



STUDYING PECULIARITIES OF INVESTING IN ALTERNATIVE ENERGY: VENTURE FINANCING AND THE FUEL AND ENERGY COMPLEX

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ABSTRACT

The article is devoted to studying peculiarities of venture investment in the fuel and energy complex as a whole, and in projects of alternative energy, in particular. This article analyzes the statistical data of venture investments in renewable energy sources, considers the operation of venture funds in the energy sector, identifies problems, and suggests ways to solve the problems of venture investment in the fuel and energy sector.

Conclusions

The following fundamental conclusions have been made when writing the article:

- The global energy development, as well as the development of energy sectors of national states are determined by a set of aspects, the most important of which being the innovation and technological aspect that defines local and global changes,*
- Over a rather long period of time, in a new energy civilization the consumption of the primary fossil energy resources (mainly, oil and gas) will decrease and the*

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consumption of the energy resources obtained from renewable energy sources will increase. However, the latter require large venture financing.

Key words: alternative energy, fuel and energy complex, venture capital, business angels, startups.

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1. INTRODUCTION

Over the recent years, especially against the current geopolitical transformations, special attention has been paid not only to searching for new energy sources and the formation of a new energy supply system to meet the needs of the society and the economy, but also to developing traditional resource-mining and resource processing industries. The most urgent issues are related to venture financing. According to the global experience, the institute of venture investments is essential in enhancing innovation processes and accelerating structural transformations of the economy, and creates favorable terms and conditions for the implementation of promising high-tech projects.

According to the draft of the Energy Strategy of Russia until 2035, one of the tools for improving the public administration system in the area of energy conservation and energy efficiency is private venture funds [1]. At the same time, in Russia business angels prefer investments in information and communication technologies: software, the Internet, telecommunications, television and radio channels. The oil and gas industry is not a priority.

2. METHODS

This article had used the system analytical methodical approach that allowed identifying the main regularities of forming and changing the energy sector of the global and Russian economy. The article had also used the macroeconomic analysis that allowed making a brief review of the state and problems of the current development of the Russian energy sector. The article pays special attention to the practical methodical aspect of applying the results of the energy development, primarily in the context of using venture financing.

3. THE ESSENCE OF THE VENTURE INVESTMENT CONCEPT

Venture financing involves investing funds of large companies, banks, and the state in a new or developing business. That is why such investing is associated with high risks of losing the investor's capital, and in case of success, a high profit is expected. Usually, the investor earns profit from selling their share in the business. Venture investment is considered in the long term because it may take several years to develop a business [2].

Table 1 shows the peculiarities of venture investment as compared to traditional types of investment.

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Table 1 Comparative Characteristics of Venture and Traditional Investment

Items to compare	Venture investments	Traditional investments
Market distribution	Venture investor shares risks with company owners	Traditional investor has priority in making profit and returning funds in case of bankruptcy to owners
Enterprises – recipients of investments	Small high-tech companies that start a business	Companies that have already got enough capital to cover potential losses, and successful experience in the market
Enterprise selection criteria	Potential growth potential	High yield
Functions of the investor	Provision of capital, advisory assistance in management, the use of investor's relations in the markets of supply, finance, marketing, sales	Provision of capital
Providing collateral	Without collateral	Collateral is provided
Making a profit	Selling shares of an enterprise after their value has increased	Fixed interest on invested funds or on the implementation of an investment project

^aSource: compiled by the authors by using the data in [3]

Venture financing is a hybrid form that provides innovative companies with the required investments. At the same time, this form is a combination of the most efficient elements of both capital markets and banks functioning. Venture financing makes it possible to create and support the company development. At a certain stage, the venture fund takes part in the issue of shares in order to promote the company on the stock exchange for profit. Fig. 1 shows the scheme of interaction among the subjects of the venture capital.

