Innovative management in Russian production companies

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Abstract. The article exposes the necessity of effective management of innovations on the basis of the new scientific direction – innovative management. The growing attention of the Russian economists to the innovations management problems in the increasing economy complexity, the scientific and technological progress speeding up resulting in specific changes is presented. The research methodology is based on the typical changes caused by the wave fluctuations and business cycles in the public production. As the result of innovative activities growth rate evaluation, there was found out the tendency of the Russian production companies to the certain innovations. The innovative management quality evaluation in the Russian companies found out the lack of thereof and defined the factors negatively influencing the innovative development. The main means of innovative management able to increase its quality by influencing on the indices of commercialization, length of the works being completed in social, geographical, communicative, technological, science and technology, economic and financial spheres are explained.

1. Introduction

There is a gradual change of management benchmarks in the companies from prescriptive to innovative in the process of the Russian economy and production. The core of the management system is the same and concerns stability on the base of incentives. The innovations are these incentives in the new environments. It is important to take the changes caused by innovations as a new feature of the management system and an ability to reach the goal.

Under the current circumstances there is a necessity of effective management of innovations. As the result of this necessity a new scientific direction in the management system – the innovative management is being formed (Innovation Management, IM) (Robert Nowacki, Katarzyna Bachnik, 2016), (Chih-Wen Wu, Kun-Huang Huang, 2015).

IM is a relatively new concept for the Russian scientific society and the business community. Nowadays the old forms and methods of management are being replaced with “innovative” ones. All the economic entities from state-level management companies to the limited liabilities companies in the small business sector and individual entrepreneurs have to undertake the innovative activities.

IM is the primary direction of the strategic management carried out at the top level management of the company (Viliam Lendel, Stefan Hittmar, Martin Latka, 2015). The goal of IM is finding out of the main directions of science and research and production activities of the company in the process of new products development and introduction, company’s products modernization and improvement, the products in demand production development, ceasing the production of the outdated products.

In the market environment as a certain system of supply and demand economic regulation on the basis of which the market price is formed, the main components of IM are the improvements, investments and innovations. Improvements form the novation market, investments form the capital market, and innovations form the innovations - pure competitiveness market.

The scientific society, in general, defines the innovation as the final result of IM implemented as a new or improved product introduced in the market, a new or improved technological process used in practice or as a new way to meet the public needs. Meanwhile, the time period from the idea inception,
novation creation and dissemination to its introduction and use is generally referred to as the innovation life cycle. Taking into account the works implementation stages the innovations life cycle is referred to as the innovative process.

On the modern stage of the economic science the rising attention of the Russian economists to the problems of IM is explained by the increasing complexity of the economy structure, speeding up of science and technology progress causing the contradictions between the decreasing time of the product market life and increasing the time of its potential possibilities, it is also explained by the limited possibilities for the economic growth. (Deniz Dilara Dereli, 2015).

2. Evolution of Innovation

The Russian economist Kondratiev N.D. published in 1925 the theory of the wave fluctuations in the public production thus paving the way for IM. Having investigated the vast statistic on the alternation of the changing stages cycling in industrial production he determined the existence of large economic cycles.

J. Schumpeter who worked in Harvard University, the USA developed Kondratiev’s wave theory. He revealed in the wave theory the possibility to overcome the crises and declines in the industrial production through the innovative enhancement of the capital by the means of technical, organizational, economic and managerial innovations (Heinz D. Kurz, 2008). Three types of cycles are defined by J. Schumpeter in his work «Business cycles» (1939). The first cycle related to the Industrial Revolution triggered by the development of the industry in Great Britain. The second cycle coincided with the railways, mechanical engineering, steamships advent, it lasted till the 90-th of the XIX century. The third cycle was related to using the electric power, invention of the internal combustion engine, development of the chemical industry (Konstantinos N. Konstantakis, Panayotis G. Michaelides, 2017).

Such terms as the product life cycle and the production technology life cycle are determined according to the modern concept of IM.

