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Customer-oriented innovations: analysis of development practices (the case of North-West regional companies)

N. N. Molchanov, Y. V. Rybakova

St. Petersburg State University,
7–9, Universitetskaya nab., St. Petersburg, 199034, Russian Federation

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The article describes the main stages in the development of methods for joint value creation for product and technological innovations, including: external ventures, open innovations and their support tools, and the current transition from open- to client-oriented innovations and their development and financing tools, including crowd-sourcing and crowd-funding. The use of client-oriented innovations leads to the transformation of companies' business models. Involving buyers in creation and co-production becomes a key factor in this process. First, it ensures rapid adaptation to clients' ever-changing needs. Second, sustainable and direct B2C partnerships enhance a company's competitive position and efficiency. This article presents results of a field study on the practical application of joint venture creation tools in Russian innovation-oriented medium and large companies located in the North-West region. Representativeness of the survey is ensured through coverage of various sectors of the economy and businesses. The survey was conducted twice, in 2014 and 2017, which allowed a dynamic analysis. The study concludes that Russian innovation-oriented companies do not make sufficient use of target tools for creating joint value in the development of incremental innovations. At the same time, characteristics of innovation-oriented companies that influence the application of joint value creation methods were identified, including: novelty of innovations developed by the firm, company size, nature of the relationship with suppliers, etc. National innovation-oriented companies were given recommendations for using the methods of quality function deployment to increase the competitiveness of the developed innovations. It has been recommended to use CRM systems more actively for communicating with consumers.

Keywords: product and technological innovations, customer-oriented innovations, concept of joint value creation, co-creation, co-production.

Introduction

With increased competition in modern markets, firms can succeed either by offering new goods that take account of customers' specific needs, or by scaling up the needs of target groups, as it is done by Chinese entrepreneurs. One approach to creating competitive innovation in the market is the "technology pull" strategy [Valdaytsev, 2011a]. The essence of the innovation development strategy is that the developer studies consumer opinion about existing models of goods and their shortcomings, along with consumers' suggestions about product improvements. An alternative is the "technology push" strategy. This assumes that a company takes risks to create and place a fundamentally new product on the market, and then adopts measures to generate demand for it. Often, the buyer is ready to participate both in the development of ideas for improving goods (in the form of co-creation) and in the production of goods for his own needs (co-production, when the customer performs certain functions in the process of production or service of the purchased goods), if he sees it as a benefit. In some cases, the buyer is ready to co-finance a project to create an innovation he is interested in. As a result of the proliferation of these processes, a scientific and practical concept of joint value creation was formed [Prahalad, Ramaswamy, 2004].

There are a number of works by foreign and Russian scholars devoted to this topic. Research in this field began with C. Prahalad and V. Ramaswamy [Prahalad, Ramaswamy, 2004] and was further developed by A. F. Payne, K. Storbacka, and P. Frow [Payne, Storbacka, Frow, 2008]. At present, however, the tools for joint value creation methodology are used by a relatively small number of cutting-edge high-tech companies even in industrially developed countries, as reflected, for example, in the study by R. Perrin [Perrin, 2012]. Innovation methodologies based on the "technology pull" strategy (for example, quality function deployment (QFD) methodology [Kogure, Akao, 1983]) do not take into account the possibility of buyer's co-creation and co-production [Cerit, 2014]. There is little research on customer orientation and mechanisms of joint value creation in industrial markets [Gulakova, Rebiazina, Smirnova, 2019]. In Russia, the subject of innovation management is raised by V. V. Platonov [Platonov et al., 2012], N. V. Pakhomova and K. K. Richter [Richter, Pakhomova, 2018], and others. Trefilova I. N. [Trefilova, 2015; 2017 a; 2017 b; Trefilova, Kassura, 2016] examined the issue of innovation development on the basis of joint value creation methodology, and O. V. Motovilov [Motovilov, 2018] studied joint financing of innovative projects between producers and consumers. Despite all this research, an earlier study conducted by the authors of this article [Molchanov, Sergeev, 2014; Molchanov, Rybakova, 2018] demonstrated that a significant number of Russian companies are not aware of the existence of joint value creation methodology and do not apply its tools in their efforts to increase the competitiveness of their innovations. All facts considered, research in this field remains a topical and important issue. Research carried out by the authors of this article is a detailed study of how and to what extent innovation development tools based on joint value creation methodology are used in the Russian Federation, specifically among enterprises located in St. Petersburg and the North-West region. To answer these questions, it is necessary: first, to explore the emergence and development of the concept of joint value creation in product and technological innovation; second, to identify the extent to which innovation-oriented companies in St. Petersburg and the North-West apply tools of joint value creation methodology for innovation devel-

opment; and third, to prepare recommendations on the use of up-to-date tools developed in the joint value creation methodology by Russian innovation-oriented companies.

The first task in studying the development of the joint value creation methodology was addressed by analysing information sources on organizational forms and methods of innovation development. This work reviews both product and technology innovations. To answer the second question, a field study was carried out. As literature analysis has shown, there is no data on the use of joint value creation methodology by foreign and Russian companies in the process of innovation development. The aim of the conducted field study was to identify the frequency of the application of joint value creation tools and to study its dynamics over time. Research also identified factors affecting the application of joint value creation methodology tools. In conducting field studies, the authors applied bias sampling. The survey was conducted only among those company managers who had minimal required information about joint value creation and innovation development tools. The polling data was then processed with the help of mathematical statistics methods using Gretl and SPSS software packages. The data obtained provided the basis for developing recommendations on the use of joint value creation tools in Russian enterprises.

