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INVESTMENTS IN THE INNOVATIVE DEVELOPMENT OF REGIONAL ECONOMY: CONSEQUENCES FOR QUALITY OF REGIONAL ENTREPRENEURSHIP'S PRODUCTS

Abstract: *This paper aims at studying the consequences of investments in the innovative development for quality of regional entrepreneurship's products and the perspectives of balance of Russia's regional economy. Originality and novelty of this research consist in the following: firstly, it offers a systemic treatment of quality in the integrity of all its manifestations. Secondly, it considers quality as a source of overcoming the underrun of certain regions from other regions and ensuring the balance of regional economy. Thirdly, it offers a tool that is available for internal (corporate) and external (state) quality management – investments in innovations – which allows creating a synergetic effect in the form of systemic improvement of quality's manifestations. Practical significance of the obtained results consists in determination of top-priority manifestations of quality for provision of regional economy in modern Russia – volume of export and share of innovative products in the structure of regional entrepreneurship's products. Empirical value of this research consists in development of applied authors' recommendations (management implications) for provision of the balance of regional economy based on improvement of the practice of investing in innovations in the interests of quality.*

Keywords: *Quality of Products; Investments in Innovative Development; Regional Economy; Regional Entrepreneurship; Balance of Regional Economy; Regions of Russia; Quality Management.*

1. Introduction

Quality is the strategic priority of development of the modern economic systems. Efforts of economic subjects aim at its increase. This is due to the fact that quality management is the main mechanism of implementing the sustainable development goals and a mandatory condition of transition to the socio-oriented

market economy. However, despite large importance, quality of products – as an economic category – is not elaborated sufficiently from the theoretical & methodological and scientific & practical points of view and has certain gaps.

1st gap: the essence of quality of entrepreneurship's products is not clearly determined, with the ongoing scientific discourse on this topic. The classical concept

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treats quality from the positions of created benefits for consumers and satisfaction of their needs. In this case, the higher the products' quality, the fuller and quicker it satisfied the needs at which the products are oriented. In case of similar satisfaction of the needs for similar products, quality of a product of service is higher if the product or service creates the largest additional advantages (internal externalities), which are not connected to satisfaction of target needs, but are of value for consumers.

A classical idea of quality of entrepreneurship's products is "narrow" for it is limited by advantages for consumer. Thus, the consequences for economic system, as the external environment of a consumer, the interest to which grows in the course of increase of society's progressiveness, are not taken into account. When selecting products, the most responsible consumers also take into account the eco-efficiency of production and other characteristics, which go beyond the framework of consumption. However, regardless of the level of consumer's responsibility, quality of consumed products usually creates external externalities, which could be not taken into account by consumer but should be considered during scientific research, evaluation, and management of quality in entrepreneurship.

The second gap consists in the fact that in the practice of state management the quality of entrepreneurship's products is considered primarily from the positions of protection of consumer's rights without the search for opportunities for using quality in the interests of society and economy. State regulation of quality of entrepreneurship's products is based on standardization and control of its observation. Such management is unilateral, for it is aimed at prevention of the negative consequences for consumers (guarantee of products' safety) and society (prevention of social and ecological crises).

However, another equally important aspect – creation of new opportunities for society and

economy by means of increase of products' quality in entrepreneurship – is not taken into account. For example, increase of quality could strengthen competitive products of companies and stimulate the development of their export activities and creation of additional jobs. The most popular practices of state support for domestic entrepreneurship are aimed at provision of pricing advantages or short-term advantages in quality, which allows competing with rivals in the national market, but does not allow developing and increasing export.

3rd gap: the tools of quality management of entrepreneurship's products has no system – which reduces its effectiveness. Thus, in order to increase quality, most companies purchase improved resources, materials, and components and attract the best human resources and improve the systems of motivation and stimulation of labor. In its turn, government increases standards of products' quality and strengthens control over their observation. The measures of state and corporate quality management are implemented separately and often contradict each other, because strict standards hinder the change of resources and lead to companies' additional expenditures, lowering the stimulation of labor.

Thus, an important scientific and practical problem is specifying the essence of quality as an economic category and the causal connections of quality management. Originality and novelty of this research consist in the following: firstly, it offers a systemic treatment of quality in the integrity of all its manifestations. Secondly, it considers quality as a source of overcoming the underdevelopment of certain regions from other regions and ensuring the balance of regional economy. Thirdly, it offers a tool that is available for internal (corporate) and external (state) quality management – investments in innovations – which allows creating a synergetic effect in the form of systemic improvement of quality's manifestations.

The purpose of this paper is to study the consequences of investments in the innovative development for quality of regional entrepreneurship's products and perspectives of balance of Russia's regional economy. The research is performed at the level of regional economy (meso-level of economic systems), as the causal connections between investments in innovations and quality of entrepreneurship's products are especially vivid at this level due to minimum generalization. The use of Russia's experience is explained by Russia's high level of economy regionalization, which allows determining significant differences between regions, which, in its turn, allows using mathematical tools and obtaining the most precise research results.

