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MARKETING EXPERTISE OF SCIENTIFIC PROJECT RESULTS DEMAND

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Abstract

The article presents proposals for market expertise of prototypes of new raw materials, semi-finished and finished products, services, special equipment, which are the scientific projects results. In contrast to the existing approaches based on the assessment of projects scientific competitiveness and expert evaluation of their practical results, the proposed approach is focused on market expertise of scientific projects results based on testing of representative groups of potential consumers. The expertise process of scientific project results demand is tested on the example of consumer nanoproducts develop projects and a new passenger coach for traffic to the airport. Its essence is to assess the potential market capacity of a new product, its market share (using marketing testing) and planned profitability. This makes possible to determine the achieved profit, that is, to assess scientific project practical results demand. In addition, it allows creating a further product promotion program, taking into account the market capacity and competitive environment. This approach improves the accuracy of estimates and provides investors and financiers with the necessary information to filter scientific projects at the stage of their approval. The innovative potential of the research results can become the basis for a new relevant research and development direction - "scientific projects marketing audit", which is the mixture of research and development management, technological marketing, innovation management, innovation management and economics of the company.

Keywords: Scientific project result, innovative product, expertise of demand, market capacity, market share, profit from prototype scaling.

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1. Introduction

Any management model involves the search for new ways of development. Their scientific basic is one of the most complex management procedures and it is often ignored or formally implemented. The most acute problem of insufficient validity of management decisions is manifested in the development of new (innovative) product samples, which should strengthen the enterprise market position. At the initial stage of such projects, commercial effectiveness of the project results evidence is required. During the pre-investment expertise, the project theoretical significance, its scientific novelty, scientific and practical results, compliance with the world level are evaluated – in other words, the expertise of the project scientific competitiveness results is carried out. This is a very important part of the expertise, but only a part. The marketing competitiveness of scientific and practical results is also important, especially in cases where the project is aimed at the development of prototypes of new raw materials, semi-finished and finished products, services, special equipment (hereinafter – prototypes), including those without analogues.

Attempts to assess market potential of innovative solutions obtained in the course of scientific projects are usually based on expert assessments, which are often very subjective and always statistically insignificant, especially when it comes to possible sales volumes of developed prototypes. As a result, marketing specialists and, most importantly, investors, on which commercialization depends, are very skeptical about such an assessment.

2. Problem Statement

The authors propose to solve the problem of inaccuracy ("approximation") of the market demand assessment of the scientific projects results based on marketing analytical technology, in which the main source of information about the innovation demand are statistically significant and representative target groups of consumers (potential consumers). This approach to the formation of the expertise concept will reduce the statistical error in the assessment of future profits from the commercialization of the project results to +-5% and minimize the possible risks of financing. In addition, this expertise can be an effective tool for filtering and classifying scientific projects claiming to develop innovative products prototypes.

3. Research Questions

The research of the currently proposed methods of improving the expertise quality of scientific projects, presented in the works of modern of scientific research management theories and innovation management representatives, allowed to identify two main barriers that arise in the way of building a comprehensive and effective model of expertise:

1. The traditional approach dominance to the results expertise of scientific projects of Antonets et al. (2010), Pérez-Astray & Babío (2011), Kashirin & Semenov (2009), Kashirin (2015), Kashirin et al. (2016), Khomkin (2009), Kozlovskaya & Radionova (2015), Yakovleva & Demidenko (2014) and Yakovleva (2015), which focus on the evaluation of the project output parameters in terms of requirements for dissertation research, to the detriment of assessing the market competitiveness of scientific and practical results. This particularly violates the expertise complexity, when the project

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involves the development of innovative products prototypes that should be presented to investors.

2. Subjectivism of expert assessments methods to conduct market expertise of research projects results (Aniskin et al., 2017; Antonets et al., 2010; Geni, 2017; Giannella, 2015; Kormishkin et al., 2016; Kotler & Keller, 2015; Lyasnikov et al., 2017; Zobov, Degtereva, Starostin, & Chernova, 2016) mainly limited by assumptions about the possible market effects of prototypes diffusion. Despite the importance of such expertise, it should be noted its subjectivism and statistical inconsistency. The last point is especially confusing for investors who want to get a reliable market potential assessment, as they risk their own resources.