1. Customer-oriented innovations in joint value creation methodology

In this section we consider stages in the development of the concept of joint value creation. First, major high-tech companies receive requests from third parties for financial support to develop a specific product or technology linked to the profile of a particular firm. Should the idea of a new product appear promising to the company, the initiating party receives a proposal to set up a new small company to develop the innovation. The small innovation company is funded by the large company that becomes the owner of a stake in the small company in the amount of financial support provided. In the case of successful implementation of the project, the large company creates a new product department based on the small venture company. This process has been named an “external venture” or “spin-off” [Valdaytsev, 2011b]. There are also other forms of interaction between a large business and a small innovative company that, however, lie outside the scope of this article. The venture capital market has been booming recently¹. The number of venture funds is steadily increasing, and even the unfavourable macroeconomic environment has not been able to significantly restrain this growth. Since 2013, the number of venture funds operating in the market has increased by 14% and totals 189. Capital gains seem impressive compared to previous years: in 2018 alone 26 venture capital funds invested 839 mln doll. in the market, which is only 7% less than investment by all players in the Russian venture capital market in the last four years. Moreover, large corporate structures increasingly try on the role of co-investors of venture funds (for example, United Aircraft Corporation, Russian Helicopters, Russian Railways JSC), with the Russian Venture Company (RVC JSC) acting as an anchor investment and development institution. Another important factor reflecting the degree of market maturity and determining the increase in venture capital supply for innovative companies is the emergence of secondary and subsequent funds in the market, since only those management teams that have proven

¹ Analytics. The main trends of the Russian venture capital market are identified//Information portal Rusbase 24.12.2018. URL: <https://rb.ru/analytics/trendy-rossijskogo-venchurnogo-rynka/> (accessed: 22.06.2019).

themselves in the market and have had a successful track record are able to attract investment into the next fund. In this regard, the statistics on “serial funds” have demonstrated a slow but steadily growth over the past three years².

Today, Russia’s venture capital market is characterized by the following trends: acceleration of the process of launching new venture funds; a decrease in the share of those projects whose business model does not involve attracting external funds and an increase in the share of projects with external financing (business angels, corporate funds); and an increase in the number of investment projects. In 2019, 74% of venture market participants intend to increase their investment volumes and the number of projects. There is an increasing interest in foreign projects. Venture market participants believe in the necessity of state assistance: the state should build the infrastructure necessary for the development of the venture market, stimulate access to and develop a culture of buying innovations, and reduce taxes for industry participants³.

The “open innovation” model (were created in 2003) developed as a response to changes in the attitude of large businesses to research and development, due to increasing competition. Earlier innovations were created in-house, i.e. by internal divisions of companies, but now markets feel the pressure to increase the speed of introducing new products into the market. Corporations began to move beyond their own corporate structure in search of new ideas to solve a specific task and teams to develop their ideas into prototypes and finished products. Thus, depending on the type of interaction between the company and the external environment, it is possible to speak of “closed” and “open” innovations [Chesbrough, 2007]. The model of open innovation can be realized through a variety of tools, including corporate venture funds, business incubators, and technoparks. One form of support for open innovation is through accelerators. Acceleration is a process designed to help test technology received from external sources in a short time, ensure its development and improvement to required standards, and integrate the innovation into the company’s production chain.

Large high-tech companies have begun to search for tools enabling instant access to new ideas on improving their product to meet the needs of target customers to the maximum extent possible. The answer to this challenge was the methodology of joint value creation with its most effective tool: crowdsourcing. Joint value creation is the process of developing and producing a product or service in which a customer assumes an active role by forming demand or even creating a product on their own depending on their current needs, preferences, goals and objectives.

The concept of joint value creation was first proposed in 2000 by C. Prahalad and V. Ramaswamy [Prahalad, Ramaswamy, 2004]. However, interest in the interaction between companies and consumers dates back to the 1980’s. Moyers studied consumers who explore the market and gain personal customized experiences [Moyers, 1989]. Researchers such as Lovelock and Young recommended that companies draw on consumer knowledge to increase company productivity [Lovelock, Young, 1979]. Before the introduction of the term “joint value creation” into international practice, J. H. Song and C. R. Adams explored consumer involvement in co-production and found that joint work between

² Market Survey. Direct and venture capital investments in Russia 2018. URL: <http://www.rvca.ru/rus/resource/library/rvca-yearbook/> (accessed: 05.08.2019).

³ Analytics. The main trends of the Russian venture market are identified//Information portal Rusbase 24.12.2018. URL: <https://rb.ru/analytics/trendy-rossijskogo-venchurnogo-rynka/> (accessed: 22.06.2019).

consumers and manufacturers gave companies an opportunity to differentiate their products [Song, Adams, 1993]. Thus, the concept was adopted by management and became the subject of keen interest for many researchers, who undertook various approaches to its study. C. Prahalad and V. Ramaswamy defined joint value creation as a value creation process in which sellers and consumers interact to share knowledge and resources to create value [Pralhad, Ramaswamy, 2004]. At the same time, this process can also be defined as a collaborative effort to develop innovations with the active participation of consumers [Reichheld, Sasser, 1990].

