Enterprise innovative potential assessing indicator elaboration in view of the digital economy development

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Abstract. In this article with the purpose of creation of the strategy of intensifying of innovative potential of the enterprise that characterizes the possibility of innovative development of the aforementioned enterprise, it is submitted to calculate the level of the innovative potential in the context of digital economy on the basis of introduction of the integrated index which includes the group of elements such as factors of internal environment of the enterprise namely production technology resources, the level of innovative development, availability of informational resources and factors of external environment namely competitiveness of the enterprise on the market and participation in realization of the principle of «triple helix»-the partnership of the state, science and business.

Key words: innovative potential, digitalization, innovative economy, assessment methods, integral indicator.

One of the main components of innovative economy developing on the basis of equal usage of scientific knowledge, intellectual potential and innovative products, readiness to their practical realization in different spheres of human activity is digitalization. Occasionally this component is categorized as «digital economy».

Russian passage from the creation of free market economy to it innovative type of development means at the same time active usage of accumulated innovative potential namely fundamental research findings and applications, results of intellectual activity (RIA) in the form of patents. This innovative potential is necessary for the passage to innovative type of development, but the actual showings of innovative activity remain low [4].

At present moment development of digital platforms that can render different services which are the basic elements of digital economy of Russia are developing.

What does it mean «innovative potential»? In general, innovative potential of any object equals to conditions in which innovative activity is realized successfully. Innovative activity of the enterprise is the source of development only in case of the active and sometimes aggressive strategy of promotion and also in case of creation of enabling environment for launching of new products, technologies and services.

An enterprise with high innovative potential is the enterprise that exists in developed infosphere, owns patents, research findings and applications, inventions, new ideas, new technologies, untapped needs etc. Bearing in mind all mentioned above there is an multialternative interactive and expert – based approach for decisions making.

The main difference of an innovative organization is ultimately its aims such as development of corporate and workforce innovative potential, providing of long-time vitality, satisfying the potential requirements of consumers and development of the own market. The management of innovative potential is the necessary part of management of innovations. It resolves issues of planning and realization of innovative strategies of stable development of the enterprise. Development of innovative strategies bases on the evaluation of potential possibilities and innovation potential of the enterprise and on an analyze of external environment of the enterprise. An increasingly larger role of innovations makes new demands to the choice of effective mechanisms of usage and evaluation of innovative potential and also to management of innovations in the enterprise. That is why national researches and researches abroad pay more and more attention to the role of innovations in development of the enterprise.

The definition of «innovative potential» for the growth of the system due to innovations was firstly introduced by Christopher Freeman in 1970-1980. He thought that innovation is the system of measures to design, development, usage and exhaustion of economic, social and institutional potential which are at the heart of innovation.

A practical aspect of «innovation potential» is reflected in works of Peter Drucker [5] where he looks into beginnings of development of modern industry. For instance, he remarked that innovation began from the analyze of existing potential with the purpose of its effective usage. In majority of cases the authors concentrate on the analyze of separate aspects of innovative potential, there are some definitions that are inconsequent and do not place the emphasis on methodological essential of the concept.

A team of authors under the direction of V.Barancheev [6] defines innovative potential of the enterprise as the measure of readiness to fulfillment of tasks providing achievement of innovative aims of the enterprise.

B.K.Lisin and V. Fridlyanov [7] give the following definition to «innovative potential» of the enterprise. Innovative potential is the complex of scientific, technical, technological,

infrastructural, financial, legal, sociocultural and other possibilities, providing apprehension and launching of innovation.

A team of authors under the direction of M.N.Titov [8] thinks that innovative potential is capability of the unit of real sector to provide a sufficient level of updating of operational factors, their combinations in the operational process, organizational and management structures and also the internal culture.

B.A.Pateev [9] supposes that innovative potential of the enterprise is the mixture of informative, technical, technological, intellectual, spatial, financial, organizational, managemental, juridical and business resources that forms the single system for appearance and development of ideas, providing competitiveness of final products or services in accordance with aims and strategies of the company.

S.V.Kortov [10] regards the innovative potential as an assembly of resources containing human resources, material and technical resources, finances, management that are sufficient for realization of whole innovative cycle and satisfying the developed requirements in innovation. Innovative potential of the enterprise is often regarded as the set of resources with different level of detailing.

