The methodology for solving the multi-criteria problem of choosing a tool for the development of intrapreneurship for Russian corporates

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Abstract. The article is devoted to the problem of the development of innovations within the framework of internal entrepreneurship (i.e. intrapreneurship). The main objective of the study is to develop a methodology for solving the multi-criteria problem of choosing a tool for the development of intrapreneurship for a private or public company, regardless of its industry affiliation. The relevance of the intrapreneurship problematics for modern Russian corporates is revealed. As a result, a conceptual model of the decision support system is proposed, and directions for its refinement and complication are indicated.

1. Introduction
In modern realities, it is impossible to imagine the development of the economy without innovation. Innovative development is the key to the competitiveness of the country's economy in the context of global competition. Like any complex phenomenon, Russia's transition to an innovative economy has a number of specific features.

In 2011, an unambiguous choice was made towards innovative development: the Government of the Russian Federation approved the main document defining the trajectory of development of the innovation system for the long term - the Strategy for the Innovative Development of the Russian Federation until 2020. The results have yet to be analyzed, new global challenges should be taken into account, therefore the next strategy is still at the project stage [1].

There are many challenges and barriers to the diffusion of innovation, but the government is making efforts to overcome this situation. Entrepreneurs, in turn, also face a variety of innovation challenges. This can be helped by advanced foreign experience, which, nevertheless, requires adaptation to the Russian business environment [2].

The approaches to innovation from the point of view of intrapreneurship are especially interesting.

Entrepreneurship is primarily associated with the creation of new enterprises, which is quite justified, since the key feature of entrepreneurial thinking is the ability and willingness to develop, organize and manage a commercial enterprise, along with any of its risks, in order to make a profit. However, in addition to classical entrepreneurship, there is the concept of "intrapreneurship" (from the Eng-
lish Intrapreneurship, internal entrepreneurship) - this is a system that allows an employee to act as an entrepreneur within a company (organization) [3].

Intrapreneurs are motivated, proactive and action-oriented people who take the initiative in promoting an innovative product or service.

Intrapreneurship is a relatively new term for domestic economic science, therefore, at the same time, sources use the concepts: intrapreneurship, internal (intra-corporate / intra-firm) entrepreneurship.

Intrapreneurship implies innovative and proactive employee activities aimed at:
- creation of new products and services,
- significant updating of existing processes,
- opening new business areas within the company.

This activity is carried out with the acceptance of possible risks and to strengthen the competitive position of the company, which is a complete analogy to the situation of a traditional entrepreneur.

At the moment, Russian corporations do not sufficiently use the tools of domestic entrepreneurship. Most of the barriers hindering the development of internal entrepreneurship are associated with a lack of flexibility in the organizational structure and a corporate culture that is not focused on working with innovations.

The very concept of "corporate legal entities" in the Russian Federation officially appeared in 2014. It is not surprising that the level of development of corporate culture in Russia and developed countries is somewhat different. Many domestic businesspersons tend to underestimate the importance of corporate culture, because its correct construction requires time and resources, and the return is not obvious, although it is clear from a strategic perspective.

On the other hand, the specificity of some industries (types of activity) in itself pushes for the development of intrapreneurship. For example, companies from the financial sector, IT and telecom.

At the same time, intrapreneurship matters for companies of all sizes and various industries. Goals and tasks are changing, as well as implementation tools. Therefore, the success of the implementation of innovations largely depends on the optimal choice of the form of organization (tools) of internal entrepreneurship.

There are several factors influencing the choice of one or another instrument of internal entrepreneurship:
- industry affiliation of the company,
- the scale / size of the company,
- goals and tasks in relation to the costs of implementing innovative activities,
- the level of development of corporate culture / innovative maturity of the company.