Despite a wide range of approaches, all studies emphasize that the core idea of the concept is the creation of new value in the process of interaction between the consumer and the developer. Value for the consumer, in this case, consists in the acquisition of unique experience [Pralhad, Ramaswamy, 2004]. The consumer benefits from the creation of a product tailored to his needs and requirements and experiences emotional joy from participating in the process, while the manufacturer acquires new knowledge about the consumer. This allows the company to become more client-oriented and produce goods that have the greatest value for the buyer, which, in its turn, leads to an increase in sales and financial benefits. The concept, however, does not usually imply the creation of radical innovation. Often, the company uses its customers to refine or upgrade existing products, as only direct consumers know all the subtleties of using the product.

The aim of the joint creative activity is to improve the process of organizational knowledge by involving clients in the process of value creation. Joint creation blurs actual boundaries of the company by attracting innovation and creating value for the client. The possibility to participate in joint development transforms the client into an active partner of the company, helping to create future value. This relationship affects both consumers and companies. Customers are increasingly becoming owners of the company's fixed assets in the form of expertise. For the company, the involvement of consumers in the value chain leads to blurring of boundaries between the process of scientific development and market research.

Thus, the methodology of joint value creation becomes a new successful milestone in the development of innovation theory. The role of the consumer changes significantly, as he can directly influence the production process, acting as a co-developer and even as a co-producer of a new product. Therefore, both sides benefit from their participation in the process.

There are several levels of involving consumers in the co-creation of value and co-production [Payne, Storbacka, Frow, 2008]. The first level is self-service, when some part of the production process is passed on to the customer, who regards it as a benefit (for example, the client assembles the desired computer configuration from provided blocks and nodes). One of the best examples in the field of furniture development and production is the Swedish company IKEA. Many models of furniture were offered by the buyers themselves. The company actively promotes the idea of self-service, independent delivery, self-assembly of furniture, etc. The second level is when the consumer independently chooses the options provided by the manufacturer to solve a particular problem (for example, the options offered to the buyer of a passenger car or a call center of a large bank, where consumers operate with an automated system). The third level is the involvement of a consumer in creation (development) of the product (for example, direct order of options

(parameters) required by the consumer or customisation of a real-time service). This level is most fully implemented in the QFD methodology [Kogure, Akao, 1983].

In order to attract consumers to the development of innovations, entrepreneurs might refer to crowdsourcing. The term is believed to have been used first by J. Howe in his article “The Rise of Crowdsourcing” for *Wired* magazine in 2006 [Howe, 2006]. “Crowdsourcing is a technology that makes it possible to build a connection with a wide range of external audiences that are not directly related to business activities” [Kogan, 2011]. Lapshova defines crowdsourcing as “involvement of people from the social medium and general population, interested and willing to manifest themselves, in joint work” [Lapshova, 2012, p. 35]. Crowdsourcing differs from outsourcing in that in latter, professionals are invited to work together, and in the former, these are amateurs. Outsourcing also implies contract relations and obligations, while crowdsourcing is based on voluntary participation and incentives. “Crowdsourcing attracts a wide range of people’s opinions to solving a problem; then these opinions are analysed, the most important ones are chosen and a decision is made on their basis. Crowdsourcing relies on the initiative and intelligence of hundreds, thousands and sometimes hundreds of thousands of participants. Not only can crowdsourcing involve thousands of people in the process, but it also creates a “collective mind” on a national scale. The results of brainstorming the “network crowd” can lead, for example, to design solutions for t-shirts, methods of budget reduction, a slogan for a new beer brand, or a solution to a complex mathematical problem” [Lapshova, 2012, p. 45]. One of the examples of crowdsourcing is Wikipedia. Crowdsourcing does not require much investment and can be used in different kinds of business processes.

At present, it is possible to talk about joint innovations developed by companies along with consumers and other participants cooperating in creating a product for the end user [Trefilova, 2015]. Joint innovations are the result of joint development of new solutions of the company in collaboration with consumers and partner companies, where the crowdsourcing platform serves as basis for establishing such collaboration. Practice shows that joint innovations more and more often result from co-creation and co-production between the company and its buyers or from the involvement of both partners and buyers into the innovation process. This supports the legitimacy of the chosen term “client-oriented joint innovations,” which reflects the trend of integrating buyers in the development of innovations (introduced by the authors). There are also authors who use the term “client-centred innovations,” but provide no precise definition.

Client-oriented innovations are innovations of various types, obtained by integrating the consumer into the innovation process at different stages of the innovation cycle. They involve various tools (user platforms, software, etc.), which determine the type of innovations received as a result of value co-creation or co-production together with consumers [Trefilova, 2015]. Figure 1 presents the classification of joint innovations, including radical and incremental client-oriented innovations.

Client-oriented innovations are mostly incremental, i. e. they serve to improve current technologies or products, while radical innovations generally result from the interaction between professionals, including R&D centers, academic institutions, universities, partners, competitors, etc. The transition to client-oriented innovations changes the company model, with customer involvement becoming a deciding factor (Table 1). The increase in the share of joint innovations affects core company activities in supporting innovative activities [Trefilova, 2017b]. In these conditions, marketing does not just pass the