Introductio is followed by literature review and gap analysis, as well as description of materials and methods of the research. The results include the following: 1) connection between investments in innovations and the manifestations of quality of entrepreneurship's products in regions of Russia; 2) systemic evaluation of quality of entrepreneurship's products and its influence on the balance of Russia's regional economy; 3) perspectives and management implications on provision of balance of regional economy based on improvement of the practice of investing in the interests of quality. Conclusion comes at the end of the paper.

2. Literature Review

Investments in the innovative development of regional economy are studied in detail and described in a lot of published works. Li et al. (2019) determines and compares the strategies of coordination in a two-channel chain of supply in view of investments in innovations and various game opportunities based on Game theory. Quintella et al. (2017) suggests performing evaluation of the

results of investment and innovative projects in view of financial risks and investments in technological innovations (approved by the example of resources spheres of Brazil).

Wu and Wang (2017) describe the influence of competition that is connected to local authorities' decisions on investments in innovations of companies in the conditions of the information asymmetry and multiple risk appetite. Reutzet et al. (2018) think that leader's gender determines companies' investments in innovations. Mikołajczak and Pawlak (2017) determine the factors that influence the results of EU-backed investments in innovations among the subjects of SME (by the example of Wielkopolska region of Poland).

Li et al. (2018) point out that foreign direct investments increase effectiveness of regional innovations (analyzing the empirical data from China). Moljevic (2016) proves the influence of infrastructure's quality on regional development. Arsic (2016) deems it necessary to integrate sustainable development and quality at the organizational and regional levels. Savovic et al. (2016) point out the vivid influence of investments in quality and environment protection, as well as sustainability of the regional economy. Bogoviz et al (2018) determine the approaches to managing the economic growth of socio-economic systems.

Soboleva et al. (2017a) offer a perspective methodology of evaluation of regional management's quality and Soboleva et al (2017b) develop a mechanism of regulating the quality of economic processes in a region. Cheglakova et al. (2019) develop a marketing strategy of quality management during reorganization of regional universities in the process of modernization of education in the conditions of region's transition to Industry 4.0. Sozinova et al (2017a), Sozinova (2017b) develop the marketing strategy during transformation of companies. Lysova et al. (2019) study the digital modernization of educational services

market and note its large influence on quality of education. Sofiina (2020) determines and substantiates the general systemic processes of quality management in agriculture at the regional level. Snigireva et al (2017) offer a conceptual approach to evaluating the regional factors of the innovative environment based on the index method. Palkina and Kislitsina (2018) determine the factors that increase the investment attractiveness of Russian regions.

The important role of innovations for provision of quality of entrepreneurship's products and its competitiveness in the conditions of the digital economy and Industry 4.0 is shown in the works Popkova (2017), Popkova et al. (2017) and Shahin (2019).

Holschbach and Hofmann (2011) study the theory and practice of management of business services' quality from the point of view of a buyer, by a lot of examples from the practice. MacKenzie Jr et al. (2019) provide a systemic overview of studying the quality and value of international accreditation of AACSB. Metaxas et al. (2018) study economic crisis and business domination, performing a comparative evaluation of several thematic studies. Guizzardi et al. (2016) determine quality as the basis of hotels' competitiveness from the positions of corporate business trips.

Various issues of measuring and achievement of regional economy's balance are studied in the following works. Yoon (2017) points out the importance of support for the regional innovative clustering for provision of high effectiveness of R&D and development of creative economy (by the example of Daedeok Innopolis, South Korea). Tang et al. (2017) collect the flow of energy consumption and regional economic development (based on the data of 25 economies). Goryachikh et al. (2019) deem it necessary to perform an audit of digital personnel training for the regional economy in the conditions of Industry 4.0.

Degelsegger-Márquez et al. (2018)

determine the connection between regional knowledge economies and global innovative networks (by the example of countries of South-East Asia). Galvão et al. (2018) think that training in the sphere of entrepreneurship stimulates regional development. Vidyarthi (2017) notes that banking services' coverage, level of infrastructure development, and growth rate of regional economy are interconnected (based on empirical data from Indian states). Park and Shin (2017) determine the factors of effectiveness of the regional programs of industrial technologies' development.

The specifics of quality management in the practice of corporate and state governance are reflected in the following works. Al-Gamrh et al. (2020) think that investment opportunities, quality of corporate management, and result of companies' activities are closely interconnected (proved by the example of the UAE). Okaily et al. (2019) note that quality of corporate management and premature revenue recognition are interconnected (providing factual data from the UK).

Bajra and Čadež (2019) consider alternative regulatory policies, compliance, and quality of corporate management. Ajili and Bouri (2018) point out that quality of corporate management influences financial results (shown by the example of Islamic banks). Lahiri (2017) notes the regulatory influence of the market potential and previous experience on the interconnection between management quality and participation in capital (by the example of mergers and acquisitions in BRICS).