The product life cycle consists of four stages. Investigation and design of the product novation are performed in the first stage. The stage is completed when the finalized technical documents are transmitted to the production units of the industrial organizations. Technological exploitation of the new products large-scale production is performed in the second stage. The first and especially the second stage are related to significant investment. The growth of the production is followed by the products cost lowering and profits increasing. It allows recouping the investment of the product life cycle at the first and second stages. Then the third stage starts, it is distinguished with the stabilization of the production volume. A gradual lowering of the production and sales takes place in the fourth stage.

The production technology life cycle also consists of four stages. The first stage is related to the birth of the process novation and carried out by a broad range of technological research. The second stage is connected with the process novation exploitation in the production facility. The proliferation and replication of the new technology with its multiple replicating in the other production facilities are carried out in the third stage. The fourth stage includes the using of novation on the routine basis i.e. the realization of the novation process in the stable full-time functioning units of the production facilities.

3. Solution Methodology

The “investment in novation” as the result of the new process, product or service practical application is defined as innovation. Novation is some novelty that was not applied before: a new phenomenon, discovery, invention, and a new way to meet public needs.

J. Schumpeter interprets the innovation as the new scientific and organizational combination of the production factors motivated by the entrepreneurial spirit. Schumpeter developed the theory of the entrepreneurship according to the technological innovations in his “Theory of Economic Development” (1912). He interprets the profit and the income of an entrepreneur as the result of the
dynamic changes in the economy because of the innovative activities. The function of the entrepreneur amounts to the imbalance, creation of the imbalance state in the market as the result of the innovations which brings the profit. A person can be an entrepreneur only till he undertakes innovative activities and loses this status after business establishing, running it as a routine process without any further managerial, technological and other improvements (Nadide Sevil Tülüce, Asuman Koç Yurtkur, 2015).

Changes are the innovation specific content and the function of changing is the primary function of an innovative activity. J. Schumpeter defined the following typical changes: new equipment, new technological processes or new production marketing (purchase and sale) application; new featured products introduction; new raw materials application; changes in production management and its logistics; new sales markets formation (Kerk L. Phillips, Jeff Wrase, 2006).

Science and technic innovativeness and production applicability are the essential innovation properties. Tradability concerning innovation is an eventual property requiring some efforts to be reached. According to the commercial aspect the innovation is an economic necessity realized through the market needs. It is necessary to pay attention to the possibility of innovations “materialization” into new technically perfect kinds of industrial products, means and tools of labor, technologies and production management as well as commercialization converting the innovations into the source of income.

Innovations are an effective tool of competition in the market economy as they lead to the creation of new demands, cost price reduction, an influx of investments, increasing the reputation (rating) of the new goods producer, opening-up and capturing new markets including export ones (Massimiliano Bratti, Giulia Felice, 2018).

4. Result

IM includes scientific and technological, managerial, financial and marketing activity. IM changes creation and application in the field of new products, methods, their introduction, exploitation and replication.

Novelties, innovations and investments are the main components of IM. Novelties form novation market, the main product of which is intellectual property. It is covered by copyright, obtained according to the international, federal, corporate and other legislative and normative acts.

A novelty creation and its transformation into the innovation require material, time, finance and other types of investment. The volume of investment into the innovation, its recoup time, the profitability of the future innovation and failure risk are the basic criteria for evaluating the innovative changes undertaking perspectivity (Jin Chen, Ximing Yin, Liang Mei, 2018).

The results of the innovative activities growth rates evaluation (table 1) helped to define the weakest indicators of Russian companies’ innovation development

| Table 1. Innovative activities in Russia growth rate, per cent |
|-------------------------------------------------------------|
| **Indicator**                                               | **Average, 2011 – 2017** |
| Companies undertaking ecological innovations ratio in the year under review, in the overall number of companies reviewed | -14.75 |
| Companies undertaking marketing innovations ratio in the year under review, in the overall number of companies reviewed | -5.67 |
| Companies undertaking managerial innovations ratio in the year under review, in the overall number of companies reviewed | -4.51 |
| Investment in technologic innovations ratio in the delivered goods, completed works and services overall volume | -1.42 |
| Companies undertaking technology innovations ratio in the year under review, in the overall number of companies reviewed | -0.49 |

Source: calculated by Federal Government Statistical Service data URL=http://www.gks.ru (Date of retrieval 02.10.2018).
The Russian companies tend to develop ecological and marketing innovations less and technologic innovations more. It reveals positive developments in technology for innovations introductions non-linearity.