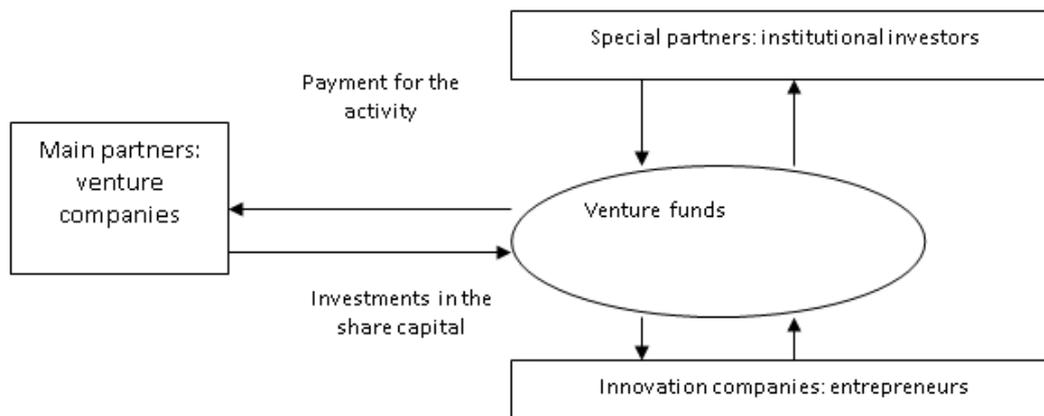


Figure. 1. Scheme of Venture Capital Subjects' Interaction

^aSource: [4]

It is necessary to note that the life cycle of investments in the venture business is 5 – 7 years, and this period is quite long for a national investor. Within the specified time frame, the organization must achieve such indicators that could allow venture investors to complete their

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role in the company development stage and make a profit. At the same time, they can sell their shares either on the market or to the company's manager.

Venture funds can act as a venture investor. A venture fund is an investment fund focused on the work with innovative enterprises and projects. The objects of such funds' investments are venture companies. The stock capital is formed at the expense of private sponsors. The investor authorizes the fund to manage their money. Management companies are professionally engaged in venture investment [5].

The main Russian venture fund is the Russian Venture Company (RVC). RVC is a state development institute, one of the key instruments of the state in organizing the national innovation system. The main purpose of its activity is to create and promote a venture capital financing system in Russia.

4. PECULIARITIES OF VENTURE CAPITAL FINANCING IN FEC

The fuel and energy complex (FEC) of Russia includes the companies engaged in the extraction of energy resources, their conversion into energy, transportation and distribution of energy and energy carriers. It includes facilities for oil and gas production, oil refining, transportation and distribution systems for gas, oil and refined products, various types of power plants, transmission and distribution networks for heat and electricity.

Performing their activities, the Russian TEC companies face the following important problems: reduction of geological exploration; depreciation of fixed production assets with low rates of commissioning new capacities; use of outdated equipment and technologies for the extraction of mineral resources and raw materials; recycling byproducts of resource extraction instead of their productive use; lack of modern energy-saving technologies; outdated infrastructure; and low investment attractiveness of industries [6].

In the oil and gas industry, the seed fund created by RVC and North Energy Ventures is the most famous one. The assets to be managed are valued at RUB 1 billion. It was formed in February 2015 and is focused on investing in projects related to energy efficiency, new coatings and materials, and next generation technologies in the oil and gas industry.

Almost all major oil and gas companies allot venture investments in separate corporate structures – specialized funds: Chevron Technology Ventures, Shell Technology Ventures, Total Energy Ventures, BP Ventures, and Saudi Aramco Energy Ventures.

Russian companies have not got such expertise yet. Venture investments are made either by a separate department of the head office or at the stream level. However, a venture fund as a structure separated from the company is considered to be more efficient in the economy because it can make decisions quickly, regardless of a particular stream's interests, etc.

In Moscow North Energy Ventures and the Gubkin Russian State University of Oil and Gas (NRU) organized the Gubkin Innovation Booster, an accelerator for oil and gas startups. In the Russian market, they constitute the main share in the total investment volume – 70 % in 2017. In the national oil and gas sector digital technologies are greatly demanded by them (drilling assistance, data interpretation, etc.). The sanctions have expanded the potential market niche by replacing foreign software for such products. For example, in 2016, Geoscience Technologies, the Russian company, raised more than \$1 million from the AYR fund [7].

Private equity funds are important in the development of technologies at a later stage. They provide new companies with funds for business expansion. In Russia, the state Russian Private Equity Fund (RPEF) is an undoubted leader in this segment. It accounted for 58 % of the total investment in 2017. The oil and gas industry also has its traditionally active funds. Middle East investors show their keen interest as well [7].