Martins et al. (2017) study the differences in quality management (by the example of a Brazilian pig breeding network). Tran and Dat Le (2019) think that quality of management, direct foreign investments, and entrepreneurship in developing markets are closely interconnected. Martins et al. (2020) note the interconnection between quality and mechanisms of management (performing a

qualitative study of the networks of healthcare supply chains). Riganelli and Marchini (2017) note that disclosure of information largely determines quality of entrepreneurship's products (by the example of palm oil).

Gerged and Elheddad (2020) think that national management could influence the quality of education (shown by the example of Western Europe). Salem et al. (2019) provide arguments in favor of the connection between corporate management and quality of disclosure of information on risks (with proofs from Tunisia). Xiaoti (2018) notes the interactive influence of quality of management of state and family-owned companies on the results of R&D (performing empirical studies of family-owned companies in China). Hammami and Hendijani Zadeh (2019) determines the connection between quality of audit, coverage in mass media, disclosure of ecological, social, and corporate information, and effectiveness of companies' investments (by the example of the data from Canada).

An overview of the existing works and publications on the described topic has shown that the issues of investments in innovations, quality management of entrepreneurship's products, and overcoming of disproportions in the regional economy's development are thoroughly elaborated.

However, absence of a system in the elaboration of these issues leads to certain gaps: uncertainty of the consequences of investments in the innovative development of regional economy for quality of regional entrepreneurship's products and ambiguity of the perspectives of these consequences' management in the interests of provision of the regional economy's balance. The empirical experience of development of Russia's regional economy is studied in detail in the existing works, but the role of quality of entrepreneurship's products in this process requires further elaboration. In this paper we try to fill these gaps.

3. Materials and methodology

The research objects are top 10 regions of Russia by the volume of investments in fixed capital per capita in 2020. It should be noted that there are no recorded statistics of quality of entrepreneurship's products in Russia's regions. The available data are the data from sociological surveys on quality of products in certain regions – e.g., Tula Oblast (Open region, 2020) – but they cannot be used for this scientific research. That's why, in order to reflect the essence of regional entrepreneurship's products' quality we shall consider its following manifestations:

- Quality of life index as a manifestation of completeness of satisfaction of the needs of consumers of entrepreneurship's products and creation of additional advantages for them;
- Export as a manifestation of the influence of products' quality on its global competitiveness and demand in the world (export) markets;
- Level of digitalization as a manifestation of hi-tech and digital competitiveness of products;
- Share of innovative products in the total structure of regional entrepreneurship's products as a manifestation of innovativeness and progressiveness of products;
- Regional budget's balance as a manifestation of the advantages of products' quality for replenishment of the regional budget by means of increase of tax revenues;
- Balanced financial result activities of companies as a manifestation of the advantages of products' quality for the company in the form of increase of profit and profitability.

Data for most of these indicators are available in the Dataset "Interactive statistics and intelligent analytics of the balanced state of the regional economy of Russia in terms of Big data and blockchain – 2020" of the Institute of Scientific Communications

(2020). As we work with the data on different indicators for different time periods (2016, 2017, or 2017), provision of their compatibility and receipt of the most correct results requires the use of forecast data for 2020 according to the forecast of the Institute of Scientific Communications with “all other conditions being equal”.

Statistics of quality of life are taken from the ranking of RIA Novosti (2020), and the data on export – from the materials of regional statistics of Federal State Statistics Service (2020). The indicator of investments in the

regional economy’s innovative development is investments in fixed capital per capita. Also, the indicator of differentiation of the level of socio-economic development of regions is the depth of “underdevelopment whirlpool” (the lower the better; negative value shows the absence of underrun and the progressiveness of a region). The values of both indicators could be found in the materials of the Institute of Scientific Communications (2020). The selection of statistical data is shown in Table 1.

Table 1. Statistics of investments in innovations, quality, and balance of Russia’s regional economy in 2020.

Region	Manifestations of regional entrepreneurship’s products’ quality						Investments in fixed capital per capita, RUB thousand	Depth of “ underdevelopment whirlpool” , years
	Quality of life index, points 1-100	Export USD million	Digitalization level, points 1-100	Share of innovative products, %	Balance of regional Budget, RUB million	Balanced financial result of companies’ activities, RUB million		
Amur Oblast	38.752	308.8	50.18	0.66	-9,212.77	52.96	345.58	2
Astrakhan Oblast	42.495	720.1	51.79	0.16	16,043.91	53,606.76	257.36	5
Khanty-Mansi Autonomous Okrug - Yugra	58.813	14,498.9	69.24	0.98	-39,423.48	11,477,595.48	699.28	-4
Leningrad Oblast	60.695	5,652.9	63.71	12.32	-203,387.26	519,733.25	439.63	-3
Magadan Oblast	44.658	405	30.32	0.94	-3,579.35	2425.38	372.09	-4
Moscow Oblast	74.500	6,580	66.93	4.10	-768,964.17	592,223.86	350.06	-2
Republic of Sakha (Yakutia)	37.992	4,800.2	61.57	0.03	-10,169.40	9,318.50	576.29	-4
Sakhalin Oblast	47.873	10,574.6	52.09	0.35	-12,734.09	21,347.04	907.75	-4
Tyumen Oblast	57.022	19,845.3	66.76	2.92	-272.07	1,161,043.16	774.72	-4
Yamalo-Nenets Autonomous Okrug	58.181	2,406.1	67.36	0.00	91,664.69	100,181.08	1946.64	-4
Amur Oblast	79.275	149,246.6	69.32	86.47	150,826.68	11,477,595.48	-	-

Source: calculated and compiled by the authors based on Institute of Scientific Communications (2020), RIA Novosti (2020), Federal State Statistics Service (Rosstat) (2020).