\( IM \) can reduce positive developments in technology non-linearity; the quality (Quality of Innovation Management, \( QIM \)) of which is calculated by the following formula:

\[
QIM = \left( I_p \times I_c \right)^{1/2}
\]

- \( I_p \) - Innovation potential, \( I_c \) - Innovation climate.

\( I_p \) – the level of commitment to the project or strategic innovative changes program realization, it is defined by the effectiveness of economic, financial, managerial and personnel resources. The main factors of \( I_p \) are:
- Scientific and technological potential: number of personnel with Academic Degree; quantity of rational proposals to one employer; quantity of patents;
- Commercialization indicators: new products share in the total amount of the produced goods; quantity of the license agreements;
- Duration of the works being carried out (rate of the innovative lag);
- Management system innovativeness: kinds of innovative activities stimulation in the company, top managers participation in innovative projects realization; innovative activity participants’ degree of freedom.

\( I_c \) is a part of total team culture of the company contributing to the employee’s efforts in new ideas generation and realization. To create a favorable \( I_c \) it is necessary to create the atmosphere of confidence, to detect and overcome the factors “blocking” creative efforts and a team searching work of the personnel, to broaden the powers of innovators in their job activities, to use managerial and psychological tools helping to generate the new ideas.

\( QIM \) rate is identic to \( PMI \) (Purchasing Managers Index), but expressed in shares, accordingly to \( I_p \) and \( I_c \) (table 2).

**Table 2. QIM**

|                      | Base | Calculated |
|----------------------|------|------------|
| \( I_p \)            | 1.0  | 0.7        |
| Scientific and technical potential (the number of Academic Degree Personnel, the number of rational proposals to one employer; quantity of patents) | 0.3  | 0.3        |
| Commercialization indicators (new products share in the total amount of the produced goods, the number of licensed agreements) | 0.3  | 0.1        |
| Duration of the works being carried out (rate of the innovative lag) | 0.2  | 0.1        |
| Management system innovativeness (kinds of innovative activities stimulation in the company, top managers participation in innovative project realization, innovative activity participants’ degree of freedom) | 0.2  | 0.2        |
| \( I_c \)            |      | 0.7        |
| Social, geographic and communication spheres (social strain, access to raw material, fuel, energy, material and technical resources, transport and information resources) | 0.3  | 0.2        |
| Technological, scientific and technical sphere (technologies, scientific and technical information market, availability of research institutions, consulting, engineering, venture and other companies) | 0.3  | 0.2        |
| Economic and financial sphere (taxes, benefits for R and D, federal investment climate, interested in innovations investors) | 0.2  | 0.1        |
| Political and legal sphere (federal and regional plans and programs, legal base regulating the R and D works) | 0.2  | 0.2        |
| \( QIM \)            | 1.0  | 0.49       |

Source: calculated by Federal Government Statistical Service data URL: http://www.gks.ru. Rating Agency RAEX (“Expert PA”) URL https://raexpert.ru (Date of retrieval 02.10.2018).

The \( QIM \) evaluation results allowed revealing its low level (more than 0.5) and the factors negatively affecting on the Russian companies innovation development: commercialization; duration of the works...
being completed; social, geographical, communicative, technological, scientific and technical, economic and financial spheres.

5. Discussion

*IM* must start with the general goal formulation clear to each member of the personnel. Goal formulation is very important for the company business relations with the external environment, market and consumers. Company’s general goal has to cover the main company’s activity, working principles in the external environment (trading principles; treatment to the consumers; business relations); company’s culture, its traditions and working climate.

The next stage of *IM* is innovative planning relying on company’s external and internal environment analysis, during which changes happening in the planned period are evaluated, factors impending company’s positions are revealed, factors favorable for the company’s activities are investigated, innovations letting the company strengthen its market position are planned.

*IM* is a way affect agent management on object management including innovations, innovative process and business relations in the innovation introduction market. Innovations introduction always depends on the investment of the innovation. Therefore all the ways of innovative management should take into account money relations arising in the process of innovations introduction.

