

Innovative Mechanisms of Investing in the Development of the Regional Knowledge Economy*

Konstantin Getmantsev

Department of Organization and Planning of Local
Development
Kuban State University
Krasnodar, Russia
E-mail: kot34@mail.ru

Vladimir Ermolenko

Department of General, Strategic and Information
Management and Business Processes
Kuban State University
Krasnodar, Russia

Darya Lanskaya

Department of General, Strategic and Information
Management and Business Processes
Kuban State University
Krasnodar, Russia

Boris Pedanov

Department of State and Municipal Administration
Kuban State University
Krasnodar, Russia

Abstract—The article discusses the ways of solving the ongoing scientific and practical problem associated with purposeful financing of a strategizing process conducive to the development of “smart” economy based on designing, by means of financial engineering, of financial infrastructure, new financial institutions, financial technologies and processes. There has been suggested a methodology of forming a range of instruments for financing innovations in the course of strategizing the development of a region based on configuring and diversifying direct and indirect sources, as well as non-trivial financial instruments.

Keywords—*venture financing; derivatives; covenant; project financing; strategic directions for a region’s development; strategizing; “smart” economy; financial institutions; financial infrastructure; financial technologies and processes; financial engineering; knowledge economy*

I. INTRODUCTION

The development of Russian regions in the long term has become an area of focused attention and broad approach in studying problems related to new industrialization and reindustrialization.

The implementation of the development strategy specified for Russian regions is associated with the need for investments not only in traditional sectors of economy (reindustrialization), but also in the “smart” economy or knowledge economy, the evolution of which takes place in the framework of the sixth technological mode (new industrialization).

The substantive content of work on implementation of the development strategy specified for Krasnodar Territory is represented by innovative and investment-related activities carried out by the regional authorities and administrative

*Fund: The reported study was funded by RFBR according to the research project No. 18-010-00220

bodies. In this regard, the institutional design and financial engineering of instruments in implementing the strategy are highly important.

Joseph Schumpeter wrote that the financial mechanism of innovation activity is fundamentally different from the financial mechanism of economic activity both in terms of purposes, and in terms of structure of instruments. [1]

Solving the innovation and investment-related problems without accumulating resource supports is impossible under the conditions of shrinkage of the investment market and development of innovations. [1] [2] [3] [4] The need for financial innovations, for building the financial infrastructure, new financial institutions, financial technologies and processes for the investment support of strategizing process specified for the regional economy has risen and now is a pressing challenge of financial engineering. [5] [6] [7] [8]

Functioning of the financial sphere under the current conditions is determined by the necessity for continued search of balance between three constituent parts of investment parameters concerning any kind of assets: riskiness, profitability and liquidity.

The present flow of investments in the economy of Krasnodar Territory does not cover the needs for these investments. The innovation activity of the domestic economic agents can be characterized as unstable and fragmentary one and the main trend of the said activity is fading of innovative process. The sluggish behavior of the entrepreneurial sector in the area of innovations is continuing and it is not commensurate with the trend towards redistribution of property in its favor.

The purpose of the article is to explain the elements of theory and methodology of financial engineering, as well as their use for developing the flexible range of financial

instruments for strategizing of the “smart” economy of a region, as well as transferring the risks for a long-term support of the innovative development targeted to prioritized national projects.

II. ENGINEERING THE INVESTMENT MECHANISMS TO ALLOCATE FINANCIAL RESOURCES FOR INNOVATIVE GROWTH AND DEVELOPMENT

The traditional financial instruments for improving the effectiveness of financial activities against the background of instability of the financial market do not fully provide for the fulfillment of the requirements concerning profitability and risk mitigation, which constitutes the need for more effective instruments, products and technologies.