In order to determine the connection between investments in innovations and manifestations of quality of entrepreneurship’s products in Russia’s

regions, the method of correlation analysis is used. For systemic evaluation of quality of entrepreneurship’s products we use T.L. Saaty’s hierarchy process; for determining

the influence of quality on the balance of Russia’s regional economy – regression analysis.

For determining the perspectives and management implications on provision of the balance of regional economy based on improvement of the practice of investing in innovations in the interests of quality we use the method of comparative analysis. Significance of the components of quality and their connection with investments in innovations and with the depth of “underdevelopment whirlpools” in Russia’s regions in 2020 are compared.

4. Results

4.1 Connection between investments in innovations and manifestations of quality of entrepreneurship’s products in regions of Russia

For determining the connection between investments in innovations and manifestations of quality of entrepreneurship’s products in Russia’s regions, let us use the results of correlation analysis (Figure 1).

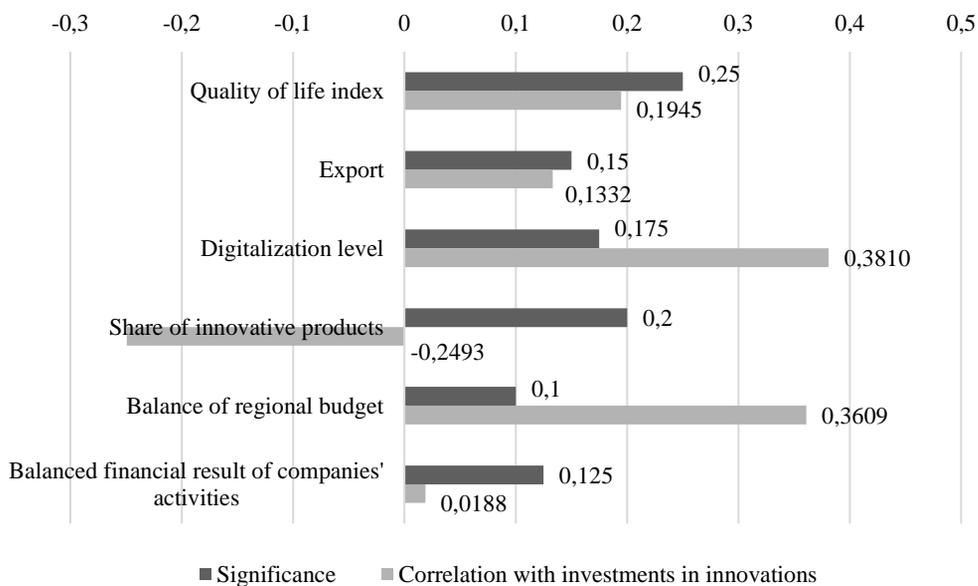


Figure 1. Correlation with investments in innovations and significance of the manifestations of regional entrepreneurship’s products’ quality.

Source: calculated and compiled by the authors.

Significance of the manifestations of regional entrepreneurship’s products’ quality is also shown in Figure 1. Expert evaluation is used for evaluating the significance of different manifestations of quality of entrepreneurship’s products in regions of Russia (1 point – the worst value, 10 points – the best value):

- Quality of life index: 10 points;

- Export: 6 points;
- Level of digitalization: 7 points;
- Share of innovative products: 8 points;
- Balance of regional budget: 4 points;
- Balanced financial result of companies’ activities: 5 points.

The sum of the scores equals $10+6+7+8+4+5=40$ points. Figure 1 shows significance in shares of 1, calculated as score/sum of all scores ratio. For example, for quality of life index the score is transferred into shares of 1 in the following way: $10/40=0.25$.

As shown in Figure 1, the most significant manifestation of regional entrepreneurship's products' quality is quality of life index (0.25), but its correlation with investments in innovations is moderate (19.45%). The largest correlation of investments in innovations is with the level of digitalization (38.10%) and balance of regional budget (36.09%). However, significance of these manifestations of quality is moderate, constituting 0.175 and 0.1, accordingly.

A rather significant manifestation of regional entrepreneurship's products' quality is export (0.15), but its correlation with investments in innovations is moderate (13.32%). Balanced financial result of companies' activities is also a rather significant manifestation of quality (0.125), but its correlation with investments in innovations is very small (1.88%). Share of innovative products is also rather significant (0.2), but its correlation with investments in innovations is negative (-24.93%).