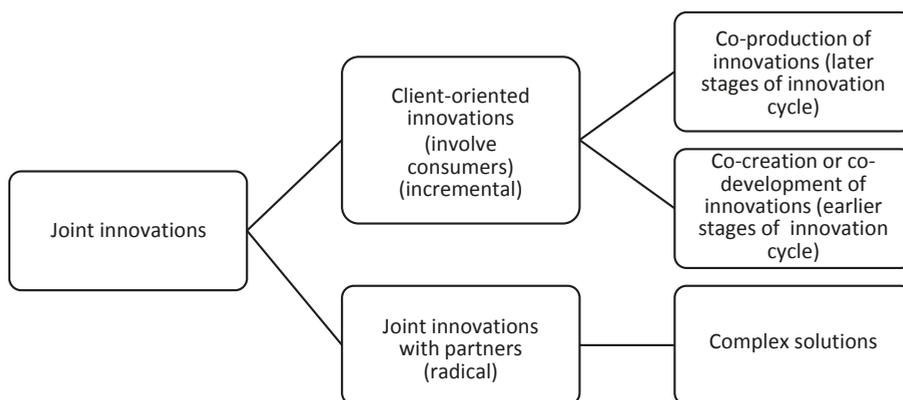


Fig. 1. Classification of joint innovations

Table 1. Evolution of innovation as a result of integrating consumers into the innovation process

Innovation development stage	Description
Closed innovations	Developed by the company (the innovation is initiated by company employees) and tested on the market
Open innovations	Developed by the company in collaboration with partners and customers (the innovation is initiated outside the company)
Client-oriented innovations	Developed in collaboration with customers at all stages of innovation cycle (the innovation can be initiated by the company or in the external environment)

Table 2. Mechanisms of consumer integration into the innovation process

Stage of innovation process	Stage	Consumer involvement (integration) tools
Development of a new product concept	Generation of new ideas	Involvement of consumers into concept generation, including through crowdsourcing
	Selection of ideas for implementation	Organising the selection of ideas on the platform (voting)
	Testing of innovation concept	Alpha testing of product concepts
Development of a new product	Design development (engineering)	Crowdsourcing. Tools for designing innovations on a platform
Business-analysis and production of a prototype product	Business analysis of innovations	Inviting consumers-experts to assess the market potential of innovation
	Production of a product prototype	Installation of equipment at the customer's premises for independent prototype production (typical for B2B market)
Commoditisation of a new product	β-testing and modification	Delivery of the product to leading consumers
	Introducing innovation to the market	Involvement of consumers and opinion shapes into the process of promotion

information about consumer demands through to technical specialists to transfer them into a final product, but serves as a strategic instrument to involve and integrate partners and consumers into the innovative process at earliest possible stages to reduce risks and adapt solutions to clients' needs. Integration of customers and partners into the innovation process as value co-creators has become part of the overall business model of a company. Innovation support models are specifically aimed at creating effective mechanisms of interaction with partners and customers, and their integration into the innovation process to generate new and share existing knowledge, as well as to reduce market risks.

The creation of innovations requires the company to develop a strategy to integrate partners in value creation into the innovation process, where the ability of consumers to integrate in the process at any stage of the innovation cycle is one of the most important competencies ensuring the innovation support potential (Table 2).

2. Analysis of the use of joint value creation tools by Russian innovation-oriented companies

This part of the article presents the results obtained from a study of applying joint value creation tools by Russian innovation-oriented companies in their activities. A questionnaire was used as a working tool. The standardized questionnaire, containing closed questions, was then developed to interview managers of innovative companies in St. Petersburg and the Leningrad Region. The content of the questionnaire was coordinated with specialists of the business incubator and the Technopark of St. Petersburg State University, who also assisted in organizing the survey. A biases sampling was applied in conducting the field survey. Survey participants were selected based on their advancement in the field of innovative entrepreneurship. The survey involved only those managers of innovation-oriented companies who had minimal required information about the methodology of joint value creation and tools for developing innovations based on its principles. In other words, the interview was conducted among people who could provide reliable information about the topic being studied. The authors believe there is little sense in interviewing company representatives with little awareness of joint value creation tools. The level of respondents' awareness was measured during lectures and special consultations. Respondents included students of the Presidential Program for the advanced training of managerial personnel in the field of innovative projects, as well as managers of small innovative firms of St. Petersburg's leading technoparks (ITMO Technopark and the Technopark of St. Petersburg State University). Participants in the survey included representatives of various sectors of the economy and types of business, which allowed the authors of the survey to reach the main target audience and further assert that most of the representatives of this socio-demographic group will respond to the questions in a similar way.

The survey was carried out in two stages. The first took place in 2014⁴. The second stage was carried out in 2017. Respondents were asked to complete a questionnaire containing 22 multiple choice questions. The questionnaire included four categories of questions: questions about the respondents and the industry they work in; questions about the use of innovations in the organisation; questions about the interaction between the

⁴ More information on the results of the first stage is presented in [Innovations in marketing models..., 2018].

company and consumer; and questions about the involvement of the company in the innovation processes.

Several hypotheses were advanced in the course of the study.

Hypothesis 1. Even in such a scientifically developed and innovative region as St. Petersburg, the level of the application of advanced innovation development tools in Russian companies is low;

Hypothesis 2. The application of joint value creation methodology tools in developing innovations increases in frequency (volume) over time (2017 versus 2014);

Hypothesis 3. There is dependency between the volume of state support and the novelty level of innovations developed by the company (the more original the innovation, the more support the company receives from the state);

Hypothesis 4. The size of the firm and its ability to customize the goods to the needs of the client are related (the larger the firm, the higher its ability to customize the new goods);

Hypothesis 5. There is a dependency between after-sale service provided for outsourcing to the buyer of innovations and pre-sale service (volume of after-sale service provided for outsourcing to the buyer of innovation grows with the increase in outsourcing of pre-sale service);

Hypothesis 6. The establishment of long-term customer relationships requires similar long-term relationships with suppliers.