According to the survey of the Global Entrepreneurship Monitor, Russia is still significantly inferior to the leading countries in terms of the level of development of domestic entrepreneurship - only 0.7% of the population is involved in the entrepreneurial process within corporations. A number of objective problems and barriers stand in the way of accelerating the development of domestic entrepreneurship in the Russian Federation:

1. Lack of goal setting in terms of innovation.
2. Features of the organizational structure. Red tape and excessive formalization of business processes. A large number of divisions with different interests and focus of development. Long terms of decision making. Lack of a unified innovation management center in the company.
3. The conflict between innovative tasks and the tasks of the main business.
4. Inappropriate corporate culture.
5. Lack of competencies. Lack of specialists with the necessary skills to work on innovative projects, lack of methods and competencies in the field of project management.
6. Weak internal communications.

Despite a number of difficulties, there are several important prerequisites for the development of corporate innovation. First of all, these are: digital transformation of a business, a request to create
new revenue streams through business diversification and the development of related activities. The use of innovations accelerates the growth of the company's capitalization, etc [4].

Intrapreneurship can be implemented using the six main tools presented in table 1.

Table 1. Characteristics of the main tools for the development of intrapreneurship.

| No. | Type of tool for the development of intrapreneurship | Brief description |
|-----|-----------------------------------------------------|-------------------|
| 1   | Contest / hackathon | Hackathon (in English – from "hacker" + "marathon") is a forum for developers, during which specialists from different areas of software development (programmers, designers, managers) jointly solve any problem for a while. Contests and hackathons are often used to stimulate free generation of ideas and to form an internal community that is tolerant of a culture of innovation and entrepreneurship. |
| 2   | Accelerator | The internal accelerator is a short-term program for employees to accelerate product development and testing with the involvement of corporation resources (sales channels, big data, financial support, etc.). |
| 3   | Incubator | The internal incubator aims to provide individualized and longer-term support to proactive employees and teams. Incubation programs are most often characterized by a smaller flow of projects, but at the same time a higher conversion - the likelihood of an idea being turned into a finished product. The incubator is most often looking for projects that complement strategies and current activities of a company, although there are exceptions. An incubation duration is not fixed and depends on the type of projects. |
| 4   | Innovation laboratory | Innovation laboratories are engaged not only in product development and finding new niches, but also in the implementation of projects and the introduction of new products to the market. From the main task’s viewpoint, all laboratories can be conditionally divided into several types. |
| 5   | Intrapreneurship program | The intrapreneurship program consists of a set of interrelated tools and activities for organizing systematic work with ideas - from their submission to turning them into a finished product. Such program is available at any time with an idea, and not periodically (several sets per year), which allows you to massively involve employees. |
| 6   | Startup Studio / Corporate Venture Builder | The goal of a startup studio is the serial production of new startups. It is characterized by high survival rates of projects and a high speed of their introduction to the market. Venture builder (studio, startup factory, venture studio) is an organization that systematically creates new companies, helping them grow and achieve success.

The studio provides a full range of services: formulating ideas and testing hypotheses within the corporation, selecting teams, supporting the management of internal startups and scaling them.

A startup studio invests primarily not with money, but with competencies and resources (for example, access to data, assistance in finding a developer, etc.).


2. Methods and Materials
All these tools for the development of intrapreneurship can be represented as a variety of alternatives, of which the decision support system (DSS) chooses the most effective for the decision maker (DM) [5]:

\[ A = \{a_1, a_2, ..., a_q\} \]  

where: \( a_q \) – the alternative, \( q \) – the number of alternatives. The choice of alternatives is carried out from six main tools for the development of internal entrepreneurship (table 2).

| Property / alternative | \( a_1 \) | \( a_2 \) | \( a_3 \) | \( a_4 \) | \( a_5 \) | \( a_6 \) |
|------------------------|----------|----------|----------|----------|----------|----------|
| Contest / Hackathon    |          |          |          |          |          |          |
| Accelerator            |          |          |          |          |          |          |
| Incubator              |          |          |          |          |          |          |
| Innovation laboratory  |          |          |          |          |          |          |
| Intrapreneurship program |        |          |          |          |          |          |
| Startup Studio         |          |          |          |          |          |          |

