

Management subject is made up by management employees with certain dimensions of their activity, competence and the specificity of functions fulfilled as well as specificity of the functions fulfilled and also the totality of aims, functions and methods of management

with the help of which a managerial influence is realized. The subject of management provides the employees with output results and ensures the provision of expected results at the stage of admission. The subject of management concludes about the activity of an object work and makes correction decisions on the basis of output results of innovational activity management system.

Innovational activity management system admission makes up the resources, elements (raw materials, energy, information, etc) which are disposed to processes and operations. The summation of external environment factors which influence the processes of the system under consideration and are not under direct management belong to the same innovational activity management system admission. Different instructions and other norms which ensure the placement and functioning of innovational activity management system are the elements of the system as well.

Innovational activity management system output is the product, service or other result of its activity. To achieve a maximum efficiency of the management system under consideration, its products, services and technologies are to satisfy a number of criteria which meet the demands of consumers.

The analysis of innovational activity management system of an enterprise is a complex and purposeful process which is directed into the identification of the state and tendencies of the main management system elements, managerial decision making process. According to Melnyk M. [14], an analysis makes up the basis for the evaluation and grounding of basic measures of imperfection and management results rise. It also allows achieving output data to evaluate a real level of management system, finding advanced methods and «weaknesses» in the process of management, also the choice of primary imperfection objects, management system development plans making accounting real system capabilities (financial, technical and resource supply, the staff with appropriate qualifications or the possibility of their hiring); formation of complex programs for management imperfection.

In literary sources [3; 10; 13; 14; 17; 25], a great importance is attached to the indexes which characterize management system. We share the authors' opinion, but we apply only those indexes which characterize the innovational activity managements system to a proper extent (tabl. 1).

**Table 1.** Indexes which characterize the system of enterprise system of innovation activity management\*

№	Indexes names	Symbols
1	The index of ID management system functioning	$I_{fe}$
2	The index of economic work within the system of ID management	$I_{cw}$
3	The index of ID management system of the aims realization	$I_{ir}$
4	The indexes of management reliability within the system of ID	$I_{mr}$
5	The index of personnel employment in the apparatus of ID management	$I_{pi}$
6	The index of work efficiency of managerial personnel ID management	$I_{mpwe}$
7	The index of educational level of the personnel of ID system*	$I_{deg}$
8	The index of information applied in the ID management system usefulness	$I_{iu}$
9	The index of offered and realized novelties by the system of ID*	$I_{is}$
10	The index of franchising efficiency of ID system*	$I_{ife}$

\* – suggested by authors.

The index of qualification degree ( $I_{deg}$ ). The managers and employees who are in the head of personnel are the main element of innovational activity management system and they give exact tasks for certain periods, provide necessary conditions for their fulfillment. Under the analysis of a qualification degree of innovational activity management system the staff and managers of different level are provided. During this process the necessity of preparation, prequalifying and training are found out within the very system of management. In conclusion, to apply rationally the personnel important enough is the evaluation of their qualification. Under these circumstances, it is first of all possible to find out the relativity of qualification level to the demands suggested by norms. Respectively, to characterize innovational activity management system we suggest defining an index which will characterize the given system's appropriate personnel. To count the given index we take into consideration the educational level of the staff and also the fact of their training:

$$I_{deg} = \frac{Q_{hed} + Q_{te}}{Q_{gen}}, \quad (1)$$

where:  $Q_{hed}$  – the quantity of people having higher and secondary education which corresponds to the profile of innovational activity management system of an enterprise;  $Q_{te}$  – the quantity of employees who had their training course throughout the last 3-5 years;  $Q_{gen}$  – is a general quantity of employees of innovational activity management system of an enterprise.

The index of a qualification level may be counted separately according to the categories of employees, for instance managers, researchers, workers, supervisors, etc.

The index of the applied information reward within the management system of innovational activity ( $I_{iu}$ ) characterizes the importance of the information applied for the solution of the tasks aimed. The index of reward is generalized and counted with the following formulae:

$$I_{iu} = I_{iv} \cdot v_{iv} + I_{iru} \cdot v_{iru}, \quad (2)$$

where:  $I_{iv}$  – is an index of information value;  $I_{iru}$  – is an index of information rational use;  $v_{iv}$  and  $v_{iru}$  – are the

coefficients of validity for value indexes and information rational use respectively.

