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Technological innovations in Russia

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ABSTRACT

In Russia there is a clear awareness of the vital necessity to innovate and to do it radically. This regards both businesses and government. The problem is that financial conditions do not favor radical innovations in Russia. However, those Russian business owners who intend in the long run to compete with imports and products of foreign companies basing in Russia, even if only they assemble in Russia final products, still dare to undertake reconstruction and major product innovations. For them this often means a risk of their companies' bankruptcy. The government helps but relevant opportunities are insufficient.

KEYWORDS: Russia's technological innovations, managerial and government innovation policies

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INTRODUCTION

The objective of this article is to give an insight of the situation with technological innovations in Russia and to develop a foundation for managerial and government innovation policies. Special attention is paid to following issues: general overview, motivation to innovations, financial environment for radical innovations, visions from the points of view of business owners, management and government, problems, governmental policies and support, implementations for management and government.

1 INNOVATIONS AND COMPETITIVENESS

Sometime ago Russian manufacturers comforted them selves, relying on lower quality combined with much smaller price. Now, it is already not the case. Wages for Russian workers grew, prices for local supply of energy goods also increased, import custom duties as well as transaction costs connected with convertibility of Rouble fell.

Russia finalizes talks on joining the World Trade Organization and has already taken and fulfils preliminary obligations on decreasing tariff and non-tariff barriers in its international trade. And what is even more new, foreign production capital comes into Russia: new plants belonging to foreign competitors are constructed, controlling portions of stock of existing Russian corporations are being purchased by leading international manufacturing firms (followed by technology transfer).

All this leads to a completely new situation: foreign competitors with better products and technologies acquire access to as yet comparatively cheaper Russian energy goods, labor force and land. Hence, products from foreign producers prove to be both better (also with better service) and less expensive.

A good example is here cars and motor vehicles in general, namely the case of AvtoVAZ, the biggest Russian producer of cars "Lada" and "Niva". In the 90-s and before 2005 these cars had 25-30 % of the Russian market. They practically totally occupied its lowest price-quality segment. In 2006-2007 Renault corporation started in Russia assembling of the Renault-Logan model at a newly constructed plant (importing components and paying for them low import duties). Already after 3 years the share of AvtoVAZ decreased down to 15-17 %. As a consequence, Troika-Dialog (a Russian private investment bank) and Rostekhnologii (a state corporation) decided to sell 25 % of their shares in AvtoVAZ plus one share to Renault corporation. In 2011 talks have

started on selling 25 % more of AvtoVAZ stock to Nissan corporation which is a partner of Renault in the Renault-Nissan alliance (Kommersant 2011). On the one hand, Troika-Dialog has decided to withdraw from cars production. On the other hand, one can be sure that AvtoVAZ will now radically innovate.

2 FINANCIAL ENVIRONMENT

Radical innovations (even those which are aimed at eliminating the technological gap, radical only for the innovator) need usually much money and have a long pay-back period.

Inflation rate in Russia in last years is 8-9 %. From the point of view of those who are invited to invest in radical innovations this is very unattractive, since much money with a higher purchasing power is paid back in such projects very late and by money with a much smaller purchasing power. Only if such innovations promise very high average yield investors will be ready to invest. This yield in Russia should considerably exceed the yield of alternative investments with comparable risk (opportunity cost of equity, or simply cost of equity).

The problem is also in the fact that in Russia this cost of equity, in turn, remains high.

Even the so called "risk-free interest rate", i.e. the yield on the most riskless investments in the relevant country, in Russia is much higher than in Europe or in the USA. The weighted average yield to maturity of Russian long-term federal bonds nominated in Roubles is about 6 % (Interfax 2011), while the similar yields of American and Eurobonds is two times lower (Bloomberg 2011). This means that the country risk in Russia, which is integrated in the yield to maturity of national treasuries, is correspondingly two times higher.

However, if investments in Russia are accomplished directly in dollars, the markets of treasuries appraise the Russian country risk lower: the spread between yields to maturity of Russian and USA dollar-nominated treasury bonds equals only 1.3 % (Bloomberg 2011).

The yield on alternative risk-comparable investments (not in innovations or innovatively active companies) in the same industries in Russia related to the USA or Europe is

also much greater. If one, for simplification, uses the frameworks of the commonly accepted Capital Assets Pricing Model (CAPM), it will be enough to say that, according to Damodaran, only the market premium (added to the “risk-free interest rate” for average risk industries) in Russia was in the beginning of 2011 7.25 % compared to 5 % in the USA and Europe (Damodaran 2011)³. Beta coefficients for specific industries in Russia also tend to be a little higher.

All this leads to a higher attractiveness for outsiders (i.e. for those who as yet has not bound their capital in specific businesses that need innovations) to invest in Russia in anything other than radical innovations – or in general not invest in Russia.