Each of the alternatives has a set of properties \( W = \{w_1, w_2, ..., w_n\} \), where \( n \) is the number of properties. As a first approximation, there are three main properties: investments in the creation of an appropriate tool, the resulting economic effect and the effect aimed at developing corporate culture. Estimates given in a qualitative format must be converted into quantitative indicators using the Harrington verbal-numerical scale (with an estimation interval of [0; 1], step 0.3), presented in table 3.

| Property / rating | Tall | Middle | Low |
|------------------|------|--------|-----|
| Investment in creation | 0.8  | 0.5    | 0.2 |
| Economic effect   | 0.8  | 0.5    | 0.2 |
| Effect on the development of corporate culture | 0.8  | 0.5    | 0.2 |

The alternatives can be assessed according to the scale given. The results of the assessment are presented in table 4.

| Property / alternative | \( a_1 \) | \( a_2 \) | \( a_3 \) | \( a_4 \) | \( a_5 \) | \( a_6 \) |
|------------------------|----------|----------|----------|----------|----------|----------|
| Investment in creation | 0.2      | 0.5      | 0.2      | 0.8      | 0.5      | 0.8      |
| Economic effect        | 0.2      | 0.5      | 0.5      | 0.8      | 0.5      | 0.8      |
| Effect on the development of corporate culture | 0.5  | 0.8      | 0.8      | 0.2      | 0.8      | 0.2      |

\[ \sum 0.9 1.8 1.5 1.8 1.8 1.8 \]

Along with the properties of each of the alternatives, a set of key metrics must be introduced:

\[ M = \{m_1, m_2, ..., m_t\} \],

where, \( t \) – the number of metrics characterizing the alternatives.

Key metrics in this form were used by the innovation agency of the city of Moscow, based on the experience of leading Russian corporations such as MTS, Raiffeisen-Bank, Severstal, Sberbank, etc. Such a quantitative approach to the choice of metrics / key indicators is, in principle, typical for modern domestic business practice. For example, similar indicators were used to assess the results of the
implementation of the "Strategy for the innovative development of the Russian Federation for the period up to 2020" or to assess the level of innovative activity of the Cluster Development Centers.

The data showing the correspondence of the alternative / metric can be summarized as follows (table 5):

| Metric / Alternative | $a_1$ | $a_2$ | $a_3$ | $a_4$ | $a_5$ | $a_6$ |
|----------------------|-------|-------|-------|-------|-------|-------|
| Number of teams      | +     | +     | +     | -     | -     | -     |
| Number of working prototypes | +     | -     | -     | -     | -     | -     |
| Share of employees involved | -     | -     | -     | -     | +     | -     |
| Number of successful pilots (implemented solutions) | -     | +     | +     | -     | +     | -     |
| Number of total projects | -     | -     | +     | -     | -     | -     |
| Number of commercialized products | -     | -     | -     | +     | -     | +     |
| Product development speed | -     | -     | -     | +     | -     | -     |
| Number of ideas      | -     | -     | -     | -     | +     | -     |

It is also necessary to determine the set of basic tasks that this or that alternative solves for the company, in the form

$$Z = \{z_1, z_2, ... , z_p\},$$

where, $p$ – number of tasks. To define the tasks, materials from the report of the agency of innovations of the city of Moscow were used. Development of entrepreneurship within corporations: international experience and Russian practice [4] (table 6).

| $a_1$ | $a_2$ | $a_3$ | $a_4$ | $a_5$ | $a_6$ |
|-------|-------|-------|-------|-------|-------|
| To quickly find new ideas for a specific task, form an internal co-society of intrapreneurs | To accelerate product / service development, find new customers, develop entrepreneurial competencies | To finalize the idea, turning into a product, development of entrepreneurial competencies | To quickly bring to the market breakthrough products, most often from adjacent and new markets | To create a new internal business process for working with innovations | To launch mass production of internal startups |

Thus, we can conclude that the set of properties $W$ are the qualitative characteristics of the set of alternatives $A$ (presented in the form of weight coefficients), the set of key metrics $M$ are the quantitative
characteristics of the set of alternatives $A$, the set $Z$ are tasks that solve the alternatives $A$. Each alternative in this case can be represented in the form:

$$a_q = \{ f_q(w_i, m_j, z_p) \}$$

(4)

where, $i = \{1, n\}$, $j = \{1, t\}$, $p = \{1, q\}$, $f_q(w_i, m_j, z_p)$ – characteristic function defining a subset $A^* \subseteq A$, where, $A^*$ - all possible alternatives suitable for the company [6].