Thus, it has been determined that investments in the innovative development of regional economy largely determine the level of regional entrepreneurship's products' quality in Russia in 2020. However, the connection between investments in innovations and the manifestations of quality of entrepreneurship's products in regions of Russia is very different from significance of the quality's manifestations.

Therefore, investments in innovations stimulate the improvement of only certain,

moderately significant, manifestations of quality, providing insufficient support for the key manifestations of quality and having neutral or negative influence on other manifestations of quality. This proves non-optimality of the existing practice of investing in the innovative development of regional economy in modern Russia and the necessity for improvement of this practice through its re-orientation at quality regional entrepreneurship's products.

4.2 Systemic evaluation of quality of entrepreneurship's products and its influence on the balance of Russia's regional economy

The systemic evaluation of quality of entrepreneurship's products (with the help of T.L. Saaty's hierarchy process) in regions of Russia in 2020 is performed in three consecutive stages. At the first stage, indicator's value/maximum value in Russia ratio is calculated – “weighing” of the indicators. Let us demonstrate calculation by the example of quality of life index in Amur Oblast: $38.752/79.275=0.49$.

At the second stage, products of the obtained (“weighed”) values of the manifestations of quality and their significance from Figure 1 are calculated. By the example of quality of life index in Amur Oblast, we obtain the following result: $0.49*0.25=0.1225$. At the third stage, sums of all obtained (at the second stage) values are calculated (hierarchy synthesis). For Amur Oblast, this sum equals 0.48. The results for all studied regions are shown in Table 2.

The obtained (as a result of the systemic evaluation) quality of entrepreneurship's products in regions of Russia in 2020 is shown in Figure 2.

Table 2. Evaluation of quality of entrepreneurship’s products in regions of Russia in 2020, with the help of T.L. Saaty’s method, shares of 1.

Region	Quality of life index	Export	Digitalization level	Share of innovative products	Balance of regional budget	Balanced financial result of companies’ activities	Quality of regional entrepreneurship’ s products
	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	
Amur Oblast	0.49	0.00	0.72	0.01	0.00	0.00	0.48
Astrakhan Oblast	0.54	0.00	0.75	0.00	0.11	0.00	0.60
Khanty-Mansi Autonomous Okrug - Yugra	0.74	0.10	1.00	0.01	0.00	1.00	1.60
Leningrad Oblast	0.77	0.04	0.92	0.14	0.00	0.05	0.66
Magadan Oblast	0.56	0.00	0.44	0.01	0.00	0.00	0.45
Moscow Oblast	0.94	0.04	0.97	0.05	0.00	0.05	0.70
Republic of Sakha (Yakutia)	0.48	0.03	0.89	0.00	0.00	0.00	0.51
Sakhalin Oblast	0.60	0.07	0.75	0.00	0.00	0.00	0.52
Tyumen Oblast	0.72	0.13	0.96	0.03	0.00	0.10	0.70
Yamalo-Nenets Autonomous Okrug	0.73	0.02	0.97	0.00	0.61	0.01	1.20

Source: calculated and compiled by the authors.

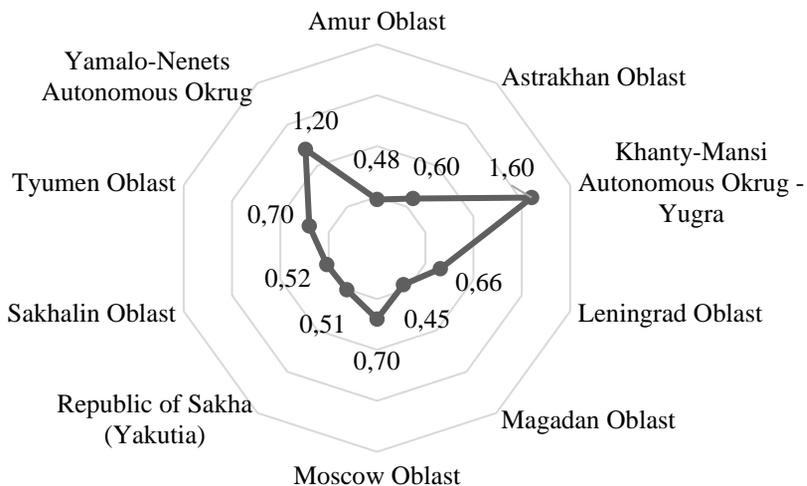


Figure 2. Quality of entrepreneurship’s products in regions of Russia in 2020, shares of 1.
Source: calculated and compiled by the authors.

As shown in Figure 2, quality of products of regional entrepreneurship is the highest in Khanty-Mansi Autonomous Okrug – Yugra (1.60) and Yamalo-Nenets Autonomous Okrug (1.20); the lowest – in Magadan (0.45) and Amur (0.48) Oblasts. For

determining the systemic influence of investments in innovations on quality of entrepreneurship’s products in Russia’s regional economy in 2020, let us use the results of regression analysis (Figure 3).