At the same time, one should remember that in times of a continuing financial crisis it becomes too risky to invest in portfolio financial assets. The CAPM figures become unreliable. Direct investments in business start to look more preferable, since they provide access to cash flows from business. And once more, from the businesses that need innovations.

3 ON THE CAPITAL STRUCTURE POLICY OF RUSSIAN INNOVATING FIRMS

Statistical data indicates tendency of massive technical re-equipment of quite a number of Russian innovating firms at the very beginning of the global economic crisis with the investments were based mostly on debt finance (Gurdin 2010, Inozemtsev 2010). The reason for preference to debt finance in Russia most likely is concerned with reluctance of equity capital owners to lose control over their property. However this capital structure policy of Russian innovating firms nearly ended with their financial distress and even bankruptcy, although some of the innovating firms managed to succeed in their projects and became more competitive

For example, the jet engines-producer Saturn Corp. developed the engines for the fifth-generation Russian fighter jet, T-50, which can compete with American Raptors. Magnitogorsk Iron and Steel Works produced a new tube mill with unique characteristics making it possible to produce extremely durable pipes (Metallpress 2011).

³ At that time 5 % corresponded only to “triple A” countries (according to ratings of Fitch, Moody’s and Standard and Poor’s).

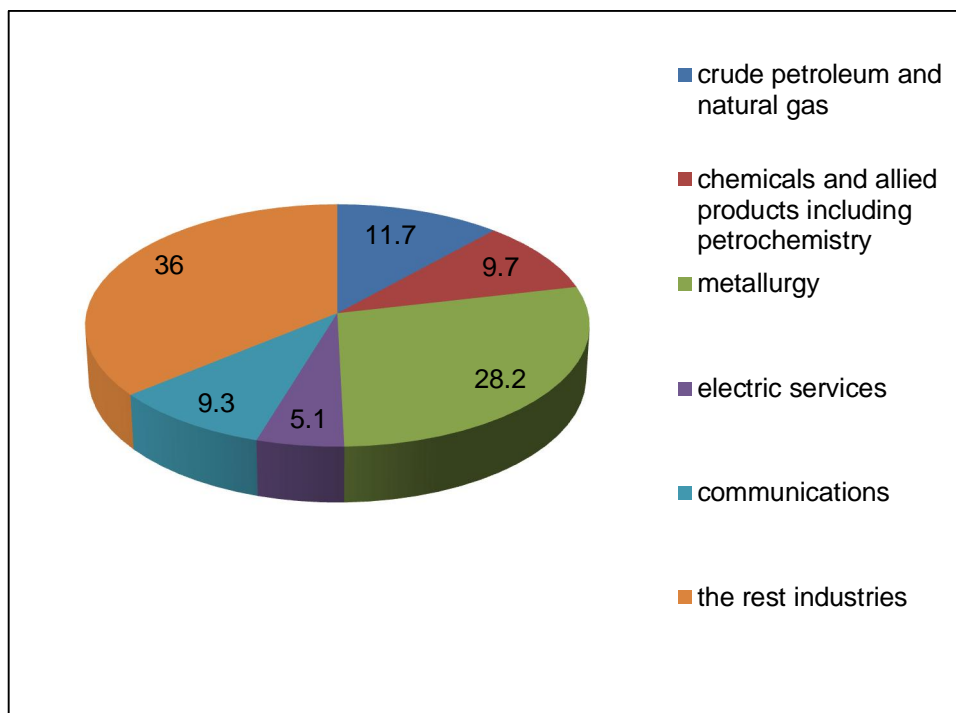
These tendencies stimulate implementation of the analysis of capital structure policy of Russian innovating firms. The aim of such analysis is to reveal average debt-equity ratio (D/E) of a certain sample of the most successful Russian innovating firms in 2008-2010 and compare it with the same measure of the most successful non-Russian firms operating in relevant industries. Similarly it is worth comparing average interest coverage and average debt-EBITDA ratio (D/EBITDA) in order to expose consequences of Russian companies capital structure policy.

As a matter of fact the main Russian innovating segments which risked to start big innovation projects before the world 2008-2009 economic crisis are:

- large private corporations (in such industries as metallurgy, chemicals, communications, crude petroleum and natural gas, electric services aerospace, etc.);
- several successful private start-ups (small and medium-sized firms in information technologies, pharmaceuticals, biotechnologies, components for motor vehicles, high tech services, etc.).

In order to carry out analysis it is appropriate to concentrate on Russian large private corporations. The main reason for this is data accessibility of large private corporations in Russia (and a lack of information about private start-ups). Considering that one of the main factors of innovativeness is organizational slack (O'Brien 2003, Nohria and Gulati 1996, Vincente-Lorente, 2001), which is available primarily for successful large companies, it seems reliable to take into account in particular this type of firm.