It is important to note that some successful solutions to this problem are developed by consulting and analytical companies and agencies (for example, BCC Research and Lux Research (USA), Cientifica (Great Britain)). However, they are rarely published, as they are protected by the authors from replication as sources of income from consulting in the high-tech industry.

Overcoming the identified barriers is possible on the basis of market testing technologies of new products, adapted to the scientific and practical projects specifics. In this case, the key experts are large-scale samples of potential consumers. If the target group and the organization of testing procedures are correctly identified, the expertise results will be statistically significant, and therefore ensure acceptable accuracy of the expertise results. In this regard, the main issues of the study were:

- Definition of marketing expertise subject of market demand for products developed in the scientific projects (hereinafter – expertise).
- The rationale for the expertise formula and criteria.
- Formation of assessment methodology the expertise criteria with details of the features of this assessment in relation to the developed raw materials, semi-finished and finished products, services, special equipment and markets B2B, B2C and B2G.
- Development of marketing research technological procedures (selection of target groups, determining the conditions of respondents' representation, calculating the sample size and statistical error, the questionnaire templates development) for measuring the values of the expertise criteria.
- Templates development for qualification (positioning) of expertise results and recommendations preparation for project financing.
- Technology testing.

4. Purpose of the Study

The research focused on the most complex and at the same time key elements of the proposed expertise. As a result, the research objective was narrowed to the justification of the object, the formula and criteria for the expertise of scientific project results demand.

5. Research Methods

To achieve this objective, the systematization of objects and criteria for the scientific projects expertise was conducted, implemented by Russian scientific funds (RFBR, RPF, RGNF, grant Council of

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the President of the Russian Federation, Fund for the promotion of Russian science), foreign scientific funds (national science Foundation of the USA, European science Foundation, German research society, Ford Foundation). The systematization allowed to identify typical and original criteria of potential demand (market demand) of scientific projects results. They were specified taking into account the consulting companies and analytical agencies practice (BCC Research, Lux Research, Cientifica), as well as the commercial banks and investment funds requirements which make decisions regarding the scientific projects financing.

6. Findings

The following findings were obtained regarding the object, formula and criteria of the expertise:

- The expertise object is obvious to the investor – the profit bringing by a prototype when it is put into production. It is a possible (future) profit from commercialization, and therefore a profit direct estimate is very difficult.
- The authors propose to assess profits through components that are multiply it and can be accurately measured using marketing technologies. In this regard, as an expertise key formula that determines the investment attractiveness of scientific projects results, the profit formula is proposed – as a multiplication of the market capacity by market share by profitability, which subsequently allows to detail and specify the strategic management objectives by a startup creating and scaling.
- We propose the following formula to calculate the profit (P) from the commercialization:

Profit = MC x MS x P,

Where Profit is a profit from prototype commercialization, million rubles.

MC – market capacity of the target product (total sales of all market operators), million rubles;

MS – market share achieved by the product (share of projected product sales in the total market capacity), %

P – planned product profitability (planned profit share in the product price), %

The market capacity, which is the total sales multiplied by the market share of the researching product, forms the product sales volume. The subsequent multiplication of this value by the product profitability results in a recoverable profit. In other words, the right side of the equality after the reduction forms a profit. The offer of such profit decomposition into components is not accidental. Each of these components can be accurately measured in the course of field marketing research, the key priority of which is "expertise from consumers (potential consumers)".

- Representative and statistically significant consumer groups should be used as the main source of information for measuring these criteria. For this purpose, the statistical apparatus of sample formation is used, including the selection of target groups (Aleshnikova, Ryzikova, & Tokarev, 2018), determining the conditions for the respondents representativeness, calculating of sample size and statistical error, developing template questionnaires, data processing layout and

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criteria values scheme, which provides the measurements statistical error no more than +-5%. The sample size can be 500-600 respondents to achieve this accuracy in the B2C market. To reduce the statistical error to +-2-3%, the sample size increases to 800 respondents. At the same time, the key issue in the sample formation is representativeness, which is ensured by achieving compliance of the sample structure with the all potential consumers structure.

