MODELLING OF CRITERIA FOR THE FEASIBILITY ASSESSMENT OF INTELLECTUAL PRODUCTS' POTENTIAL IN THE VENTURE FINANCING SYSTEM*

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Abstract

Objective of the research is to develop a logical modeling variant of criteria for the feasibility assessment of intellectual products` potential in the venture financing system. Research methodology is based on synthesis of institutional and new institutional economics theory, theories of innovations, uncertainty and risk, management of innovations.

Essential characteristics of venture financing are structured in the article, its treatment as an economic category is suggested. The structure of institutional field of venture financing (by the example of Russia) is elaborated with consideration of projected development and co evolution of formal and informal institutions as a favorable environment for drawing into economic turnover and commercialization of technological developments and projects. A logical model of institutional criteria for the assessment of intellectual products` potential feasibility in the system of venture financing is suggested.

Key words: *venture financing, intellectual products` potential, assessment criteria, institutional field.*

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1. Introduction

Building a national venture financing system is for many countries including Russia an objective necessity determined by specific features of innovation economy establishment in developed countries and the pressing demand for securing reproduction of national wealth on an intense basis.

In modern conditions up to 80% of GDP in developed economies is ensured due to innovations and high technologies, therefore all around the world investment into innovative developments including those financed by venture capital is one of the most profitable ways of capital placement.

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Introduction new products (services) into the market, ambition to become the leader in the chosen sphere, earning an excess profit distinguish innovative function of venture entrepreneurship as basis of a "new economy" (Schumpeter, 1982). Subject to further development of venture capital financing the most rapid growth of knowledge-intensive and high-technology sectors can be achieved (Romer, 1990, 1994; Thurow, 1999).

2. Venture capital financing as investment resource and system of social and economic relations

It should be noted that the most of existing venture financing treatments are primarily applied ones (Balaban, 1999; Dictionary of venture capital financing terms; Gulkin, 2001). In the venture capital study course, which was elaborated by EVCA together with RVCA, venture capital is regarded as a sort of direct investments into equity capital and implies investments at the stages of start-up, early growth or expansion of business.

Analysis of the European venture capital financing experience showed that in these countries there are almost no differences between the notions of venture capital and direct investments and both terms are often used as synonyms. Characteristic features of venture business in the USA are orientation towards investing into innovative firms, which realize advanced technologies in different branches of industry, and high rate of early stages firms among the recipients of investments. Therefore, in the USA the term "venture capital" is used for determining investment into companies at the early stages of development and investment into high-tech companies not listed on the stock exchange (Venture entrepreneurship training course EVCA-RVCA).

In accordance with the formulated problem to highlight theoretical and methodological background of this complex process following definition may be emphasized:

"*Venture capital is a specific resource which constitutes a unity of financial and human capital and therefore has the synergistic effect on business activity in economical systems through development of innovative and investment activity.*" (Folomyov and Noibert, 1999, p. 34).

Venture financing as an economic category reflects, in our opinion, the system of social and economic relations between the concerned agents regarding realization of intellectual products' potential, lowering of uncertainty and risk level, investment of funds into bringing these products to marketable state, development of innovative enterprise, mutually beneficial distribution of profits from realization of innovative products.

3. Development of venture financing theory based on the synthesis of theoretical and methodological insights

J. Schumpeter's (1982) theory of innovations should be mentioned without doubt as a significant theoretical background of venture financing. One of the most important conclusions of this theory is that the only way to receive fixed return and possibly excess profit for the leading entrepreneur is using continuous innovations which assume endogenous and permanent character in the system of innovative entrepreneurship.

Developments of representatives of institutional economic theory and new institutional economics, which use contract theory, transaction cost theory, economic theory of property rights in capacity of theoretical and methodological background, are justifiably considered systematically important for investigation of economic relationship at all stages of innovation process (Arrow, 1962; Knight, 2003; North, 1990).

However, while analyzing aforementioned theories and theoretical orientations as basic for development of the institutional theory of venture financing, one should, in our opinion, use

them in conjunction with theories of finance, risk, innovation management, marketing etc. Such research methodology is determined by contemporary realities of the venture capital financing process, integrated into a complex system of relations regarding bringing technologies to marketable state, their transfer, commercialization, as well as establishment of new companies and firms.