Currently, there is a G100k competition of technological projects in the oil and gas industry, initiated by the Russian State University of Oil and Gas, together with such venture funds as North Energy Ventures and Phystech Ventures. For two years, G100k has become a federal platform, where private investors can find industrial technologies that meet their professional interests and competencies. Since 2018, G100k has been operating as a permanent investment club [8].

According to the results for 2016 – 2017, the following projects became winners of the All-Russian competition of high-tech projects in the oil and gas industry:

1. Technology to reduce the capital intensity of constructing multilateral wells from ADL Completions.

2. Integrated telemetry systems of a new generation for tracking horizontal drilling.

Based on the G100k results, the team of the first project attracted venture capital investments from the North Energy Ventures fund in the amount \$100,000. Pilot projects were founded with Gazprom Neft, Gulf energy (Oman), KOS (Kuwait). A commercial contract with Zarubezhneft (Zapadno-Khosedayuskoe oil field) was successfully completed.

According to the G100k results, the second project attracted venture capital investments from the funds of North Energy Ventures and Phystech Ventures in the amount of \$200,000. Investments will allow the team to create a new product that will make it possible to increase the company's revenue four times in 2018.

5. ANALYZING VENTURE INVESTMENTS IN FEC

The analysis of the global practice of venture investment shows that venture capital and private investments in renewable energy sources decreased one third in 2017 down to \$1.8 billion, which was only one sixth of the peak of 2008 that had exceeded \$10 billion. Investments in these classes of assets continue to fall as the sector grows, and research and development in the area of wind and solar energy are more and more often carried out by large producers [9]. Investments in the capital of expanding direct investments fell down by 55 % down to \$780 million, and the venture capital at the early stage decreased by 18 % down to \$511 million, but the venture capital at the late stage increased by 43 % up to \$502 million.

The main reasons for the active investment in the alternative energy development include the following:

The growth of prices for traditional types of energy resources, which is caused by the limitation of natural resources and artificially limited production,

Instability in the fuel and energy market,

The exhaustive nature of nonrenewable energy resources,

The desire to improve the energy security of the country as a component of the economic security,

The creation of new jobs,

Reducing the level of dependence on the supplying country by replacing traditional types of fuel, most of which are imported to alternative sources,

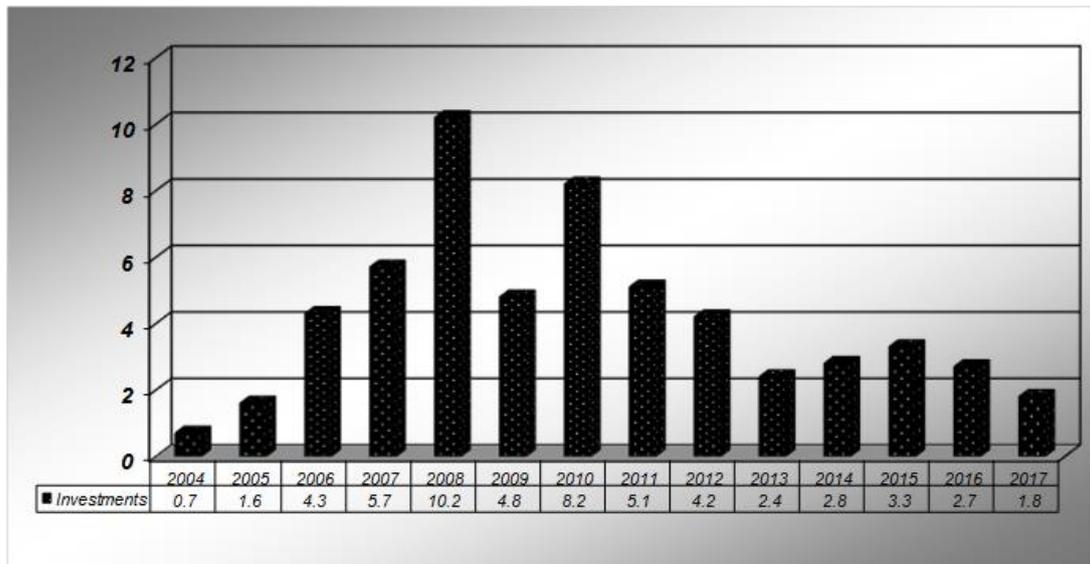
The negative effects of fluctuations in the market price of gas and oil,

The rapid growth of the market that has a high level of profitability, and

Improving the environmental component, namely reducing carbon dioxide emissions.