6. Management solutions

Let us consider the *IM* main ways capable to increase the *QIM* rate and improve Russian companies innovation activities lagged factors (commercialization/marketing index, duration of the works being carried out, social, geographic and communication sphere, technological, scientific and technical spheres, economic and financial sphere):

1) Innovations engineering is a scope of works on innovation project implementation including creation, realization, promotion and replication of some innovation. The goal of innovations engineering is to get the best economic effect from the investment into the new product and determination of the innovative activities perspective ways;

2) Reengineering is a variety of engineering method. Reengineering as the way of innovative management treats with the innovation process dedicated to the new products and operations production as well as their realization, promotion and replication. Reengineering in *IM* is connected with some certain goal of the innovation, i.e. the current necessity or strategic necessity in innovations;

3) Bench-marking is business entities’, first of all, competitors’ activities investigation to use their positive experience in your own activities. It includes a scope of means to find, evaluate all the positive sides of another’s experience constantly and use them in your own work;

4) Brand-strategy (brand-innovations) is a system of the new product or operation distinctive properties that forms the consumer’s consciousness and defines the innovation place in the market as well as its producer or seller. Brand makes a buyer to choose a certain product (operation) among all the available in the market.

5) Price control in *IM* represents a way to effect on the innovation sale through the price mechanism.

The main goal of all the methods is speeding-up the innovations sale at the greatest profit and effectiveness within the current period of time as well as the greatest advantage of this sale in the future.

7. Conclusion

The necessity of *IM* in the Russian companies is related to new requirements to the companies, their managerial activities content and methods in the raising competitiveness for the sales markets. *IM* in the Russian companies must represent itself a system of coordinated measures to increase *QIM* by all the factors optimal combination.

Innovative activities carrying out in a more perfect way providing *QIM* increase acknowledges the going to a higher level of production abilities and is an index of the innovative development of the company.
**IM** introduction process in the Russian companies includes the following stages: defining the innovation management goal; choosing the innovation management strategy; defining the innovation management ways; developing the program on innovation management, organizing works on the program carrying out; controlling the planned program carrying out; management ways effectiveness analyzing and evaluation; innovation management ways correction.

**IM** in the Russian companies must be budgeted at innovation creation and realization, i.e. in the process of innovation itself. Innovative process is the basic foundation and the effectiveness of **IM** and QIM ways and methods will depend on it.

**References**

[1] Bratti M, Felice G 2018 Product innovation by supplying domestic and foreign markets. *International Journal of Industrial Organization* 60 126–178

[2] Chen J, Yin X, Mei L 2018 Holistic Innovation: An Emerging Innovation Paradigm. *International Journal of Innovation Studies* vol 2 iss 1 1–13

[3] Dereli D D 2015 Innovation Management in Global Competition and Competitive Advantage *Procedia - Social and Behavioral Sciences* 195 1365–1370

[4] Konstantakis K N, Michaelides P G 2017 Does technology cause business cycles in the USA? A Schumpeter-inspired approach *Structural Change and Economic Dynamics* 43 15-26

[5] Kurz H D 2008 Innovations and profits: Schumpeter and the classical heritage. *Journal of Economic Behavior & Organization* vol 67 iss 1 263–278

[6] Lendel V, Hittmar S, Latka M 2015 Application of Management of Innovation Processes in Enterprises: Management Approach, Problems and Recommendations *Procedia Economics and Finance* 34 410–416

[7] Nowacki R, Bachnik K 2016 Innovations within knowledge management *Journal of Business Research* vol 69 iss 5 1577–1581

[8] Phillips K L, Wrase J 2006 Is Schumpeterian ‘creative destruction’ a plausible source of endogenous real business cycle shocks? *Journal of Economic Dynamics and Control* vol 30 iss 11 1885-1913

[9] Tuluce N S, Yurtkur A K 2015 Term of Strategic Entrepreneurship and Schumpeter’s Creative Destruction Theory *Procedia - Social and Behavioral Sciences* 207 720–728

[10] Wu C.-W, Huarng K-H 2015 Global entrepreneurship and innovation in management *Journal of Business Research* vol 68 iss 4 743–747