- Testing of the expertise proposed criteria on the example of 3 scientific projects in the field of nanotechnology related to the development of products prototypes, showed their applicability and effectiveness:
  - The testing results of the potential market capacity for such prototypes as diode lamps with nanoeffects for home using, knitted products with silver nanoparticles and medical nanoplaster showed positive results. 30-50% of citizens are ready to buy these nanoproducts. The total Russian market capacity for selected products amounted to 171 billion rubles (figure 01) (Azoev, 2011);
  - Assessing these products market share based on the forecast of the existing analogue replacement and amounted 2%, 4% and 58%, respectively;
  - With a given planned profitability, the profit from these products sale exceeded 28 billion rubles.

The expertise showed the economic feasibility of financing these projects, which have been developed and are at the entering the market stage.

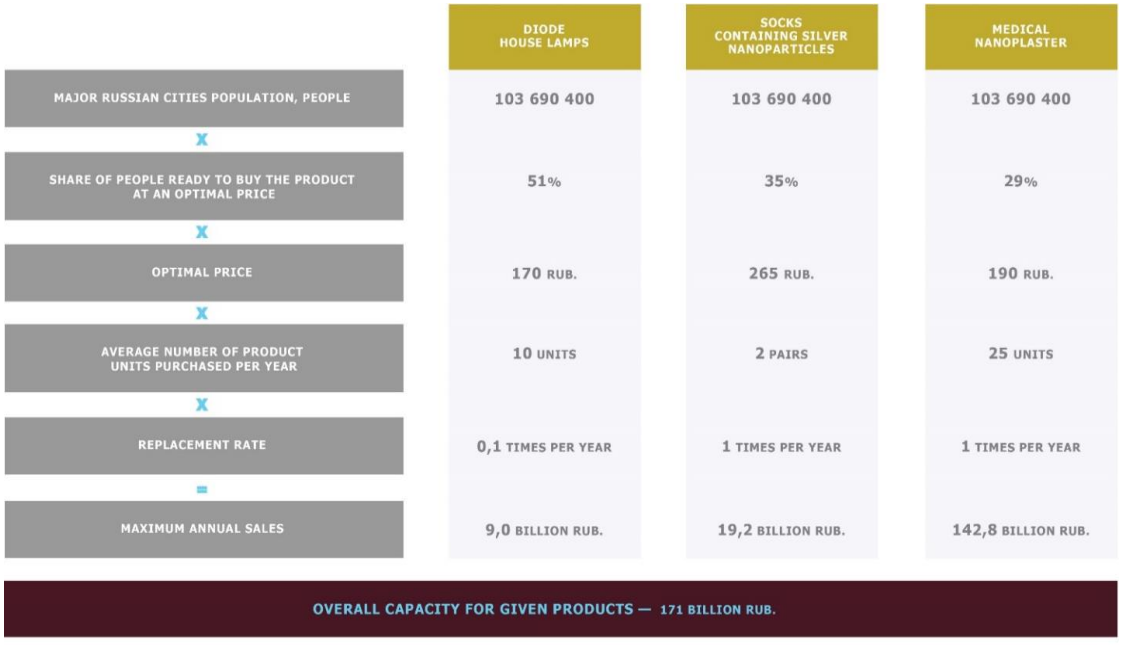

Figure 01. Potential demand for consumer nanoproducts (B2C market)
Source: Azoev (2011)

- Also, positive results were obtained during the expertise of a large complex R&D project for the development of a new passenger coach for traffic to the airport (table 01).

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Table 01. Market share of the new "Aero" passenger coach and ticket prices that maximize revenue (according to the simulator based on elasticity curves)