During accounting of a reward index of the information applied it is advisable to count the coefficients of an index of reward validity and the index of information rational use. According to the research conducted the following condition will be in action:

$$v_{iv} + v_{iru} = 1, \quad (3)$$

The index of information reward ( $I_{iv}$ ) characterizes the ability of this information to provide the object and subject of management with necessary conditions for their aim achievement. The given index is counted with the following formulae:

$$I_{iv} = \frac{I_v}{I_{ir}}, \quad (4)$$

where:  $I_v$  – is the quantity of information messages which turned out to be valuable for managerial decisions making;  $I_{ir}$  – the very quantity of informational messages out of general quantity of admission information which turned out to be true as a result of check.

The information rational use index characterizes the degree of fruitful use of information messages which appear in the system of innovational activity management and is counted with the formulae ( $I_{iru}$ ):

$$I_{iru} = \frac{I_{ru}}{I_r}, \quad (5)$$

where:  $I_{ru}$  – is the quantity of cases of informational messages rational use within the system of innovational activity management.

The authors of monographs [13; 14] count the information rational use index on the basis of accounting of general quantity of information messages which have been delivered to innovation activity management system of an enterprise. We consider it a necessity to use those information messages in accounting which have been verified.

During the analysis of innovational activity management system informational supply it is possible to evaluate the full range of informational supply therefore managers and employees' acquiring of the full

and sufficient information, reliability of it; timeliness and purposefulness of information supply and its address correctness. Under these circumstances the evaluation of the information flow is also possible to fulfill.

The results of analysis of innovational activity management system information supply will allow concluding about the development of information bulks and the choice of rational forms of informational system organization.

Index of success of innovational activity of the novelties offered and realized by the innovational activity management system ( $I_{is}$ ). This index characterizes the level of successful novelties out of their general quantity. The index is counted with the following formulae:

$$I_{is} = \frac{I_s}{I_{gen}}, \tag{6}$$

where:  $I_s$  – and the quality of novelties which were worked out and successfully realized by the system of innovational activity management system;  $I_{gen}$  – general quantity of novelties which were worked out and realized by the system of innovational activity management system of an enterprise.

Coming up with and realizing the useful and creative ideas the system of innovational activity management tries to provide the efficiency of each of them. The more successfully offered and realized creative ideas are there, the more efficient is the work of the system of management under consideration. The correspondence to the condition is the most perfect meaning of the index of success among the ideas offered and realized  $I_{is} \approx 1$ .

The index of franchising efficiency innovational activity management system of an enterprise is ( $I_{fre}$ ). This index characterizes the interrelation of innovational activity management system with other enterprises. Such interrelation includes the use of know-hows, commercial secrets and enterprise non-material shares. Apart from that, this index allows other enterprises using non-material shares of an enterprise.

$$I_{fre} = \frac{F_e}{F_{gen}}, \tag{7}$$

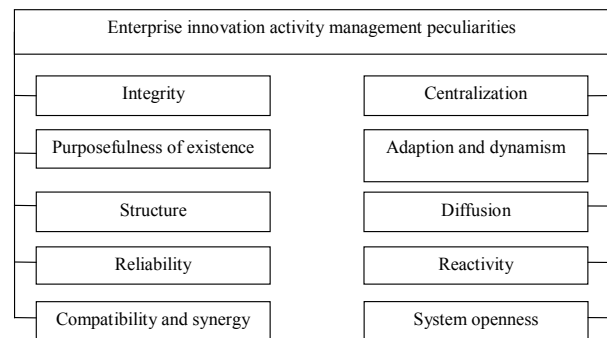
where:  $F_e$  – are franchising deals which ensured the system of innovational activity an economic profit;  $F_{gen}$  – is a general quantity of the deals signed in terms of franchising.

The index of franchising success characterizes the success of innovational activity management system with other companies. The higher the meaning of this index, the greater an economic profit is from management system functioning.

The indexes offered characterize innovational activity management system and enable us to evaluate the given system of management in full range, define its state and development perspectives.

The innovational activity management system can be also characterized according to the parameters peculiar to the management system. As a result of scientific sources review [1; 6; 12; 15; 16; 18; 19; 20; 21; 22; 23; 24; 26], we can define the following innovational activity management system features, which provide innovational enterprise development (fig. 1).

It is worth considering the features of innovational activity management system offered previously. The first feature is integrity. The term "integrity" presumes that the complex of elements is considered as a system and make up a whole which possesses general features and their own behavior. The deletion or replacement of at least one element may lead to efficiency decrease or even the collapse of innovational activity management system. Innovational activity management system analysis according to the following feature is rather important as all the systems are to operate in concord. The incapability of functioning of at least one element may damage the whole system of innovational activity management.



**Fig. 1.** Enterprise innovation activity management peculiarities\*  
\*compiled by the authors on the basis of sources analysis.