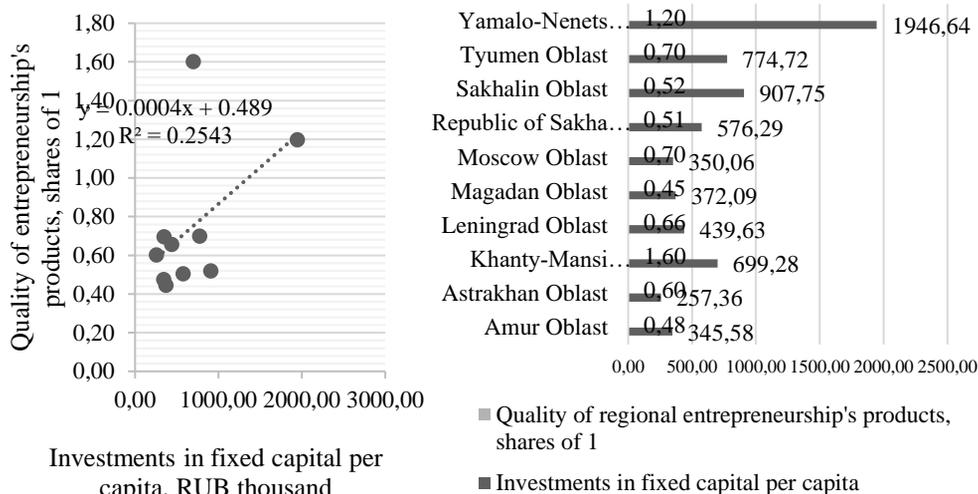


Figure 3. Quality of products, investments in innovations, and the regression curve of their dependence in regions of Russia in 2020.
 Source: calculated and compiled by the authors.

According to the regression curve (Figure 3), increase of investments in the innovative development of Russia’s regions’ economy in 2020 by RUB 1,000 leads to increase of systemic quality of products of regional entrepreneurship by 0.0004. Correlation of the indicators is moderate: 25.43%. The largest volume of investments in fixed capital per capita is observed in Yamalo-Nenets Autonomous Okrug (RUB 1,946.64 thousand), where systemic quality of regional entrepreneurship’s products is rather high (1.20). The highest quality is observed in Khanty-Mansi Autonomous Okrug (1.60), where the volume of investments in fixed capital per capita is small – RUB 699.28 thousand. For determining the influence of systemic quality of entrepreneurship’s products on the balance of Russia’s regional economy in

2020, let us use the results of regression analysis (Figure 4).

As shown in Figure 4, increase of quality of regional entrepreneurship’s products by 1 leads to reduction of the depth of “underdevelopment whirlpool” by 2.4177. Equation of multiple linear regression reflects the dependence of the depth of “underdevelopment whirlpools” on the manifestations of quality in regions of Russia in 2020: $y = -3.402 - 2.77x_1 - 51.56x_2 + 7.43x_3 - 14.34x_4 - 6.62x_5 - 0.64x_6$. According to this equation, increase of quality of life index by 1 point leads to decrease of the depth of “underdevelopment whirlpools” by 2.77 years; increase of export by USD 1 million leads to decrease of the depth of “underdevelopment whirlpools” by 51.56 years; growth of digitalization level by 1 point leads to increase of the depth of

“underdevelopment whirlpools” by 7.43 years; increase of share of innovative products by 1% leads to decrease of the depth of “underdevelopment whirlpools” by 14.34 years; increase of balance of regional budget by RUB 1 million leads to decrease

of the depth of “underdevelopment whirlpools” by 6.62 years; increase of balanced financial result of activities of entrepreneurship by RUB 1 million leads to decrease of the depth of “underdevelopment whirlpools” by 0.64 years.