Concentration of efforts in the innovation policy and the practice of financial stimulation of activity performed by economic agents goes along the following strategic lines:

- the variability of tax regimes and ensuring the comprehensive solution of a problem of combining motivation possessed by innovatively-active agents and stimulation of the agents who show sluggishness when it comes to innovations;
- the development and adoption of instruments for accelerated depreciation of fixed assets (the equipment that outlives its usefulness quickly) involved in the innovation research process;
- the adoption of legislation on innovations that regulates the mechanisms ensuring the active growth of economy in accordance with the priority lines of development. [9] [10]

In foreign countries, when it comes to stimulating innovation activity, the direct methods on the part of the government (such as budgetary financing, subsidizing interest rates, the state guarantees and others) are less and less frequently used, while giving place to indirect methods. In a number of countries, the withdrawal of the government from business in the investment area is expressed as the transition from direct methods of financing innovations to indirect ones. In European countries with the low level of budgetary funding and without the interference of the state employing indirect methods of stimulating innovation activity is supplemented by augmentation of instruments dealing with variability of tax regimes. At the same time, the state does not completely withdraw from the innovation area. In Europe there operates the Lisbon investment strategy, in accordance with which 3% of budgets in a number of countries are allocated to R&D. [11]

The historically-formed stereotypes in governing give priority to employing the methods and instruments that correspond to institutional X and Y matrices and, according to S.G. Kirdina, provide orientation either towards stimulating of motivational mechanisms for growth of innovation activity due to accumulation and redistribution of financial flows, or restricting of motivation for economic agents' activity. [12] In practice, the evolution of their use

leads to their productive configuring. And thus, various ranges of investment instruments are being formed.

According to International Financial Reporting Standards (IFRS-32), “Financial instrument is any contract that gives rise to both a financial asset of one entity and a financial liability or equity instrument of another entity.” [13]

The experience of stimulating innovation activity in the frameworks of American, European, Japanese and Chinese models differs by principled approaches. [11]

All financial instruments are divided into conservative, moderate and aggressive ones. Configuring (combining) and diversifying all types of financial instruments in the same line for a specific project allows for ensuring security, payback and rapid capital growth in the short and long term, as well as getting profit. [6] [7] [14] [15] The financial instruments are subject to the following requirements: profitability, reliability and liquidity. But not all financial instruments are at once profitable and reliable, and liquid. Practice shows that it is difficult to find a financial instrument that combines the features ensuring the conformity to all of the requirements. Therefore, diversification and combination procedures enable designing a range of financial instruments that meet the imposed requirements, as well as reducing the risks and increasing profitability.

In the course of the present study preference is given to the special sources and instruments that are the products of financial engineering.

A.A. Ayupov defines financial engineering as “designing, development and implementation of innovative financial instruments and processes, as well as the creative search for new approaches to solving problems in the area of finance.” [5]

Intense innovative activity generates a request for practice and gives the impetus for financial engineering to create flexible and adaptive range of financial instruments based on operations related to combining and decomposing derivatives. [6] [8] [16]

The first group of derived instruments comprises the ones that have already become traditional: swaps, futures, forwards. Based thereon the innovative financial products of the derivative market have been created: swaptions, credit derivatives, innovative leasing options, etc. [8]

The second group consists of the financial market instruments that have been created on the basis of their combination (configuring) with the purpose of increasing profitability, attraction of investment resources, insuring against investment risks, credit and financial support of innovative activities, etc., for example, innovative leasing, venture financing and others.

Among the traditional approaches for reducing various kinds of risks provided for by law are liquidated damages, surety bond, bank guarantee, pledge, bill of exchange and other ways.

However, under the conditions of conducting innovative activities that entail special risks the ways and methods of reducing significant risks are needed.

E.V. Sysoeva views new financial instruments as “combinations of such elements as profitability, risk, urgency and transferability, etc.” [17]

I.A. Sultanov examines a manoeuvre involving the tax base associated with the fact that an innovative project acquires an independent legal status of an economic entity with its admission to the simplified tax system. [18]

In recent years, there has been an active development of a new direction for attracting financial resources in order to create business projects in the framework of so called non-trivial methods, in particular – crowdlending, crowdinvesting and others, based on operation of the Internet platforms, with the aid of which the companies at the initial stages of their development can attract the necessary resources. [19] [20]

E.A. Fiyaksel reviewed the essence and the concept of syndicated transactions, performed a comparative analysis of crowdinvesting and institutions for syndicating business angel capital, savings and loan cooperation, made comparisons between the market of venture deals and crowdinvesting and the data on crowdinvesting platforms. [21] [22]

StartTrack, Kickstarter and Indiegogo investment platforms are a relatively new instrument, with the help of which the business of innovation can receive investments by-passing investment funds and banks.