The purposefulness of existing is an exact goal fixing of innovational activity management system which change with the time flow in dependence of the conditions and does not contradict to the general goals of enterprise. The feature under consideration means the concordance of goals of innovational activity management system with the aim of organization and decision making concerning novelties in the view of usefulness of enterprise. The analysis according to the given feature provides a constant correspondence among the goals and tasks of innovational activity management system of enterprise in general.

Structure is a complex of components and their connections within the system of innovational activity, it is to be mobile and able to easily get accustomed to the change of demands and goals of the very management system and enterprise on the whole. Connection trekking within the given system of management allows preventing from elements interaction which is inefficient for the system under consideration.

Innovational activity management system analysis, according to such features as reliability, reaction, adoption and dynamism allow defining the possibility of constant functioning of the given management system under any circumstances. Every enterprise functions under constant changes of outer and inner environment. That is why the ability to quickly react and get accustomed to any changes provides smooth effective functioning of innovational activity management system and enterprise on the whole.

Compatibility and synergy define the interrelation of innovational activity management system, mutual supplement of one another, the ability to get accustomed, not to contradict and provoke conflicts, mutual adapting to achieve the best result with the help of mutual direction of their actions. Innovational activity management system analysis according to the given feature provides an opportunity to find those elements which are inefficient in their work.

The analysis of centralization of the system of innovation activity provides the opportunity to avoid anarchy, irrationality, irresponsibility and impunity within the given management system.

Personnel's skills reconsider the information and define correctly its scope make up the effect of diffusion. Innovational activity management system analysis is rather important for the enterprise as the information received on time provides the efficiency of enterprise functioning. N.Heorhiady in her monograph [3] made a detailed research of informational management system supply. The author claims that «it is necessary to analyze the degree of managerial information security; the documents of informational management security; technological security of management activity; personnel security and the service of informational management system used». Methodological recommendations offered by N.Heorhiady enable us to evaluate actual level of information security of management system of enterprise.

Innovational activity management system analysis of openness is of the urgent importance, as interrelation and interdependence of the given system with other ones and outer environment are analyzed.

The reversibility of connection is a direct or mediate connection with the innovational activity management system and other systems of an enterprise. The connection which is qualitatively established provides innovational activity management system with the opportunity to timely get rid of existing deviations, prevent from new ones or lower their risk to none and also work out efficient measures of the system protection from negative influence of inner and outer environments of indecent competitiveness.

## CONCLUSIONS

The analysis of management system by innovational activity enables us to find the drawbacks which were taken during both the formation of the very management system and its functioning. The analysis of innovational activity management system according to such parameters as object and subject of management, admission and output of the system, the mechanism of management and outer environment enable to find out the drawbacks of the system and prevent from negative outcome of their functioning. For instance, through the analysis of innovational activity management system admission a high quality of such resources as information, raw materials, personnel are provided which in its turn provides a high quality of an outcome of innovational activity management system, including novelties, creative ideas and innovational technologies.

The analysis of innovational activity management system according to its features enables us to find out that not the quantity of elements is essential in the system but the interrelation between them, the skills to work efficiently in concordance, interrelate with other systems of an enterprise and outer environment as well. Innovational activity management system inherence of the above mentioned features ensures its effective functioning nevertheless all possible unfavorable conditions in inner and outer environments of an enterprise.

The innovational activity management system analysis fulfillment according to all provided parameters is a background for decision making directed to its functioning.

## REFERENCES

1. **Burrennikov Yu.Yu., Polishchuk N.V. and Yarmolenko V.O. 2011.** Innovational Activity Management in Industry: entity, development peculiarities, the ways of imperfection: monograph. – Vinnitsya. – 184. (in Ukrainian).
2. Large Explanatory Dictionary of Modern Ukrainian / Compiled and edited by V.T. Bussel. – K.; Irpin: VTF "Perun", 2004. – 1440. (in Ukrainian).
3. **Heorhiady N.H. 2009.** Integrated Systems of Machine Building Enterprise Economic Development Management: Monograph. – Lviv: Publishing House of National University "Lviv Politechnic", – 336 (in Ukrainian).
4. **Hrynyova V.M. and Vlasenko V.V. 2005.** Organizational Problems of Innovational Activity at Enterprises: Monograph. – H.: VD "INJEK", – 200 (in Ukrainian).
5. **Knyaz S.V and Komarnytska N.M. 2014.** The Evaluation of the Efficiency of the Management System by Eco-innovational Enterprise Activity // Investment Practice and Experience. – №13, July. – 2014. – 63-66 (in Ukrainian).
6. **Knyaz S.V. and Komarnytska N.M. 2014.** A Systemic Approach towards Innovational Enterprise Activity