While the venture capital at early stages declined as a whole, considerable success was achieved at some individual stages.

Investments in renewable energy sources continued their long-term decline in 2017 (Fig. 2).



Source: compiled by the authors by using the data in [9]

Figure. 2. Investments in Renewable Energy Sources in 2004 – 2017, \$ billion

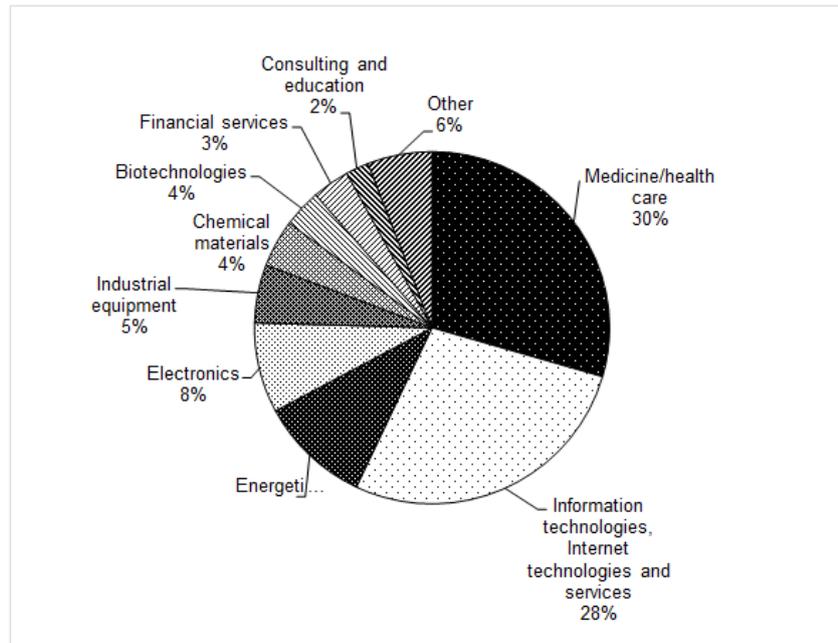
The total volume of investments decreased down to the sixth part of the peak of 2008, and the expansion of private capital, in particular, – up to the ninth part. Both early and late venture investments decreased to a quarter of their record maximums, although venture capital at the late stage managed to increase by 43 % from even lower figures in 2017.

The main reason is the increased maturity of the renewable energy sources sector. The wind and solar energy industries are currently such huge global industries that barriers to enter are getting higher.

The competition for funding can be another reason. The decrease in the investments in the venture capital/private equity during 2017 coincided with a fivefold increase in repurchasing of the private equity up to \$11.2 billion because some public companies were bought by private investors. That is why it may happen that some investors' capital was redirected to a strong acquisition market. Over the years since 2008, the expansion of private capital and investments in the redemption of private capital had most often moved in opposite directions, although the correlation was weak [9].

In 2007 – 2017 the energy sector obtained 10 % of the investments of RVC JSC, the Russian Venture Capital company (Fig. 3).

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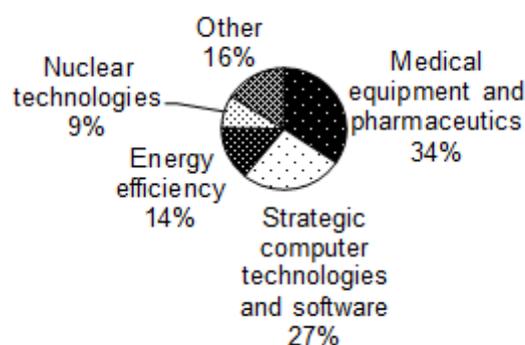


^aSource: compiled by the authors by using the data in [10]

Figure 3. Allocation of the Investments Made by the Funds Involving the Capital of RVC JSC in the Sectors of Economy for 2007 – 2017, %

Among the sectors, the investments in solar energy decreased by 38 % down to \$1.2 billion, but they still accounted for two thirds of all investments in venture capital/private equity, while the investments in wind energy decreased by 12 % down to \$433 million and made up almost a quarter of the share. Biofuel decreased by 22 % down to \$151 million and provided only 8 % of the total volume.