The mechanisms of StartTrack platform have a full-function nature and differ from those of Kickstarter and Indiegogo platforms. StartTrack implements three mechanisms for attracting private financing into business: investments under a loan agreement (crowdinvesting) and investments under a convertible loan agreement. [20]

In 2015 Russian startups attracted 115.5 million rubles at StartTrack crowdinvesting marketplace. 512 investors were registered there and 576 applications came from the startups seeking funding.

Kickstarter and Indiegogo platforms allow only for realizing a crowdfunding technology, i.e. of attracting voluntary donations or contributions (private finance) in exchange for the intellectual activity results that have grown to be innovations achieved by a small innovation company (SIC). Outsourcing of financial activities, crowdfunding and crowdinvesting should become more accessible by SIC.

I.A. Darushin, when considering “the securitization as a procedure for reselling of financial assets,” is persuaded that “it is being carried out by an investment institution that releases financial instruments, sells them to investors and transfers the proceeds from such sale to the seller in exchange for transfer of assets or the monetary flows generated by them.” [11] It appears to him that the main purpose of securitization consists in augmenting the operating profit of the main parties to the transaction (investment institutions) and improvement in the capital turnover.

One of the new forms of stimulating investment activity on the part of a fund is the innovation voucher – a certificate providing its holder (small and medium-sized innovative businesses) with a possibility of receiving scientific or consulting support (access to the research resources) at a scientific center or a university with the purpose of implementing an innovative investment project. [23] Thus, the fund is engaged in funding the third-party scientific organizations or consultants for conduction of the whole range of scientific researches. The cost of works is covered by a financial institution (a fund) – by a voucher issuer (“emitter”). [23]

Special prominence is given to the projects based on the National Technological Initiative (NTI) in Russia. The Russian Government has institutionalized new instruments of financial support for projects by including them in “roadmaps” enlarging the number of participants in the NTI and aimed at the development of new markets for high-technology products. Nearly 10 billion rubles was allocated on implementation of the NTI.

Financial relations follow the innovation practices and are fulfilled at the higher level of risks and opportunities.

With high expenses incurred, the participants in the innovative process try to find better ways to create innovative financial instruments. [8] Among the instruments of financial engineering there are derivatives allowing for the transfer of credit risk without actual transfer of asset.

N.L. Poltoradneva came to the conclusion that the demand for financial engineering services “is actually characterized by a cyclic undulating motion” and “the area of the practical implementation of constructing new financial products constantly intersects the factors of its proper development, while generating new stimuli for creative work.” [8] In her view, “financial engineering is directed, firstly, at creating an optimal level of risk – it is expressed in managing the enterprises’ financial flows; secondly, at speculation and arbitration – it is expressed in employing the strategies involving derived financial instruments; thirdly, at using the market imperfections for making profit.” [8]

Practice shows the multidirectionality of innovative and investment-related processes. These processes are poorly coordinated and synchronized. It would be ideal if they were complementary and harmonious when solving current problems. [15]

A number of regions, while having a competitive advantage represented by investment attractiveness and a full-fledged credit-and-finance infrastructure, is simultaneously very dependent on the external financial institutions given the insufficient quality of internal system for finance management and investment raising. This contradiction can be resolved subject to systematic work on the refinement of the credit-and-finance infrastructure of a region. The relatively easiest approaches can be:

- allowing a part of profits to flow from sectors of the regional service economy to the area, for example, of “smart” economy (through the replacement of natural resource rent with intellectual rent). That is why the

pressing issue at the regional level becomes the harmonization of the intersectoral reproduction proportions with the purpose of finding an optimal combination of reproduction factors and searching for the parameters for development of the pluralistic economy in the light of the theory of technological modes;

- the formation of a dedicated budget for development as part of the regional budget (its expenditure section).

P. Pottier points out that “the territories enabling transport communication situated between the growth poles receive additional growth impulses due to the increased freight traffic, spreading innovations and developing the infrastructure.” [24] This statement is important for the regions, which, while having an advantageous geostrategic situation, take on the role of a transportation hub, poles of growth and development of a healthy human capital.