- Management // Economic Dimension: A Collection of Scientific Works. – №83. – Dnipropetrovsk: PDABA, 2014. – 186-194 (in Ukrainian).
7. **Knyaz S.V. and Komarnytska N.M. 2014.** The Management System Formation by the Commercialization of Enterprise Innovations [electronic source] // Effective Economics. – 2014. – №5. – Mode access to the journal: <http://economy.nayka.com.ua> (in Ukrainian).
  8. **Koyuda V.O. and Lysenko L.A. 2010.** Enterprise Innovational activity and the Evaluation of their Efficiency: Monograph. – H.: FOP Pavlenko.; VD “INJEK” – 224. (in Ukrainian).
  9. **Kuzmyn O.Ye., Pashchenko I.N., Chernobay L.I. and O. A. Bosak 2009.** Innovational Enterprise Economics: Manual – Lviv: Publishing House of National University “Lviv Politechnic”, – 456. (in Ukrainian).
  10. **Kuzmin O.Ye. and Heorhiady N.H. 2006.** The Formation and Application of Information System of Enterprise Economic Development System: Monograph. – Lviv: Publishing House of national University “Lviv Politechnic” – 368. (in Ukrainian).
  11. **Kuzmin O.Ye. and Melnyk O.H. 2003.** Theoretical and Applied Background of management: Manual. – 2-nd ed. Added. And reviewed. – Lviv: National University “Lviv Politechnic” (Information and Publishing Center INTELLECT+” The Institute of After studies ), “Intellect-west”, – 352. (in Ukrainian).
  12. **Lavynsky H.V. 1989.** The Formation and Functioning of Complicated Systems of management: Manual. – K.: Higher Educ. Main Publishing House. – 336. (in Russian).
  13. **Lala O.M. 2008.** Enterprise Management Evaluation Quality System: Monograph– Poltava: RVV PUSKU, – 165. (in Ukrainian).
  14. **Melnyk M.V. 1990.** The Analysis and Evaluation of Enterprise Management Systems. – M.: Finances and Statistics, – 136. (in Russian).
  15. **Myzyuk B.M. 2004.** Systemic management: Monograph. – Lviv.: Publishing House of Lviv Commercial Academy, – 388. (in Ukrainian).
  16. **Nykyforuk B.V. 2007.** Systemic Approach towards Managerial Decision Making. – Lviv: Ukrainian Academy of Printing, – 229. (in Ukrainian).
  17. **Zavlyn P.N. and others. 2000.** The Basis of Innovational Management: Theory and Practice: Manual – M.: OAO “NPO “Publishing House “Economics”, – 475. (in Russian).
  18. **Osovska H.V. and Osovskyy O.A. 2009.** Management of Enterprise. Meant for Individual Learning. Manual. – K.: Condor, – 378. (in Ukrainian).
  19. **Hladunskyy V.N. 2011.** Systemic Approach towards the Formation and Managerial Decision Making Process(logics and pedagogy aspects) : monograph. – K.: UBS NBU, – 207. (in Ukrainian).
  20. **Dmytrychenko M. F., Havrylov E. V., Dmytrachenko M.F., Dolya V. K. and others. 2005.** Systemology of Transport. Manual: 5 ed. – K.: Ukrainian Knowledge, B. I: The Basis of System Theory and Management– 344. (in Ukrainian).
  21. **Stadnyk V.V. and Yohna M.A. 2006.** Innovational Management: Manual. – K.: Academydav. – 464. (in Ukrainian).
  22. **Fathutdynov R.A. 1998.** Innovational Management: Manual. – M.: ZAO “Business school “Intel-synthesis”, – 600. (in Russian).
  23. **Fathutdynov R.A. 1997.** Management System: Manual, 2<sup>nd</sup> ed. – M.: ZAO “Business school“Intel-synthesis”, – 352. (in Russian).
  24. **Fathutdynov R.A. and Osovska H.V. 2009.** Enterprise Competitiveness Management: Manual. – K.: “Condor”, – 470. (in Russian).
  25. **Shypulina Yu.S. 2008.** The Criteria and Methods of Commercial Enterprise Innovational Potential Diagnosis Methods [Electronic source] // The Mechanism of Economy Regulation. — 2008. — №3, V.1. — C.58-63. Mode access: <http://essuir.sumdu.edu.ua/handle/123456789/3171>. (in Ukrainian).
  26. **Golovkova K. and Kalyuzhna N. 2013.** Structural contradictions in control system by enterprise as function of associate administrative decisions [electronic source] // Econtechmod. An international quarterly journal. Lublin – Rzeszow – Vol. 02. No. 3. 59-63. – Access mode: <http://www.pan-ol.lublin.pl/wydawnictwa/Econtechmod> 2013/Econ\_2013\_2.pdf/. (in Polish).