The energy efficiency area was one of the top priority directions of modernization and technological development of the Russian economy for 2007 – 2017. It accounted for 14 % of the investments made by RVC JSC (Fig. 4).



Source: compiled by the authors by using the data in [10]

Figure 4. Allocation of Investments of RVC JSC in the Priority Areas Related to the Modernization and Technological Development of the Russian Economy for 2007 – 2017 (Calculated from the Volume of Approved Investments), %

Startups in the area of renewable energy sources (RES) were financed in 2018. For example, CarbonLab raised RUB 300 thous. to develop an anti-icing system for the northern version of

wind turbines. The project of the HitLab company that works at hydrogen sources of energy for unmanned aerial vehicles was supported [11].

The state program on supporting RES is prolonged until 2035. The Ministry of Industry and Trade expects to achieve 100 % localization of producing solar and 90 % of wind power plants. The entire set of support measures will be developed in 2019. It is assumed that investors will be partially compensated for the R&D costs and certification for entering foreign markets, as well as be assisted in organizing the production, sale and post-sale service of products [11].

In June 2018, the ROSATOM state corporation announced the creation of a venture capital fund aimed at developing new and promising areas. The fund will focus on the development of new business areas related to promising sectors of the Russian and global economy. The key areas of investment will include artificial intelligence and other digital solutions in industry and service applications, renewable and “smart” energy, 3D printing and new materials, systems of developing smart and energy efficient cities.

In the long term, sustainable venture investments in energy startups will depend on the ability of venture capitalists to find efficient solutions to problems on venture investment.

After analyzing the regulatory framework and the main trends of venture investment in Russia as compared to the foreign experience, it is necessary to identify the main problems that do not allow to activate risk investment in Russia (Fig. 5).

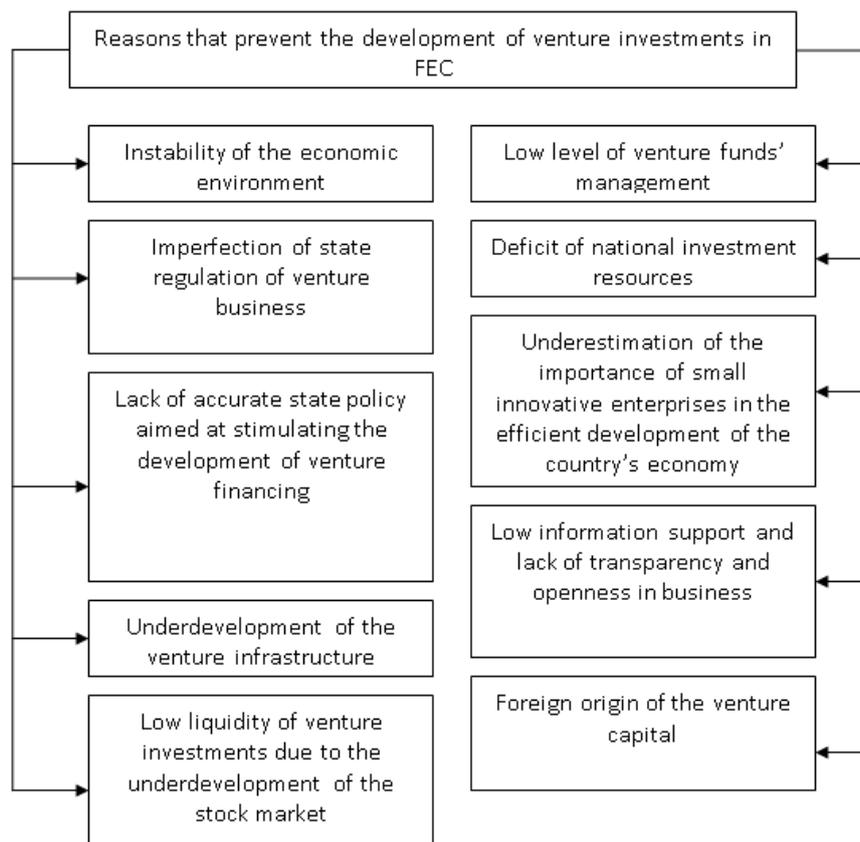


Figure. 5. Reasons that Prevent the Development of Venture Investing in Russia

The problem is related, firstly, to the lack of a mechanism for attracting investments and, secondly, to the non-availability of attractive terms and conditions for the venture capital functioning. Despite the adopted laws, in particular, “On Science and State Scientific and Technical Policy” [12], an optimal national source of financing and methods to support new high-risk enterprises have not been found.