Growing complexity of economic relations in the pluralistic economy and the implementation of derivatives promote the search for new options and opportunities for investment of funds and risk management. The infrastructure of the region’s and the university’s innovation ecosystem is facing the tasks of forming and managing the derived financial instruments, as well as of composing a portfolio of derivatives, which is ready to be tested and widely implemented in the practice of innovative activity. And it calls for financial engineering. Thus, I.A. Blank states that financial engineering is a process of the purposeful designing of new financial instruments or new schemes for realization of financial transactions. [25]

Financial engineering is becoming more and more topical in the context of increasing globalization and financial instability. This compels financial analysts, on the one side, to build new and increasingly complex financial instruments and, on the other side, to look for better risk management tools.

The difficulty in solving this task is associated with the necessity for studying the specific cases requiring a labor-intensive system-oriented factor analysis of structure, volume and level of profitability, riskiness and quantitative evaluation of the cash flows defining the realization of an organization’s innovation strategy.

Wide choice of innovation-funding sources and availability in the scientific community of detailed results of intellectual activity represent only the pre-requisites for the successful innovation-generating process. And the sufficient conditions are linked with organizational (managerial) and commercializing (marketing) as well as financial-and-economic mechanisms along with service support of the broad range of solutions related to innovative and investment-focused activity. Such solutions are superstrategic in substance. And they are connected with reproduction of the reproducible base on foot of the sixth-mode technologies. The economic space includes material and spiritual types of production, generation of energy and information: or the so called quatrefoil economic model. A special problem is constituted by ensuring the harmonization

of the common economic field, the constituent parts of which are built on the principles of a particular technological mode. The proportions between parts of the common economic field shaped from economic entities, which are grounded on the particular technological modes, are flexible and change themselves, while fixating a relatively established balance and some measure of harmony over a certain period of time.

In terms of evolution of economic relations and production basis, as well as that of production apparatus, the general development trend is connected with the increasing share of objects of economic activity based on upper technological modes.

The systematically-arranged innovation and investment-related activity implies:

- the great variety of objects and agents with special structure and substance of activities, the status, functions, goals, effectiveness criteria and mechanisms of which would be set out in a special innovation and investment code;
- capturing the economic and legal mechanisms for the establishment, upkeep and development of ties between their agents and objects of science and innovation systems;
- defining the field of relations between the objects and the agents, which would be recognized by society and the state and which would therefore be legitimate;
- setting the goals of interaction between the agents and the objects of science and innovation systems and determining how they relate to the effectiveness criteria of their activities;
- specifying the system of supporting measures to motivate the agents and the objects of science and innovation systems, as well as the range of stimulus measures that would drive them to activity for the sake of society.

D.V. Lanskaya considers that financial resources “do not directly appear as an element of the innovation-generating process, but can be converted into any other kind of resources”, for example, of immaterial nature. This idea corresponds to the J. Clark’s general acknowledgement of the possibility of replacing one production factor with the other, highlighting such factor, which prevails in the formation of effective capital combination. [15].

A.A. Ermolenko, when substantiating the necessity of generating fictitious capital for elaboration of investment proposal at various levels of economy, came to the conclusion that “the global financial crisis had demonstrated the kinds of destructive forces that are hidden in the artificial separation of the financial sector from the development of the real sector of economy: formation of the financial “bubbles” in the market; uncontrolled and unlimited debt accumulation by various economic entities; interest expressed by managers of credit organizations in releasing unbacked securities, etc. By multiplying the branches of

fictitious capital, we multiply the corresponding risks. The solution is in the strategy-oriented development planning, in designing special instruments for managing the interaction between the actual and the fictitious capitals.” [26]

Project financing and venture capital investments are widely used in worldwide practice.

The project investment is usually understood to be the type of organizing investments where the revenues obtained from implementation of a project are the sole source of settling the obligations.

In the area of innovations, where venture capital investments prevail, the effective instruments are put together from the range of instruments in combination with the risk mitigation methods. The innovative venture capital business allows for the possibility of failure of a funded project. [10] And the compensation for losses in such cases is possible at the expense of successful implementation of other projects. The project portfolio should be a success on the whole. If venture capital (risk capital) can be used for organizing the investment in the scientific activities at any of its stages, then the organizer of the venture capital investment cannot take such risk.