In 2014, 42 representatives of innovation-oriented companies from the following industries were interviewed: IT (39%); manufacturing (23); education and medicine (including pharmaceuticals) (6); other industries (32%).

Approximately 12% of industries develop innovations characterised by the highest level of novelty (a new scientific and technical principle), while the rest create goods of the medium and lower levels of novelty. No complex scaling options were required for the survey. A simplified version of the semantic differential was used to register the fact of application or non-application of a specific tool of joint value creation methodology. The formal results of 2014 survey are presented below.

When developing a new product, 78% of surveyed companies scrupulously examine the needs of targeted market segments (customers). In the course of such studies they use (percentage of respondents): questionnaire (51%); focus groups (19); in-depth interviews (19); QFD methodology (13); other methods (32%).

Provision of a choice of options for the consumer to solve a particular problem is practiced in 57% of surveyed companies; 73% of the surveyed companies are ready to customise the goods (to dispose of unnecessary functions in the goods or to include the required functions). Only 44% of respondents noted that goods and services developed by the firm provide self-service elements for the buyer in the course of pre-sale service (independent delivery, independent assembly, etc.). Similarly, only 39% noted that the goods and services developed by the firm provide self-service elements for the buyer as a part of after-sales service (replacement of components, batteries, independent maintenance and repair, etc.).

In terms of establishing long-term relationships with customers, survey results were significantly better. Thus, 90% of surveyed companies have long-term trust-based relations with each individual customer. In establishing long-term relationships with customers, the companies rely on (percentage of respondents): contacts in the course of render-

ing services (73 %); regular contacts at exhibitions and fairs (48); internet consulting (41); use of CRM-systems (14); other tools (21 %).

In terms of joint value creation methodology, the most favorable result was obtained in the survey of consumer opinions on improving characteristics of the developed product. About 80 % of surveyed firms make use of customer suggestions for product improvement and try to study customer needs in a targeted manner. However, it should be noted that the most comprehensive approach to the survey of consumer opinions on the creation of innovation (methodology of structuring the quality function) is used by a very small percentage of firms (13 %), while 21 % of respondents apply rather simplistic methods of customer research (based on the content included into the category "Other").

The results of the survey on the readiness of companies for product customization to meet the needs of individual customer turned out quite well. More than 70 % of companies are ready to customize the product and almost 60 % offer the customer a choice of options provided by the company.

As for the survey on co-production of goods, less than a half of all surveyed firms noted that they provide the buyer with the possibility to perform some manageable functions in pre-sale and after-sale service.

Results in the sphere of relations with clients were reasonably good. The majority of companies try to maintain long-term relationships with customers in various forms. However, the structure of the process is far from perfect. Contacts are mainly maintained in the course of rendering services. Only 14 % of surveyed firms use CRM-systems (mainly those companies that work in the field of software and Internet technologies), which are the most efficient and modern tools at present.

In general, the authors' hypothesis on the low application level of advanced marketing tools in the innovative companies of the St. Petersburg and Leningrad region in 2014 was confirmed.

Let us now present the results of the research conducted in 2017. The study included 102 respondents. The analysis of the results received showed that the majority of respondents (62 %) work in innovation-oriented medium-sized companies with the number of employees varying from 10 to 499, 30 % are representatives of large companies, 8 % of respondents identify themselves as employees of small companies.

Most respondents (63 %) work in companies servicing the industrial market, i.e. the B2B market.

The respondents represent the following industries: IT (8 %); manufacturing (18); education and medicine (including pharmaceuticals) (2); other industries (72 %). Among "Other industries" the respondents named consulting, telecommunications, etc.

Equal shares of respondents described the companies where they work as medium innovative (42 %) or lower (39 %). It should be noted that the level of innovation is highly dependent on the company's area of activity, so respondents working in high-tech industries note that their companies are characterised by the highest level of innovation.

When developing a new product 63 % of companies scrupulously examine the needs of the targeted market segment (customers). For this purpose, the firms use the following mechanisms: questionnaire (56 %); focus groups (22); in-depth interviews (28); QFD methodology (8); other methods (38 %).

About 43 % of the companies participating in the survey (44 companies) offer the client the possibility to choose their own options. At the same time, more than 63 % of the

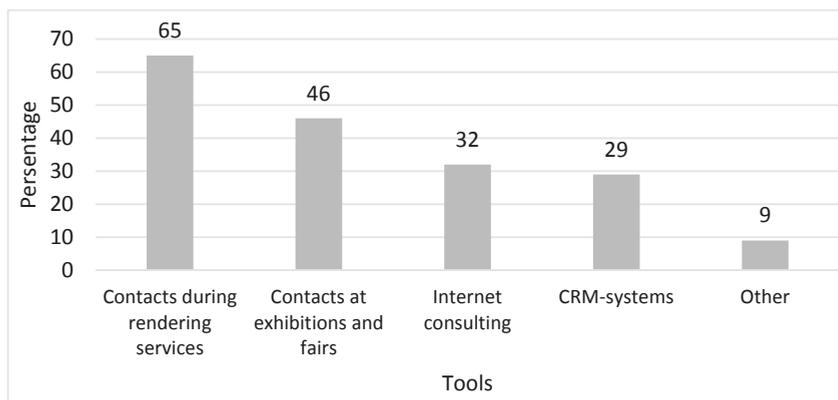


Fig. 2. Tools for establishing long-term relations with customers

Based on: Excel MS. URL: <https://www.microsoft.com/ru-ru> (accessed: 12.02.2020).

companies are ready to customize their products for a particular customer. On the basis of this, it can be concluded that it is easier (financially and technically) for a firm to produce an individualized product than to provide options for selection. Almost half of the companies — 43 % (44 companies) provide their customers with an opportunity to participate in pre-sale services. The number of companies providing the possibility of independent after-sales service to the client is higher (64 companies (63 %)).