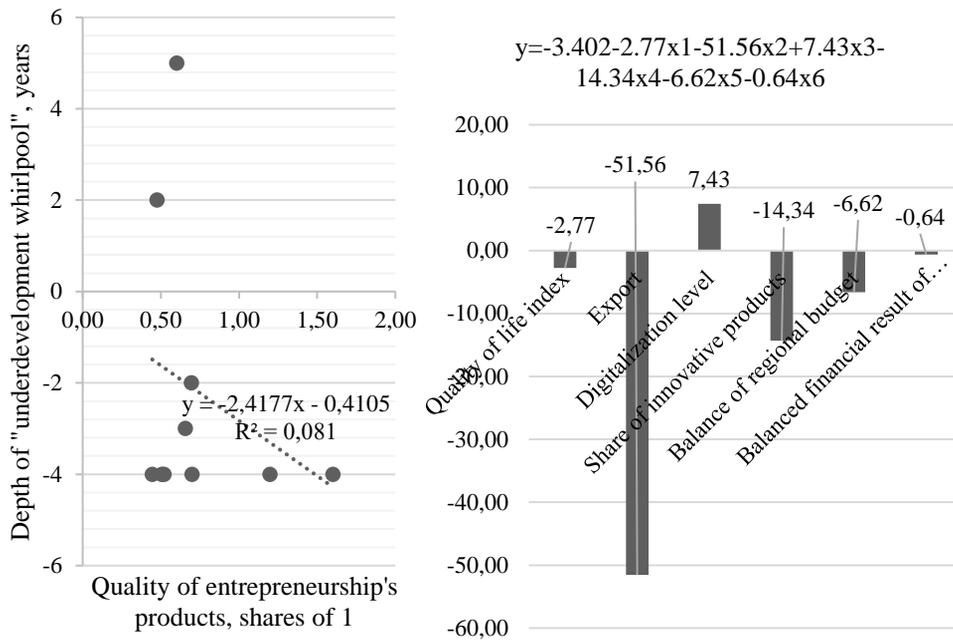


Figure 4. Regression dependencies of the depth of “underdevelopment whirlpools” on quality on the whole and its manifestations in regions of Russia in 2020.

Source: calculated and compiled by the authors.

Thus, quality of regional entrepreneurship’s products is a perspective mechanism of provision of the regional economy’s balance. The most significant manifestation of quality for overcoming the “underdevelopment whirlpools” in regions of Russia is increase of export of regional entrepreneurship’s products. Investments in the innovative development of regional economy perform large systemic influence on quality of products of Russia’s regional entrepreneurship.

It should be noted that investments in the innovative development of regional economy in Russia are treated as a goal in itself. In the Russian rankings of region, the

volume of investments in fixed capital is taken into account. Thus, investments in innovations are not oriented at quality, and their positive influence on quality of products of regional entrepreneurship is their additional advantage.

The non-target character of investments in innovations does not allow for full realization of the potential of their stimulation of increase of quality of entrepreneurship’s products in Russia’s regions. In order to provide the balance of the Russian regional economy, it is necessary to improve the existing investment practice by aiming it at stimulation of growth of quality.

4.3 Perspectives and management implications for provision of the balance of regional economy based on improvement of the practices of investing in innovations for the purpose of quality

For determining the perspectives of provision of the balance of regional

economy based on improvement of the practice of investing in innovations for the purpose of quality, let us use the data of Table 3, where significance of the components of quality and their connection with investments in innovations and with the depth of “underdevelopment whirlpools” are compared.

Table 3. Comparison of significance of the components of quality and their connection with investments in innovations and the depth of “underdevelopment whirlpools”.

Manifestation of quality	Significance, shares of 1	Correlation with investments in innovations, %	Regression with depth of “underdevelopment whirlpool”, years
Quality of life index	0.25	19.45	-2.77
Export	0.15	13.32	-51.56
Digitalization level	0.175	38.10	7.43
Share of innovative products	0.2	-24.93	-14.34
Balance of regional budget	0.1	36.09	-6.62
Balanced financial result of companies' activities	0.125	01.88	-0.64

Source: calculated and compiled by the authors.

As shown in Table 3, the largest contribution to overcoming of “underdevelopment whirlpools” in Russia’s regions is made by export (regression -51.56 years). Its significance for quality is rather high (0.15), but correlation with investments in innovations is not sufficiently high for obtaining a vivid practical effect (13.32%).

Another manifestation of quality, which contributes a lot to overcoming of “underdevelopment whirlpools” in Russia, is share of innovative products in the structure of regional entrepreneurship’s products (regression -14.34 years). Its significance for quality is very high (0.2), but correlation with investments in innovations is negative and does not allow expecting a positive effect (-24.93%).

That’s why the perspectives of provision of balance of regional economy based on improvement of the practice of investing in innovations for the purpose of quality are connected to aiming the investments in fixed capital at stimulation of development of regional entrepreneurship’s export and at support for its innovative development. The

following management implications are offered for this.

Firstly, it is necessary to form a special regulatory framework. The goals of increase of quality of regional entrepreneurship’s products with the emphasis at such manifestations as export and innovativeness should be adopted in the regional strategies of socio-economic development. The programs of provision of balance of regional economy at the national level should reflect the applied mechanisms of its achievement, among which an important role should belong to investments in the innovative development of regional economy, aimed at increase of regional entrepreneurship’s quality.

Secondly, it is necessary to perform an indicative evaluation of the consequences for quality of regional entrepreneurship’s products within the monitoring of effectiveness of investments in the regional economy’s innovative development. This means that investments in fixed capital should be treated not as a goal in itself but as a tool of increase of quality of

entrepreneurship's products. That's why a ranking of regions should be compiled not from the positions of the volume of investments in fixed capital but from the positions of the achieved advantages for quality of entrepreneurship's products with emphasis on export and innovativeness.

Thirdly, effectiveness should be a mandatory condition of provision of tax subsidies to region's companies, aimed at stimulating their investments in fixed capital. State tax support should stimulate not investments in innovations (increase of their volume) but the obtained advantages for products' quality in a region. Treatment of effectiveness as effect/expenditures ratio envisages, instead of the classical increase, the reduction of the volume of investments (minimization of expenditures) in innovations with maximization of advantages for quality (effect).