Within the framework of the innovation management theory special prominence should be given to theoretical and practical relevance of Henry Chesbrough`s "open innovation" concept (Chesbrough, 2007). Venture capital business executives participate in the innovation process in an open innovation community in cooperation with researchers, managers, marketing consultants, consumers, partners and competitors.

4. Endogenous determinants of solving intellectual products` potential feasibility assessment problem

Distinguishing feature of venture entrepreneurship from other types of business activity with inherent risk is higher grade of entrepreneurial risk and special methods of sharing risks between such participants of venture financing process as investor and entrepreneur. For example, in comparison with investments into free traded shares venture investments show less sound liquidity, greater extent of information asymmetry and higher investment risks (Akerlof, 1970; Hall, 2002).

Analysis of national and foreign experience of venture investment shows that specific feature of venture capital is financing developments and projects with higher risk grade. In the first place, the indicated feature appears in the aims and character of funds application within the innovation process. In the second place, there is high risk to lose contributed capital for a variety of reasons: unpredictability of creative process` result, without which no innovation could occur; possible mistake in the idea forming the basis of innovation project; difficulties of technical implementation of the project; unpredictable market reaction to a newly-designed product etc.

This high level of risk in the venture financing sphere is determined first of all by essential features of intellectual products of the sphere of science and technology stipulating unpredictability of economic return and receipt of income, complexity of rights differentiation when creating intellectual products as well as high level of uncertainty by realization and utilization of these products. Among these features the following ones are justifiably emphasized:

- Limitation of objectification and embodiment;
- Possible intangible character;
- High technological, scientific and technical level;
- Unpredictability and unobviousness of scientific discoveries and inventions;
- Quite high level of uncertainty, non-linearity of cost, terms and results of scientific research and development;
- "non-appropriatability", "inalienability", unexpendability in consumption etc. (Volkova, 2004).

Intellectual product is determined and analyzed as a complex and comprehensive product, as potential and real intellectual property items. Potential of intellectual products of scientific and technological sphere is interpreted and revealed as realized and unrealized capacities and opportunities of accumulation and productive utilization of intellectual products for satisfaction of the needs of the state, scientific community, education, business and other stakeholders (Volkova, 2004).

Complexity of commercialization and realization of intellectual products' potential consists also:

- in incorporation of a diverse range of relationships and rights of parties involved into creation, development and commercialization of intellectual products;
- in the diversity of their embodiment and performance, their metamorphoses. In many cases these products combine all or separate features of varieties of their embodiment: in tangible physical form, form of various rights and powers, services, know-how. Creation and commercialization of these products involves a broad range of conditions on macro, meso and micro level (Volkova, 2009).

Accordingly, realization of intellectual products' potential under appropriate circumstances may yield high return but at the same time is connected with high risks. Perception and realization of the marked and analyzed theoretical and methodological developments is, in our opinion, the basic valuation criterion of intellectual products' potential realization in the sphere of science and technology. Scientifically grounded utilization of these developments encourages the most complete implementation of intellectual products' potential in the process of drawing these products into economic turnover, commercialization, including in the form of high-technology products in-demand in the world market.

High level of uncertainty is especially indicative for venture capital financing at early stages of a scientific and technological project. Substantial level of uncertainty is connected also with absence of proper risk investment legislation system in Russia, including protection of venture investor's rights. For instance, in the USA fundamentals of legislation determining investor's rights and obligations have not been changed more than 40 years. Game rules are known to all participants of the venture business, there are guarantees that these rules won't change in the process of project implementation, besides, there are guarantees of keeping these rules by all parties.

5. Main worldwide trends in development of the venture financing institution

Venture business practice demonstrates that market is not a self-regulating thing-in-itself. State plays a significant role in the establishment of venture funds. Thus, in the USA state impact on development of venture financing is evidenced in the proactive policy of small innovative business support (in particular, the Small Business Innovation Development Act dated 1982, prescribing to the governmental authorities whose research and development cost make up not less than USD 100 million a year to reserve 1,25% of their research budget for provision subsidies and contracts to small firms), policy of the research and development centers` incentives stimulating elaboration of up-to-the-minute technology by small firms (SOLEV International Consortium data, 2011).

According to the investigations in the area of institutional theory and practice of venture financing, various national venture systems have their own specific institutional character in realization and accommodation of economic interests in the innovation activity sphere, sources of financing, specific national venture entrepreneurship models (Van der Burg, 2001; Andersson and Napier; Mani and Bartzokas, 2002; Dvorak *et al*, 1999; Bernoth *et al*, 2010). Development of venture financing in industrialized countries is built with consideration of institutional features of capital markets performance, innovations, securities, including national traditions and characteristic aspects of scientific and technological policy, national path of precedent development etc. In contrast to Russia, in these countries assessment criteria of intellectual products` potential realization are used with consideration of specific national features.