To sum up the discussion of methodological essential of innovative potential it has to be concluded that innovative potential is not only resources available for innovation but also innovative mechanisms including development of innovative potential via innovation and investments.

With purpose of stable and effective development of the enterprise it is important to evaluate and increase its innovation potential. The authors of this article interpret innovation potential as integrated index that characterized the level of readiness of the enterprise for the development and release of innovative products. Evaluation of the level of innovative potential of the enterprise and its increase allow to speed up commercialization of novelties (patents, know-how, ideas) and realize them in real sector of economy.

Experts divides indexes of innovative potential on internal and external indexes (external environment). Internal indexes in turns divide on groups:

- technological indexes;
- indexes of level of innovative development of the organization
- indexes of availability of information resources

Existing methods of evaluation of innovative potential of enterprise include following elements: processing opportunities, effectiveness of the science and technology infrastructure, availability of means for financing of innovative activity, availability of the staff that can think outside the box etc. [3]. In majority of cases these methods base on expert evaluation methods. It

provides subjectivity in procedure of evaluation of innovative potential. The authors have developed the system of indexes based on the possibility of their calculation and reflecting the level of innovative potential of the enterprise in conditions of digital economy. This system consists of technological resources that are necessary for realization of innovative activity, the level of innovative development, availability of information resources.

Nowadays introduction of indexes of information block for the calculation is particularly topical as one of the key priorities of our state development is the focus on digitalization of economy [1].

In conditions of passage to digital economy in group of indexes of informative availability besides availability of personal computers and necessary software in the enterprise it is necessary to bear in mind such element as level of digitalization of internal business processes of the enterprise. It is offered to include this index as ratio of number of digitized business processes to the whole number of business processes of the enterprise.

The level of innovative development of enterprise is characterized ultimately by innovative activeness of the enterprise. Innovative activeness of the enterprise is complex characteristic of its innovative activity including innovativeness (the feature of the consumer of an innovative product), the level of intension performing actions connecting with transformation of novelties and their timeliness (the feature of the supplier of an innovative product), capability for mobilization of potential of necessary quality and quality, capability to provide justification of applying methods, reasonableness of the technology of innovative process referring to composition and subsequence of operations. Innovative activeness characterizes the readiness to renewal of key elements of innovation system namely knowledge, techniques, information and communications technologies and conditions of their effective usage (structure and culture) and also open-mindedness.

In general, the system of indexes of level of innovative potential may be presented as follows.

1. technological resources that are necessary for innovative activity (P1)
   1.1. Availability of intellectual property (patents, computer programs, know-how etc.) characterizes the existence of objects of intellectual property (own or purchased) in the organization (P_{11}).
   1.2. Share of expenses for researches and development (concerning the time or payment) in general volume of expenses for development of innovative product (technology) (P_{12});
   1.3. Acquisition of new equipment and technologies characterizes the capability of the organization for acquisition of new productions (share of expenses for purchasing of new equipment and technologies in whole volume of cost of operating resources) (P_{13}).

1.4. Acquisition of manufacture of new products (share of new released products in whole production data sheet) (P_{14}).

2. The level of innovative development of organization (P2):

2.1. The share of employees who are engaged in researches and development in total quantity of staff (P_{21}).

2.2. Share of expenses for education of staff in total volume of operating expenses (P_{22}).

2.3. Profitability of innovation (ratio of profit that was earned from realization of the innovative product to the revenues from its realization) (P_{23}).

2.4. Innovative activeness (ratio of quantity of innovative products to the total number of released product for the last year) (P_{24}).

3. Availability of information resources (P3)

3.1. Availability of personal computers (level of availability of personal computers in organization) (P_{31}).

3.2. Availability of software (level of availability of necessary software in organization)) (P_{32}).

3.3. Relative degree of digitalization of business processes of organization (ratio of the number of digitalized business processes to the total number of business processes in organization) (P_{33}).

It has to be recognized that innovative potential of the enterprise in spite of its full determination does not guarantee realization of its strategic aims. It is invidiously to define innovative potential without bearing in mind factors of external environment of the enterprise namely availability of necessity in released product, competitiveness on the market, possibility of realization of public private investment partnership. Without reference to aforementioned elements innovative potential of enterprise like a «dead cargo».

That is why indexes of external environment in which the enterprise is working are introduced:

4. Factors of external environment (P4):

4.1 Competitiveness of organization (share of the market of products of organization in whole volume of the market) (P_{41}).