Fourthly, target national (federal) co-financing of regions' economy's innovative development should be conducted in the interests of the balance of Russia's regional economy. It should be accompanied by accountability of regions and federal control of effectiveness of investments in innovations from the positions of their contribution to increase of quality of regional entrepreneurship's products with the emphasis on export and innovativeness. In case of insufficient positive effect and/or low effectiveness of investments in innovations, federal co-financing should be terminated, and a more detailed analysis of causal connections should be performed.

The developed recommendations allow aiming all participants of the process of investing in region's economy's innovative development – companies, venture investors, and bodies of regional and federal authorities – at quality, which will allow for the best results in the spheres of provision of regional economy's balance.

It should be noted that among the studied regions of Russia with the largest volume of investments in fixed capital per capita in

2020, most regions show rapid socio-economic development (negative values of the depth of "underdevelopment whirlpools", which show their absence). "Underdevelopment whirlpools" are peculiar only for two regions – Amur Oblast (2 years) and Astrakhan Oblast (5 years). In these regions, special attention should be paid to implementation of the authors' recommendations for achieving the balance of Russia's regional economy.

6. Conclusion

The key conclusions of the performed research are as follows. The first conclusion is that investments in the innovative development of regional economy ensure vivid but moderate consequences for quality of regional entrepreneurship's products in Russia in 2020. In particular, quality of life index, which is the most important manifestation of quality of entrepreneurship's products, has moderate connection with investments in innovations (correlation – 19.45%).

Investments in the innovative development of region's economy are not oriented at quality due to the specifics of the regulatory framework and the regulatory practices that are implemented by regional and federal authorities. Investments in fixed capital are treated as an independent indicator of region's socio-economic development, which is taken into account during compilation of regional rankings.

The second conclusion is that systemic evaluation of quality of entrepreneurship's products in Russia's regions in 2020 is rather high. It is the highest in Khanty-Mansi Autonomous Okrug – Yugra (1.60) and Yamalo-Nenets Autonomous Okrug (1.20). Influence of quality on the balance of Russia's regional economy is high. Volume of export and share of innovative products are especially significant. However, these manifestations of quality are not sufficiently determined by investments in innovations.

The third conclusion is as follows: perspectives of provision of the balance of Russia's regional economy based on improvement of the practice of investing in innovations in the interests of quality are connected to transition to target investing in the development of region's economy. The goals of investments in fixed capital should be determined based on their correlation with the manifestations of quality and based on significance of these manifestations of quality and their contribution (regression) to overcoming of "underdevelopment whirlpools". The key goals of investments in innovations should development of export and increase of innovativeness of products of region's companies, for their increase by USD 1 billion and by 1 % decreases the depth of "underdevelopment whirlpools" by 51.56 years and 14.34 years, accordingly.

The offered management implications on provision of the balance of regional economy based on improving the practice of investing in innovations in the interests of quality include regulatory adoption of the goals of investing in innovations, connected to increase of quality, monitoring of effectiveness of investments in innovations, accounting of the achieved effectiveness for tax stimulation of private investments in fixed capital, and federal co-financing of innovations in regions of Russia.

The contribution of the performed research to the development of economic thought consists, firstly, in specifying the essence of quality of regional entrepreneurship's product as an economic category, determining its manifestations, and creating a methodological framework for systemic evaluation of quality in view of all its manifestations and differences in significance for the region. Secondly, in development of the concept of investing in the innovative development of region's economy with the help of a new treatment of investing in innovations not as a goal in itself but as a source of advantages for quality of regional entrepreneurship's

products. Thirdly, in substantiating the contribution of quality of regional entrepreneurship's products in overcoming of "underdevelopment whirlpools" and provision of the regional economy's balance, as well as substantiating the key role of investments in innovations in this process.

The practical significance of the obtained results consists in determining the top-priority manifestations of quality for provision of regional economy in modern Russia: volume of export and share of innovative products in the structure of regional entrepreneurship's products. The empirical value of the research consists in development of the applied recommendations (management implications) for provision of the balance of regional economy based on improvement of the practice of investing in innovations in the interests of quality.

The research was performed based on Russia's experience, which allows for the applied character of the research, but somehow limits the opportunities and perspectives of applying the authors' recommendations in other countries. The determined connection between investments in innovations and the manifestations of quality of entrepreneurship's products is universal on the whole, though it could differ in regional economies of different countries. Quality of entrepreneurship's products will of course be different in different countries' regions.

The developed scientific and methodological approach to the systemic evaluation of quality of regional entrepreneurship's products, which is based on T.L. Saaty's method, is universal – it could be applied for regions of all countries of the world. The determined influence of quality of regional entrepreneurship's products on the balance of regional economy could be very different depending on a country.

The perspectives and management implications for provision of the balance of regional economy based on improvement of

the practice of investing in innovations in the interests of quality are universal on the whole, except for accounting of the federal structure of the state and the emphasis on export and innovativeness as the key manifestations of quality that are specific for

Russia. The perspectives of further scientific studies are connected to approbation of the authors' scientific and methodological developments and verification of the obtained conclusions by the example of other countries.

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