The survey found the companies are oriented toward long-term trust-based relations with their clients (94 % of companies). In order to establish such relations, the companies apply various instruments (Figure 2).

It should be noted that most firms use several channels of interaction with clients, thus increasing the effectiveness of trust-based relations.

Another aspect of company activity is its interaction with suppliers. Factors determining the choice of a supplier are presented in Figure 3. An absolute majority of companies (95 %), with few exceptions (5 %), try to establish long-term relations with suppliers. It guarantees them stable operation in the market.

Long-term cooperation with suppliers is most often established through long-term contracts (71 %), though informal relations are not exceptional (38 %). Some companies use both mechanisms in working with suppliers (9 %). Innovations, regardless of the level, can be financed by the state. A quarter of surveyed firms (25 %) confirm that they receive state support for innovation development and production.

The most common mechanisms of state support are state co-financing (44 %) and direct public contracts (32 %). A quarter of the respondents (25 %) noted the importance of such state support mechanisms as concessional lending and loans. Only 2 % of the surveyed firms use crowdfunding to finance projects. As for joint value creation concept, it does not look as if it is widely used by the companies. Only 49 % of companies participating in the survey confirmed that they use client suggestions to improve the quality of the final product. An even smaller percentage of companies (8 % (5 companies)) apply the QFD methodology, which is one of the most comprehensive methods that exists today. The companies demonstrated good results in terms of providing the client with the opportunity to participate (to perform) in the pre- and after-sales service — 45 and 38 %, respectively.

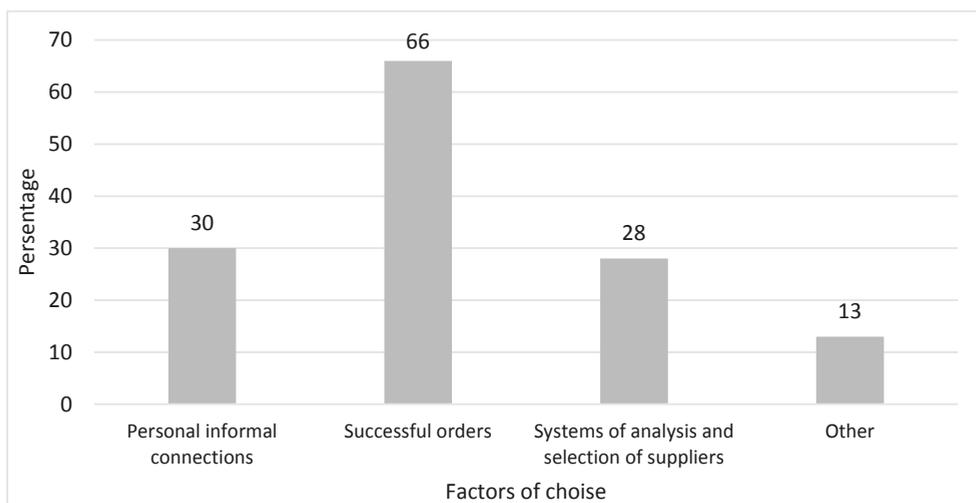


Fig. 3. Factors determining the choice of suppliers

Based on: Excel MS. URL: <https://www.microsoft.com/ru-ru> (accessed: 12.02.2020).

As a whole, it can be said that the mechanisms of joint value creation appear in the actions of companies, but are not yet applied on a wide scale.

Further, the researchers set a task to test hypotheses 2–6 by revealing correlations between the results obtained during the factor analysis, which are presented below. The analysis is based on 12 qualitative variables, each of which corresponds to the answers in the questionnaire. Definitions of the variables used are provided below (the names of the variables are given in the same way as they are used in the software package when building the correlation matrix) of the variables used. It should be noted that the parameters refer to the characteristics of both the internal environment of the firm and the external environment (characterising relations with consumers and suppliers).

Factors of the internal environment:

- size — size of the company (small, medium-sized, large);
- market — market where the company operates (B2C, B2B);
- innov_level — level of innovations in the company (low, medium, high);
- research — research of the needs of target market segment before product development (yes, no);
- individual — possibility of the company to customize the product (yes, no).

Factors of the external environment:

- custom_adv — use of customers' ideas in product development (yes, no);
- options — possibility for the customer to choose product options (yes, no);
- pre-sale_service — possibility for the customer to perform pre-sale service independently (yes, no);
- after_self-service — possibility for the customer to perform after-sale service independently (yes, no);
- custom — establishing long-term relations between the company and the customer (yes, no);

- supp — establishing long-term relations between the company and the supplier (yes, no);
- gov_sup — state support of the company (yes, no).

Correlation relationship was determined based on the general system of classification of correlation relationships: medium at $0.3 < r < 0.49$; weak at $0.2 < r < 0.29$; very weak at $r < 0.19$.

On the basis of this scale, the data were analysed and the strength of correlation links was determined. The Gretl and SPSS software packages were used to calculate the correlation. The package automatically calculates the correlation relationship based on the data series. The package provides the possibility of compiling correlation matrices, which make it possible to determine the paired correlation coefficient between several factors at the same time.