Performed analysis allowed us to come to the conclusion that during the starting phase of transition to market economy in Russia a venture financing institution was established by way of importation of separate elements of institutional venture business structure from developed countries. However, according to the statistical data and real practice, simple borrowing of ready infrastructure elements was not enough for appearance of a fully valid venture investments sector in our country and for implementation of available prospective innovation projects. Thus, taking into account the innovation projects pipeline available within the country, in fact only a few of them are implemented. Hence, for example, a share of high-technology products in the total volume of export from Russia in 2010 amounted to 9% (As a comparison, this figure in the USA in 2010 was equal to 20%, in Japan – 18%) - Statistical data of the World Bank.

Especially significant for Russia and series of countries is support of scientific and technological projects at initial stages since according to the RVCA data presented in table 1 the share of seed and start-up stages investments is decreasing steadily and amounted in 2010 to only 0,8% of the total volume of venture investments (RVCA data, 2010). As a comparison, in the USA seed stage investments made up 7% of the total venture investments amount in 2010 and 3% for 9 months of 2011 (NVCA report, 2011).

Table 1: Venture investments in Russia by project stage, 2007-2010 (RVCA data, 2010)

Stages	2007		2008		2009		2010	
	Investments volume, USD mil.	%	Investments volume, USD mln.	%	Investments volume, USD mln.	%	Investments volume, USD mln.	%
Seed and start-up	42,12	4,10	67,81	4,61	13,29	2,60	19,51	0,80
Early	66,18	6,50	93,95	6,38	110,46	21,7	131,78	5,30
Expansion	909,23	89,4	1310,65	89,01	314,15	61,9	2240,89	89,8
Restructuring	0	0	0	0	70,00	13,8	2,66	0,10
Mature stages	0	0	0	0	0	0	100,00	4,00
Total	1017,53	100	1472,41	100	507,9	100	2494,84	100

Venture support of projects at initial stages is essential because in Russia there is a break in the chain of "fundamental research – applied research – (engineering) developments – production" which prevents from securing effective transfer of scientific insights in the R&D sphere and bringing scientific and technological products to commercial use. Furthermore, fundamental science is financed insufficiently and the financing volume is inclined to reduce further (Volkova and Usoltsev, 2010).

As shown in table 1, overall across Russia after economic crisis of the end 2008th financing volume of innovation sphere significantly reduced in 2009 and amounted to 507, 9 million dollars in comparison to 1472 million dollars in 2008. In 2010 recovery of venture investments market took place and investment volume reached 2495 million dollars. For reference, venture investments volume in the USA in 2010 amounted to 23 263 million dollars which exceeds the level of Russia by more than 9 times (NVCA report, 2011).

Therefore, arrangement of conditions for financial support of scientific and technological projects at initial stages is another principal institutional criterion for the assessment of realization of intellectual products` potential.

Import of market institutions from developed countries including venture capital financing institution is inevitably connected with high transaction expenses. Reduction of this cost within the venture investments sector is possible subject to further development in Russia of market economy and free competition intrinsic to it. Development of venture financing requires also effective legal and economic environment, change of informal elements of institutional structure, e.g. development of business relations standards, overcoming of institutional traps in Russian economy (such as shadow economy, corruption, administrative burden, non-payments etc.).

For example in Russia mentality of native venture capitalists characterized by tendency to invest into mature stages of innovation project when the risks are significantly lower acts as institutional constraint or barrier for performance of venture financing. Aiming to minimize risks, venture investors are focused on investing large amounts (above USD 500 000), giving priority to companies acknowledged in the market. Attracting of small (from 10 to 50 thousand dollars) and average amounts (from 50 to 500 thousand dollars) for young innovative companies which have not yet a track record is a problem of great concern (Alekhina, 2009).

At the present time foreign capital funds prevail in the structure of venture funds operating in Russia. Among big investors Baring Vostok, Delta Private Equity Partners, Eagle Venture Partners, ЕБРР, Berkeley Capital Partners can be named. Russian venture capital is presented first of all by JSC "Russian Venture Company". Institute of business angels which are traditionally occupying a niche of initial investments into prospective scientific and technological projects in the whole world is only starting to form in Russia.