Venture capital (risk capital) is funds that are placed in a new enterprise in the form of debt obligations or ordinary shares. Such capital is not subject for registration for some years, because debt obligations (ordinary shares) cannot be sold until their release is not registered, i.e. for some years they do not have liquidity. Thus, venture capital investments are the risky capital that flows to the development of high-growth firms emerging in the process of implementing a commercially-promising entrepreneurial project. Venture capital is not guaranteed to provide an income calculated as a fixed percentage, as well as in the form of pledge or guarantees of its return to investor.

Venture capital financing is done in two main forms:

- By acquiring shares in new firms.
- Through extension of any kinds of credit, usually with the right of conversion into shares. Unlike other forms of investing, venture capital business differs in that financial resources are being put into venture capital business with no material security or guarantee;
- The investor’s mandatory equity interest in the authorized capital of a firm, i.e. the risk capital acts as equity contribution;
- Funds are provided over the long term.

Presently, around 30 nominal venture capital funds are operating in Russia and all of them are run by Western management companies and are involved in accumulating predominantly foreign capital. [27]

National venture capital fund: The resources of investment funds are derived from sums allotted by the organizations and enterprises conducting investment activities, funds provided by banks, insurance companies and

other financial institutions. The investment funds often fulfill the functions of a surety or guarantor of the obligations incumbent upon the innovative enterprises.

Foreign investments in technological projects in Russia are constituted by the international venture capital funds, the international investment organizations, foreign venture capital companies, foreign investment funds, foreign non-profit organizations and foreign business angels.

“Informal investors” or “business angels” invest their personal financial resources in new and growing small firms.

One major difference between venture capital companies and business angels consist in the fact that the former are handling someone else’s funds, whereas the latter invest their own funds.

Therefore, financial engineering proceeds from the possibility and the necessity of addressing two problems at once: the problem concerning the effectiveness of the instruments for managing investments and risks by combining the capabilities of various instruments and the problem of creating a flexible range of financial instruments.

The main sources of financing the investment activities in Russia are:

- budgetary funds used for financing fundamental researches, applied developments in priority areas and arrangement of production in order to fulfill governmental functions;
- extra-budgetary resources used for financing engineering developments, high-technology projects, mass production organizations;
- the enterprises’ own funds used for financing their R&D works and procurement of technologies;
- the resources of foreign investors and international financial organizations used for financing the international projects in scientific-and-technological sphere.

Emphasis should be placed on the following main points:

- the improvement of bank lending instruments;
- the elaboration and implementation at the region’s legislative level of a process of establishment of extra-budgetary facilities to ensure the innovative development by allocating a part of earnings from exporting oil, petroleum products and gas;
- using the administrative levers of regional authorities for attracting the funds of commercial organizations with the purposes of establishing regional and sectoral innovation funds, formation of a regional institution for using the resources of the depreciation fund;
- the elaboration of proposals for changing the taxation mechanism and the legislation providing for stimulation of investment activity;

- the activation of the regional leasing institution as being a financial instrument for stimulating the investment activity of economic agents.

The deficit of proprietary funds owned by enterprises in Russian Federation is not rectified by the inflow of private capital. A number of private capital agents show inertness and particular interests so that the optimal correlation between commercial and governmental interests is sometimes nowhere near there. Public and private capitals are not complementary in terms of their participation in the reproduction process (development process), i.e. they are not coordinated and their movement is contradictory and goes in different directions. The conditions under which the said capitals participate in the reproduction process are not only chaotic but also diffused and disorganized in character. Another peculiarity is the limited availability of material, immaterial and financial capitals that is pushing for graduality which contradicts the spirit of innovations (“innovations flying at the speed of light”). The innovation diffusion environment is a high-speed “motorway,” where one compound rule works: rapid response, flexible behavior, persistence and promptness in solving problems and tasks, out-of-the-box thinking and the ability to concentrate resources on the priority areas of development. From the viewpoint of organizing financial flows, the business needs to be further regulated. Outside the civilization framework, the business does not work to promote the development of a country.