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The low level of information transparency of the intellectual property market is a serious problem. Often there is no list of the current innovative developments and patents, which creates difficulties in searching for really worth projects.

The insufficient financial support for innovators at the early stages of projects, as well as the lack of a wide range of mechanisms to attract financing to these projects also prevent from the development of the venture industry in the Russian Federation. This is also due to the lack of services and infrastructure for the development of venture investments.

In general, the Russian Federation does not have the required well-developed legislative system for venture financing. The lack of a special legislative act regulating venture financing and defining basic concepts and characteristics of this activity affects the efficiency of legal regulation of venture activities, which affects high-risk innovative projects [13].

To activate the work of venture funds in Russia, it is necessary to develop a comprehensive approach that would cover the legislative area, macroeconomic regulation, and institutional development. By developing these processes both nationally and internationally, Russia will be able to achieve its most important goals: to develop the innovation environment to the standards that correspond to the global level, and to improve the competitiveness of the Russian economy by entering the world high-tech markets [14, 15].

6. CONCLUSION

Venture investment is a risky activity when new goods, technologies, services, results of scientific achievements, technical innovations, etc. are created and introduced into production.

Innovative development in the FEC is an integral component of success in this area. At the same time, the state bears a great responsibility. It must develop an efficient mechanism of legal regulation. It is necessary to form a unified state energy policy that will be based on the global innovative model of restructuring the energy market and a clear determination of responsibility for noncompliance with the energy strategy. To do this, it is necessary to create an efficient mechanism for the legal regulation of the introduction of technologies in the area of renewable energy, to build an innovative infrastructure by developing smart networks, and to stimulate investment activity by increasing the demand for energy innovations and creating favorable terms and conditions for the cooperation between the state and private investors.

The analysis of global trends shows a decline in investments in alternative energy, which is substantiated by the growth of barriers related to the entry of enterprises working in this industry into the market. The venture investments in the energy sector of Russia account for about 10 % of all venture investments. Now measures on the state support for venture investments in alternative energy are made.

At the same time, according to the analysis, the venture investments in alternative energy come with a number of prominent problems. The main problem of developing the venture investment system in the Russian Federation is the absence of a full-fledged regulatory framework that regulates the venture industry. Besides, the problems of developing business venture investments in the Russian Federation include the instability of the economic environment, the lack of clear state policy aimed at stimulating the development of venture financing, the underdevelopment of venture infrastructure, the low liquidity of venture investments due to the underdevelopment of the stock market, the low level of venture funds' management, the lack of national investment resources, poor information support and lack of transparency and openness in business, underestimation of the importance of small innovative enterprises in the efficient development of the national economy, as well as the foreign origin of the venture capital.

It necessitates the formation of a number of government initiatives:

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– Firstly, the creation of a legal basis for the operation of venture funds as institutions that have “long money”, as well as the possibility of the participation of pension funds and insurance companies in the implementation of venture investments, subject to the requirements of ensuring the required level of profitability and minimizing risk,

– Secondly, the organization of legal regulation of accounting required to correctly reflect the financial position of enterprises in financial statements, and

– Thirdly, it is necessary to develop unified methods of forecasting the impact of innovations for most experts, as well as methods of state support for studying innovative projects and developing consulting services for small enterprises in the area of alternative energy.

The most important points of successful attraction of venture investments at this stage definitely include state support, which, above all, comprises further formation and improvement of the legislative and regulatory framework aimed at securing scientific and technical, innovation and venture activity in Russia. In addition, it is necessary to solve the legal problems of protecting intellectual property, of creation and further support of incentives for the development of venture business in the state order system, the development of efficient strategies of state policy in the area of venture business, which should be a part of a single concept for the development of innovation and investment activity in Russia.

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