At the current stage, as international practice shows, common understanding appears that while elaborating scope of government regulation measures directed at creation of new institutions institutional factors of economy development should be considered which means that it is necessary to change both formal and informal norms (EVCA data, 2011; Dvorak *et al*., 1999).

Efforts of entrepreneurs, business and government to create a competitive national model of venture entrepreneurship in many countries are not systemic and purposeful. Among the reasons are insufficient depth and integrity of theoretical and methodological developments reflecting specific institutional features of various national venture capital generation and utilization mechanisms, lack of a clear state innovation and investment strategy, insufficient elaboration of a technology transfer and intellectual property legal framework, specific risks for venture investments and focus of entrepreneurs on short-term investments (Arrow, 1993). In connection with this, one of the most crucial tasks in Russia in the current period is creation of an institutionally flexible and integral system of venture entrepreneurship.

6. Scientifically grounded development of the institutional field as principal criterion for the feasibility assessment of intellectual products` potential

From our point of view creation, development and interconnection of key institutions (institutional field) of venture financing is a principal institutional criterion for the assessment of realization of intellectual products potential in the system of venture financing. High grade of development of these institutions facilitates transformation of intellectual products` potential into high-yield innovative enterprises, firms etc.

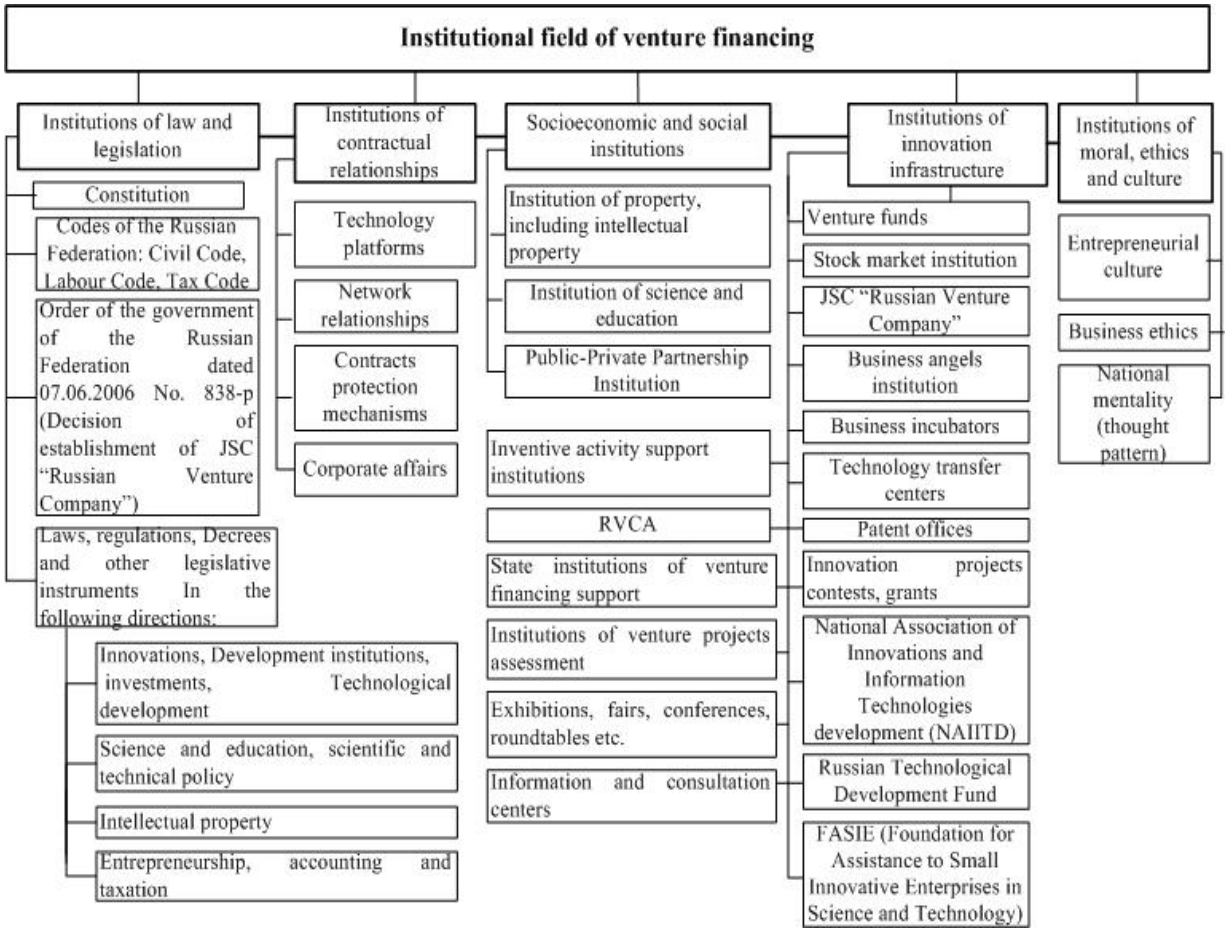
Enhanced studying of the phenomenon "institutional field" which initiated further investigation of this complex and multifarious object can be found by D. North. North presented its fundamental characteristics. The scientist emphasizes that existence of effective markets "entails a complex set of institutions that encourage factor mobility, the acquisition of skills, uninterrupted production, rapid and low-cost transmission of information, and the invention and innovation of new technologies" (North, 1990, p. 88).