It was decided to recognize a correlation relationship only when the coefficient is greater than 0.3 (see Note, Table 3), i. e. there is a moderate, medium or strong correlation relationship. Correlation coefficients indicating a weak or very weak link are deemed insignificant for the study. Thus, according to the data in Table 3, there are six significant pair correlation coefficients. First, it can be seen that the level of state support depends on the level of innovation implemented in the company (the correlation coefficient is 0.3673). This can be justified by the following: the higher the level of innovation that is developed, the higher the costs that the company incurs and, therefore, it needs additional sources of financing. As for the state, it is also interested in supporting large fundamental innovation projects.

Table 3. Correlation matrix for the applied variables

size	market	innov_level	custom_adv	research	options	individual	presale_service	after_selfservice	custom	supp	gov_sup	
1.0000	0.1561	-0.2648	0.0674	0.1392	0.1463	0.3758	0.2497	0.0231	0.0459	-0.0109	-0.1709	size
	1.0000	0.1892	-0.1559	0.0277	0.0193	0.1411	0.1383	0.1596	0.2338	-0.0756	0.2815	market
		1.0000	0.0764	0.0741	0.0878	-0.0996	0.0093	0.2656	0.0963	-0.0024	0.3673	innov_level
			1.0000	0.2181	0.2773	0.1973	0.2424	0.1098	0.1227	0.0981	0.0748	custom_adv
				1.0000	0.2113	0.0695	0.0541	0.1078	-0.0262	0.0062	-0.0157	research
					1.0000	0.3922	0.2385	0.2496	0.1410	0.0209	-0.1910	options
						1.0000	0.3508	0.2512	0.1567	0.2054	-0.2305	individual
							1.0000	0.4552	-0.0275	0.1127	-0.1449	presale_service
								1.0000	0.0223	-0.0112	0.0755	after_selfservice
									1.0000	0.3288	0.0471	custom
										1.0000	-0.0806	supp
											1.0000	gov_sup

Based on: Statistic program Gretl. URL: <http://gretl.sourceforge.net/> (accessed: 08.06.2019).

Note: correlation coefficients, observations 1–102; 5 % critical values (two-sided) = 0.1956 for $n = 102$. Second, there is a moderate correlation relationship (0.3758) between such factors as the size of the company and its possibility to customize goods to meet client's needs. It follows, and it is empirically confirmed, that a company that customizes its goods to meet client's needs offers him a possibility to choose the necessary options independently (correlation coefficient between these factors is 0.3922). A strong link between these factors is a consequence of the interaction between the company's internal and external environments, since the company, having the ability to individualize goods, is likely to provide its customers the opportunity to choose options in the product in order to attract new customers and create a favourable image.

Third, there is a logical moderate correlation link (the correlation coefficient is 0.4552) between such factors as pre-sale and after-sale service. Most often, the firms that outsource service functions to the client provide an opportunity to conduct independent pre-sale and after-sale service.

Fourth, companies focused on long-term relationships with counteragents tend to establish such relationships with both buyers and suppliers (the correlation coefficient is 0.3288).

It can be concluded that the hypotheses 3–6 are to some extent confirmed.

Let us now consider the dynamics of some processes based on the two studies conducted in 2014 and 2017. The Table 4 show a comparison of data on some indicators.

Table 4. Comparative analysis of the 2014 and 2017 survey results, %

Method	2014	2017	Increase
Questionnaire	51	56	+5
Focus groups	19	22	+3
In-depth interviews	19	28	+9
QFD methodology	13	8	-5
Other methods	32	38	+6
Contacts in the course of rendering services	73	64	-9
Contacts at fairs	48	46	-2
Online consulting	41	32	-9
Use of CRM systems	14	29	+15
Other tools	21	9	-12

Based on: Excel MS. URL: <https://www.microsoft.com/ru-ru> (accessed: 12.02.2020).

The results are controversial. Some indicators show a certain increase. However, in a number of other indicators of joint value creation, there was a decline over the past three years. Thus, in the survey of consumers' opinions on improving characteristics of the developed product in 2014, 80 % of respondents noted the use of this mechanism, while in 2017 only 50 % did. This dynamic in the indicators can be explained by some difference in the samples, as well as by the fact that since 2014 the Russian economy has been in or near recession, which resulted in producers acting in a more reserved manner, forcing them to cut costs and focus on a mass rather than an individualized customer. At the same time, there are more firms (by 6 %) implementing top-level innovations, i.e. some new scientific and technical solutions. There was a slight decline in the number of firms studying the

needs of target market segments before developing a new product (from 78 to 63%). In general, the use of methods for consumer research remained unchanged (correction by $\pm 2-3\%$ depending on the method). A noticeable improvement in company behavior can be observed with regard to such an indicator as providing the client with the possibility of conducting after-sales service independently (from 39 to 63%).

It should be noted that it is still very important for companies to build long-term relationships with clients through the use of various mechanisms. This suggests that companies use a system of long-term relationships. Undoubtedly, the structure of long-term relationships with clients is not ideal, but there is a significant growth in the number of companies using CRM systems (from 14 to 29%).

It can be said that hypothesis 2, in general, has not been confirmed, although there is an increase in the use of some tools of the joint value creation methodology.

Based on the results obtained, Russian enterprises can be advised to transfer to more modern tools of joint value creation. For example, innovation companies could use CRM systems to ensure communication with consumers. QFD methodology could be applied in developing competitive incremental innovations. Neuromarketing methods could be used to obtain more reliable information about the real needs of clients. The use of digital technologies will allow domestic firms to compete with foreign companies more successfully.