The investment actions undertaken by the business should be governed within a specified legal field that provides orientations. It would be appropriate to adopt an innovation and investment code that would deal with legal regulation of investments in the domestic real high-technology sector in a coordinated manner and bring there the proportions of capitals and capital shares directed at the promising areas of development. The innovation and investment code could reflect the systematic measures, the most central of which could be:

- defining the volume of minimum investments that each legal entity allocates in a continuous mode, on a quarterly basis throughout the year and for the legal entities failing to provide for investment in the amount not less than minimum revenues to transfer the unused funds for investments in innovations to the regional innovation-and-investment fund;
- drawing up a national list of priority innovative areas for the development of the country and constituent entities of the Russian Federation for the coming year according to the global development trends, national and regional peculiarities;
- directing the resources of the regional innovation-and-investment fund, which accumulates the investments in innovations unused by economic agents, towards implementation of prioritized strategic projects defined by the region’s development strategy, according to the decision of the regional parliament;

- introducing the mandatory protected budget dedicated the region’s development into the budget expenditure classification;
- evaluation of the effective use of resources allocated for innovations to the territorial bodies of the State Tax Service of the Russian Federation and the Ministry of Science and Higher Education, and the constituent entities of the Russian Federation. A summary report should be annually submitted to the State Duma of the Russian Federation and to the regional parliament for adoption of decisions concerning the raised issues.

One of the new instruments are financial covenants – an agreement or a clause in the contract governing the financial relations between the parties (lender and borrower; issuers and investors; etc.) with the purpose of financial and credit risk-sharing by characterizing the financial situation through financial indicators. Consequently, it can be said that financial covenants are an obligation to maintain or not to maintain certain financial indicators at the specified level throughout the period of the agreement. In Russia, covenants are not legitimized by legal means and represent a non-traditional financial instrument due to the absence of corresponding institutional environment. Covenants still preserve their status as financial innovation. [8]

Among the types of financial covenants the investment covenants are not distinguished. L.N. Poltoradneva points out that there are different types of financial covenants and their composition is not homogeneous. This is due to the fact that each financial actor has its own viewpoint and pursues different interests when assessing the contractor’s financial situation.

The consequence of the large range of instruments is naturally a problem of choosing the most suitable portfolio of financial indicators in a particular case. The great variety thereof and the voluminous complexity of use have led to a straightforward solution to the diversity problem – by simplifying the variety at the expense of establishing a universal minimum of financial covenants comprising: liquidity and paying capacity, financial viability and risk of incurring losses. [8]

The future of the innovation business in Russia depends to a great extent on flexibility in applying an adequate configuration of financial market instruments including long-term measures to support innovative development with regard to prioritized national projects.

The logic underlying the evolution of innovative activities is that the dynamics in requirements of the participants therein produces increasingly complex and specific economic relations, which entails the need for diverse and complex financial innovations, which would satisfy them and allow for reallocation of risks, and ensure the liquidity of financial assets. At this point, it is pertinent to cite a well-known cybernetic law concerning the diversity: the diversity leads to an even greater diversity and to control such diversity the diverse instruments are needed.

B.A. Zapparov, while proceeding from the theory of institutional matrices proposed by S.G. Kirdina, came to the conclusion that “the predominance of market- and the state-coordinated basic economic institutions (in Russia, the state property institution has always had a greater significance than in other countries) defines in the final analysis the framework and the format for the functioning of the institution of innovations and the institution of finance, inasmuch as they constitute the compensatory mechanism in relation to the basic institutions belonging to the economic system of the state.” [27].

Creation of a flexible range of financial instruments, including long-term measures to support the innovative development with regard to prioritized national projects, is announced to be one of the most important tasks for the period until 2030. [7]

III. CONCLUSION

The financial instruments involved in the sphere of investments, as applicable to innovative activities, are subject to selection (working-out) in keeping with the proposed open classification according to the peculiarities of innovative programmes (projects).

It is expedient to develop and implement an atlas (i.e. mapping) of financial instruments presenting their field of application, conditions of contract (derivative), mechanisms for monitoring conditions while applying the instruments, consistency among different instruments and their other peculiarities.

The atlas of financial instruments is considered to be a step towards forming a range (a bank) of instruments for an innovative programme (project) to be applied during the implementation of a strategy for development of an economic entity.

Directions for future research consist in elaboration and substantiation of an integrated model of a regional extra-budgetary fund dedicated to innovations and investments including the range of mechanisms for accumulation of investment capital.

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