We recognize such promising methodological and methodic developments as "open innovation", business-modeling, technological audit etc. It is no question that they contribute to an overall assessment and realization of intellectual products` potential and attraction of venture investors.

At the same time, we believe that these primarily micro level developments may be implemented in reality subject to creation of an institutional field of venture financing. For many countries, as our research of factual and statistical material shows, this is build-up of an institutional field which causes most acute problems on macro-, meso- and micro level.

We structured key institutes, on the basis of which an institutional field of venture financing can be formed (by the example of Russia) (figure 1).

Figure 1: Institutional field of the venture financing system (by the example of Russia)



It must be emphasized that in many cases contradictions in realization of interrelations of agents within the framework of these institutions bring forth institutions retarding positive processes, which was noted by D. North (North, 1990).

Thus, in Russia financial conditions for stimulation of innovation activity, high technologies and human capital, development of a full-scaled venture financing institution are in short supply.

One of the principal criteria for the assessment of realization of intellectual products` potential in the scientific and technological sphere is every possible development of civilized treaty,

contractual and networking relations (on the pattern of highly developed countries) between the agents of the venture financing system regarding development of intellectual products, risk sharing, drawing these products into economic turnover, their implementation into marketable products and assets.

D. North (1990, pp. 74-75) emphasizes:

"*The contract in modern complex economies both is multidimensional and extends over time. Because there are multiple dimensions, with respect both to the physical characteristics and to the property rights characteristics of the exchange, of necessity the result is that one must spell out many of the provisions*".

This statement is without doubt true in respect of the object under examination.

7. Conclusion

As a result of the undertaken study a conclusion can be made that formation of institutional criteria for the assessment of intellectual products` potential feasibility in the scientific and technological sphere in the venture financing system is a complex task. It is connected both with specific features of intellectual products` potential and with dynamics of institutional field development for this type of financing.

We detailed following principal institutional criteria determining assessment of intellectual products` potential feasibility in the venture financing system:

- Perception and realization of the system of theoretical and methodological developments is, in our
- Opinion, the basic valuation criterion of intellectual products` potential realization in the sphere of science and technology. Scientifically grounded utilization of these developments encourages the most complete implementation of intellectual products` potential in the process of drawing these products into economic turnover, commercialization, including in the form of high-technology products in-demand in the world market.
- Arrangement of conditions for financial support of scientific and technological projects at initial
- Stages is another principal institutional criterion for the assessment of realization of intellectual products` potential.
- From our point of view creation, development and interconnection of key institutions (institutional
- Field) of venture financing is a systemic institutional criterion for the assessment of intellectual products` potential feasibility.
- One of the principal criteria for the assessment of realization of intellectual products` potential is

  every possible development of civilized treaty, contractual and networking relations (on the pattern of highly developed countries) between the agents of the venture financing system regarding development of intellectual products, risk sharing, drawing these products into economic turnover, their implementation into marketable products and assets.

A logical modeling variant of criteria for the feasibility assessment of intellectual products` potential in the system of venture financing is suggested in the paper on the basis of range of theoretical and methodological developments.

Build-up of the venture financing system with consideration of fundamental criteria detailed above and other will encourage development of innovation economy, receiving profits from realization of intellectual products` potential in the sphere of science and technology, increase of science-intensive products` share in the GDP.

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