Ticket price in the "Aero" passenger coach, RUB	Value	Ticket price in the standard passenger coach, RUB						
		100	150	200	250	300	350	400
100	The share of the standard passenger coach	3%	3%	2%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	55%	55%	55%	55%	55%	55%	55%
	The share of other transport types	43%	43%	43%	44%	44%	44%	45%
	Revenue, % of maximum	***34%***	***35%***	***35%***	***35%***	***35%***	***35%***	***34%***
150	The share of the standard passenger coach	3%	3%	2%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	54%	54%	54%	54%	54%	54%	54%
	The share of other transport types	43%	43%	44%	45%	45%	45%	45%
	Revenue, % of maximum	***50%***	***51%***	***51%***	***50%***	***50%***	***50%***	***50%***
200	The share of the standard passenger coach	4%	4%	2%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	52%	52%	52%	52%	52%	52%	52%
	The share of other transport types	44%	44%	46%	47%	47%	47%	47%
	Revenue, % of maximum	***64%***	***65%***	***64%***	***64%***	***64%***	***64%***	***64%***
250	The share of the standard passenger coach	4%	4%	2%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	52%	52%	52%	52%	52%	52%	52%
	The share of other transport types	44%	44%	46%	47%	47%	47%	47%
	Revenue, % of maximum	***80%***	***81%***	***80%***	***80%***	***80%***	***80%***	***79%***
300	The share of the standard passenger coach	9%	9%	2%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	46%	46%	46%	46%	46%	46%	46%
	The share of other transport types	45%	45%	52%	52%	53%	53%	53%
	Revenue, % of maximum	***87%***	***90%***	***85%***	***84%***	***84%***	***84%***	***84%***
350	The share of the standard passenger coach	15%	15%	6%	2%	1%	1%	1%
	The share of the "Aero" passenger coach	40%	40%	40%	40%	40%	40%	40%
	The share of other transport types	45%	45%	55%	58%	59%	59%	59%
	Revenue, % of maximum	***92%***	***96%***	***89%***	***86%***	***85%***	***85%***	***85%***
400	The share of the standard passenger coach	20%	20%	9%	4%	2%	1%	1%
	The share of the "Aero" passenger coach	35%	35%	35%	35%	35%	35%	35%
	The share of other transport types	46%	46%	56%	62%	64%	64%	65%
	Revenue, % of maximum	***94%***	***100%***	***93%***	***88%***	***86%***	***85%***	***84%***

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450	The share of the standard passenger coach	27%	27%	15%	8%	4%	2%	1%
	The share of the "Aero" passenger coach	28%	28%	28%	28%	28%	28%	28%
	The share of other transport types	46%	46%	57%	65%	69%	71%	72%
	Revenue, % of maximum	***90%***	***98%***	***92%***	***85%***	***80%***	***77%***	***76%***
500	The share of the standard passenger coach	30%	30%	18%	11%	6%	2%	1%
	The share of the "Aero" passenger coach	24%	24%	24%	24%	24%	24%	24%
	The share of other transport types	46%	46%	58%	66%	71%	74%	75%
	Revenue, % of maximum	***88%***	***97%***	***92%***	***86%***	***81%***	***75%***	***72%***
550	The share of the standard passenger coach	46%	46%	33%	23%	16%	8%	4%
	The share of the "Aero" passenger coach	7%	7%	7%	7%	7%	7%	7%
	The share of other transport types	47%	47%	60%	70%	77%	86%	89%
	Revenue, % of maximum	***50%***	***63%***	***61%***	***57%***	***51%***	***38%***	***31%***
600	The share of the standard passenger coach	47%	47%	33%	24%	16%	8%	4%
	The share of the "Aero" passenger coach	7%	7%	7%	7%	7%	7%	7%
	The share of other transport types	47%	47%	60%	70%	77%	86%	90%
	Revenue, % of maximum	***51%***	***65%***	***63%***	***59%***	***53%***	***40%***	***33%***

Source: Azoev et al. (2018)

According to the expertise, the optimal combination of tickets prices for maximizing revenue is 150 rubles for a place in a standard passenger coach and 400 rubles for a place in the "Aero" passenger coach. The standard passenger coach market share will be 20%, and the "Aero" passenger coach market share will be 35% among all possible types of passengers traffic to the airport. The simulator is based on a survey of 2000 respondents at the Sheremetyevo airport.

- The obtained methodological results form the technological marketing tools in relation to the market demand assessment for high-tech products at the stage of research and development, which is especially important in the priority science and technology areas, providing a reduction in material consumption, energy efficiency, improving the medical service quality.

The innovative potential of the research results can become the basis for a new relevant research and development direction - "scientific projects marketing audit", which is the mixture of research and development management, technological marketing, innovation management, innovation management and economics of the company.

7. Conclusion

Such expertise methodics are especially relevant for large companies purchasing research projects results or startups for their development, as well as for investment funds and banks in the feasibility

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expertise of financing innovative projects, and in general for experts working on the scientific projects evaluation at the stage of decision-making on their financing.

Basically, the solutions search to the problem develops abroad. Practice forces technologically advanced countries to deal with this problem in both theoretical and practical terms. Russian developers have the opportunity to use this experience and to build mechanisms for marketing expertise of demand for the scientific projects results taking into account local specifics and on the basis of modern marketing technologies that helps commercialize research projects and prototypes developments.

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