The conceptual description of the system can be presented in the form of a set-theoretic model:

$$X = \langle A, W, M, Z, f_q(w_i, m_j, z_p) \rangle$$

(5)

To solve the posed multi-criteria choice problem, the Saaty’s method (the method of analyzing hierarchies) can be used - a mathematical tool for a systematic approach to complex decision-making problems. The hierarchy analysis method contains a procedure for synthesizing priorities calculated on the basis of the subjective judgments of experts. In the presented study, all qualitative indicators are reduced to weights using Harrington's verbal-numerical scale, quantitative indicators are based on the analysis of data from the report [4].

Then, as the first local level of criteria, one can single out the criteria given in table 5 - tasks solved by alternatives from set $A$. The second local level of criteria can select qualitative properties from the set $W$, the third level of criteria can determine the qualitative characteristics from set $M$.

3. Results and Discussion

At the moment, a set-theoretic model has been developed for the DSS for choosing the optimal tool for the development of internal entrepreneurship. In the future, it will be possible to enter additional initial data, take into account other key parameters (metrics), alternatives, tasks to be solved, and also implement the DSS in the form of a software product [7].

At the next stage of the study, a set of universal qualitative key indicators should be developed, since the use of quantitative ones seriously distorts the final assessment.

For example, “the number of working prototypes”, “the number of final projects” and “the number of commercialized products” - in this context of different complexity and cost, prototypes and projects are considered as equivalent. On the basis of this data, it is possible to assess only the general trend, but it is not possible to correctly compare the results and draw well-grounded conclusions.

Separately, the system of indicators will need to include the industry specifics of organizations, which seriously affects the choice of the form to which intrapreneurship will develop.

The result of the study will be the introduction into the model of options for choosing solutions to the main problems arising on the path of the development of domestic entrepreneurship by Russian corporations.

References

[1] Viktorov D B 2013 Russia: a course on innovation. Open expert-analytical report on the implementation progress of Strategy for innovative development of the Russian Federation for the period up to 2020. Russian Venture Company (RVC JSC). Report number 1, Available from https://maginnov.ru/assets/files/analytics/01.pdf

[2] Evstigneeva E E and Makhrova V 2018 Innovative development of Russia: strategy, barriers and ways to overcome them Young scientist 22 (208) pp 399-402 Available from https://moluch.ru/archive/208/50842/

[3] Irbe M et al 2020 Research on Transdisciplinary Entrepreneurship Training European Entrepreneurship Training Community Reference. Report number: 2018-1-LV01-KA203-046974, Available from: https://goodpractices.eu/research-results

[4] Parabuchev A I 2020 International Experience and Russian Practice October 2020, The Moscow Innovation Agency Development of Entrepreneurship within Corporations. Report number: 1, 2020. Available from: https://innoagency.ru/files/Corporate_entrepreneurship_2020_Moscow_Agency_of_innovations.pdf
[5] Ivanov S A 2018 The role of intellectual capital in the economic, social and legal culture of society in the XXI century. In: UMTE. Methods of morphological analysis in the study of complex systems St.-Petersburg p 346-348

[6] Kvyatkovskaya A E, Chertina E V, Polumordvinova A O and Kvyatkovskaya I Yu 2019 Information technology of searching for analogous companies for assessing the value of a business, using intellectual agents. Bulletin of the Astrakhan State Technical University. Series: Management, Computer Engineering and Informatics 1 pp 99-106

[7] Kovalev I V, Tynchenko S V, Zavyalova O I and Likov A N 2009 Support system for multi-attributive decision making in managing complex systems. Software products and systems 2 p 27