Conclusion

The research conducted by the authors of the article made it possible to arrive at the following conclusions and results.

1. At the current stage, innovation-oriented companies transfer from open innovations, the idea of which originates in the external environment of the company, to client-oriented innovations. Client-oriented innovations are innovations of all types, obtained as a result of consumer integration into the innovation process at any stage of the innovation cycle based on the use of various tools (consumer platforms, software, etc.). Client-oriented innovations are most often incremental, i.e. they improve current technologies or products. Radical innovations, on the other hand, are the result of the interaction between professionals (R&D centres, academic institutions, universities, partners, competitors, etc.). The term "joint innovation with partners" is used for radical innovations based on the principles of joint value creation. The shift to client-oriented innovation is transforming company models where the process of customer engagement into creativity and co-production becomes a key element.

2. The second objective of the study was to identify the extent to which innovation-oriented companies in St Petersburg were using the tools of the joint value creation methodology to develop innovations. A number of hypotheses were tested, with the following results. Hypothesis 1 was confirmed as the level of use of the tools of the joint value creation methodology for the development of incremental innovations in the underlying sampling proved to be low (thus, only 13% of companies use the methodology of quality function deployment, which is the most comprehensive tool of joint value creation). Hypothesis 2 (an increase in the percentage of firms using joint value creation tools) was not confirmed. There was no significant increase in the use of joint value creation tools in developing innovations over time (in 2017 against the data of 2014). The authors explain

this dynamic in the indicators by the fact that since 2014, Russia's economy has been going through a recession, which has also resulted in more restrained behavior from producers, forcing them to cut costs and focus on a mass rather than an individual customer. Hypotheses 3–6 have generally been confirmed. Based on the calculations of the correlation coefficients, the authors of the study have identified the following dependencies:

- the more original the innovations developed by the firm, the more support the firm receives from the state;
- the larger the firm, the more opportunities it has to individualize the new product;
- the volume of after-sales service provided to the innovation buyer for outsourcing grows with the increase of pre-sale service outsourcing;
- long-term customer relationships require similar long-term relationships with suppliers.

3. Based on the research results, it is possible to recommend Russian enterprises use more modern tools from the arsenal of the joint value creation concept. For example, all innovation-oriented companies should use CRM systems to communicate with consumers. In order to create competitive incremental innovations, it is necessary to apply QFD methodology. To obtain more reliable information about the real needs of customers it is advisable to apply neuro-marketing methods. The use of digital technologies will allow domestic firms to compete with foreign companies more successfully.

As a further study it is planned to examine the situation in other regions of the Russian Federation and in foreign countries, which would require similar field studies. A more in-depth analysis and coverage of Russian companies that widely apply joint value creation tools will be conducted.

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Authors' information:

Nikolay N. Molchanov — Dr. Sci. in Economics, Professor; n.molchanov@spbu.ru
Yulia V. Rybakova — PhD student; rbk1331@mail.ru

Клиентоориентированные инновации: анализ практики использования (на примере компаний Северо-Западного региона России)

Н. Н. Молчанов, Ю. В. Рыбакова

Санкт-Петербургский государственный университет,
 Российская Федерация, 199034, Санкт-Петербург, Университетская наб., 7–9

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В статье раскрыты основные этапы формирования методологии совместного создания ценности на примере продуктовых и технологических инноваций, которые включают: применение внешних венчуров, открытых инноваций и инструментов их поддержки; наблюдаемый в настоящее время переход от открытых инноваций к клиентоориентированным, а также к инструментам их разработки и финансирования, в том числе с использованием краудсорсинга и краудфандинга. Использование клиентоориентированных инноваций приводит к трансформации бизнес-моделей компаний, в которых процесс вовлечения покупателей в сотворчество и сопроизводство становится ключевым. За счет этого, во-первых, достигается оперативная адаптация к постоянно изменяющимся потребностям клиентов, а во-вторых, при налаживании устойчивых и не опосредуемых рынком партнерских отношений B2C укрепляются конкурентные позиции предприятий и повышается эффективность их деятельности. В статье представлены результаты полевого исследования по применению на практике инструментария совместного создания ценности в деятельности российских инновационно-ориентированных компаний (средних и крупных), расположенных в Северо-Западном регионе России. Репрезентативность опроса также обеспечивает анализ различных отраслей экономики и видов бизнеса. Исследование проводилось дважды, в 2014 и 2017 гг., что позволило проанализировать ситуацию в динамике. В результате был сделан вывод о недостаточном использовании российскими инновационно-ориентированными компаниями (исследуемой целевой группы) инструментария совместного создания ценности при разработке инкрементальных инноваций. Наряду с этим, были выявлены характеристики инновационно-ориентированных компаний, влияющие на применение методологии совместного создания ценности, к числу которых относятся: новизна инноваций, разрабатываемых фирмой, размер компании, характер отношений с поставщиками и др. Отечественным инновационно-ориентированным компаниям были даны рекомендации по применению методик структурирования функции качества для повышения конкурентоспособности разрабатываемых нововведений, а также по более активному использованию системы управления взаимоотношениями с клиентами.

Ключевые слова: продуктовые и технологические инновации, клиентоориентированные инновации, концепция совместного создания ценности, сотворчество, сопроизводство.

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Контактная информация:

Молчанов Николай Николаевич — д-р экон. наук, проф.; n.molchanov@spbu.ru
Рыбакова Юлия Владимировна — аспирант; rbk1331@mail.ru