It is important to diversify the share on the market according to the quantity of players on the market.

For instance, if there are 10 or more players multiplying co-efficient equal to 1.5 is introduced, if there are 20 or more players multiplying co-efficient equal to 1.6 is introduced etc.

4.2 Participation of organization in realization of principle of «triple helix»- cooperation of the state, science and business or public-private partnership (principle of «double helix»- cooperation of the state and business) (P_{42}).

General integrated index of potential is calculated as the sum of indexes of all elements with weighing coefficient, which reflects the significancy of each index:

$$K_{int} = \sum_{i=1}^{n} P_i \quad (1)$$

where P_i –is a value of i-th group of indexes of innovative potential of the enterprise.

It has to be marked that value of each index fluctuates from 0 to 1 that allows to calculate the level of innovative potential of the object.

There are 13 indexes, thus, integrated index of the level of innovative potential fluctuates from 0 to 13.

Let's calculate the level of innovative potential of one of the enterprises of the Murmansk region.

«Alpha» that is a franchisee of «1C» is engaged in the development of software for automatization of business processes of different organizations and also in rendering of consultation services in this sphere. «Alpha» develops and launches on platform that is called «1C:Enterprise 8», has an experience in creation of sites and portals with appliance of decisions of «1C- Bitrix» and databases maintenance with PostgreSQL, makes decision to questions connecting with support of technical infrastructure and work optimization of products of 1C. Different developed software products can be referred to the intellectual property of the company. The big share of expenses of the company includes expenses on the investigation of new productions and application fields of software solutions in order to increase customer database. Projects of «Alpha» are applied in different spheres among which there are production and fishery, fish farming, transport and logistics, education, medical care and medicine, power economy, housing and utility sector, shipbuilding and ship repairing. The company actively works together with state-owned enterprises.

The indexes of «technological resources» group:

$$P1 = (1 + 0{,}4 + 0{,}3 + 0{,}5) = 2{,}2$$

About one third of employees of «Alpha» are engaged in researches and development, recruitment and education are taken place.

The indexes of «innovative development of organization » group:

$P2 = (0,3 + 0,1 + 0,6 + 0,3) = 1,3$

Each employee of «Alpha» is equipped with computerized work place with set of licensed software products. Business processes and cooperation inside the company are automatized and are taken place in digital format.

The indexes of «information resources» group:

$P3 = (1 + 1 + 0,9) = 2,9$

«Alpha» works in conditions of severe competitiveness and has 6th place and 6% share on the market of informational resources. Public-private partnership is realized within participation in projects of cooperation and supporting of organizations of state sectors.

Indexes of «external environment» group

$P4 = (0,06 \times 1,6 + 0,4) = 0,0496 \sim 0,5$, where 1.6 is co-efficient of market competitiveness.

Integrated index of innovative potential of organization:

$K_{int} = \sum_{i=1}^{n} w_i P_i$ = P1+P2+P3+P4 = 2,2+1,3+2,9+0,5 = 6,9

The calculation of level of innovative potential of the enterprise gives opportunity to develop corresponding recommendations referring to the increase of innovative potential of the enterprise. Obviously, actions correspond to low level of corresponding indexes.

In this case we have low level of P_{22} (share of expenses on the increase of competence of staff) and P_{24} (innovative activeness). That is why the company should pay attention to these parameters.

The example of recommendations is in Table 1.

Table 1. The example of recommendations referring to the increase of innovative potential of the enterprise

The level of potential	Very low	Low	Medium	High
Value	From 0 to 2	From 2 to 6	From 6 to 10	From 10 to 13
Strategy of the increase of innovative potential	Increase of competence of staff Increase of expenses for researches and development Information support of business processes	Increase of competence of staff Increase of expenses on researches and development Information support of business processes Renewal of	Informational support of business processes Usage of progressive digital technologies Development of the mechanism of «open innovation»	Usage of progressive digital technologies Development of digital services and platforms within field of the enterprise Usage of principle of «double and

		fixed funds Increase of competence of staff in digitalization Creation of the single digital ecosystem	Usage of principle of «double and triple helix», cooperation with universities and scientific organizations	triple helix», cooperation with universities and scientific organizations

In general, definition of the level of innovative potential and development of the strategy of its increase allows to realize having opportunities in more detailed and suitable manner, to be competitive and meaningful on the market.

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