The first step of the analysis consists in choosing Russian most innovative industries. Relevant data for 2006-2009 is contained in Federal State Statistics Service data base (Federal State Statistics Service 2011). According to this data, in 2006-2009 5 main Russian industries provided for 64% of technological innovation investments, which accounted for about \$26 Bln. These industries include crude petroleum and natural gas (11.7% of technological innovation investments), chemicals and allied products including petrochemistry (9.7%), metallurgy (28.2%), electric services (5.1%), communications (9.3%). Figure 1 illustrates graphic representation of Russian technological innovation investments distribution.

Figure 1. Russian technological innovation investments distribution

In each of above mentioned industries several Russian largest public companies were chosen according to ratings of Russian analytical edition “Expert” (for instance, such as “Gazprom” and “Lukoil” in crude petroleum and natural gas, “Severstal” and “Evraz” in metallurgy, “Sibur” and “Evrochem” in chemicals etc.).

It should be noted that Russian companies which were chosen for the analysis succeeded in effective implementation of innovation projects. For instance, energy company “Gazprom” built the world’s largest compressed air plant “Portovaya” which became departing point for delivery of Russian gas to Europe, metallurgical and mining company “Evraz” produced pilot batch of steel grinding balls for ore reduction, steel company “NLMK” applied an aggregate of conventional galvanizing in the process of the production of ultrafine steel plates, mineral and chemical company “Evrochem” assimilated production of granulated carbamide, petrochemical company “Sibur” assimilated production of the preventer of corrosion of hydrocarbon steel etc.

For each company appropriate ratios (D/E, Interest Coverage, D/EBITDA) were derived over a period of 2008-2010 (taken from data base of the information agency Interfax (SPARK 2011) and sites of certain companies).

The same procedure was undertaken for the most successful non-Russian firms operating in relevant industries on the base of the data of such internet resources as Reference for Business, Google Finance, Lexis-Nexis Academic (Reference for Business 2011, Google 2011, Lexis-Nexis 2011).

The systematization of derived data resulted in following table.

Table 1. Average capital structure ratios of Russian and non-Russian industries

	D/E			Interest Coverage			D/EBITDA		
	2008	2009	2010	2008	2009	2010	2008	2009	2010
Crude petroleum and natural gas									
Average measure for the sample of Russian firms	0.575	0.699	0.643	58.229	22.17	24.228	1.01	1.195	0.78
Average measure for the sample of non-Russian firms	0.275	0.285	0.317	40.062	130.1	127.84	0.40	0.791	0.62
Chemicals and allied products including petrochemistry									
Average measure for the sample of Russian firms	1.58	1.16	1.07	8.042	3.038	5.763	2.65	7.362	2.67
Average measure for the sample of non-Russian firms	0.78	0.93	0.89	8.037	4.033	7.416	2.25	5.223	2.89
Metallurgy									
Average measure for the sample of Russian firms	0.4475	0.4915	0.4815	34.743	11.942	18.381	0.66	2.482	1.07
Average measure for the sample of non-Russian firms	0.72	0.47	0.42	19.30	8.29	20.54	2.11	9.53	1.54
Electric services									
Average measure for the sample of Russian firms	0.279	0.254	0.194	12.109	9.449	3.857	1.11	1.450	1.35
Average measure for the sample of non-Russian firms	1.32	1.38	1.61	4.707	4.705	4.916	0.62	0.728	0.615
Communications									
Average measure for the sample of Russian firms	1.202	1.143	1.247	15.097	8.457	13.636	1.35	1.524	1.31
Average measure for the sample of non-Russian firms	0.93	0.96	0.92	11.085	8.532	8.987	2.83	3.274	3.4

Derived data allows us to make following observations.

First, it becomes clear that for Russian firms of almost all considered industries (except electric services) and almost over the whole period of time higher debt-equity ratios are typical.

Second, though Interest Coverage and Debt-EBITDA ratios do not demonstrate absolutely precise correspondence between Russian and non-Russian firms of the same industries, at the same time these measures have been getting worse in general for Russian firms since 2009 (and this conclusion is confirmed by tendency of deterioration of credit ratings of quite a few Russian companies from generated sample). Apparently, this tendency is connected with higher Debt-Equity ratio typical for Russian innovating firms over the period of 2008-2010.

Presently companies which continue innovating have to solve serious problem of raising considerable financial resources since innovation projects are much capital-intensive. That's why innovating firms frequently have to attract new stakeholders and use certain selection of different types of funding sources including generally debt (bank loans, commercial credits, bonded debt, leasing) and equity (self-finance and equity finance by initial public offering (IPO), public and private subscription).

Presently the cost of both foreign and domestic debt finance for Russian companies increased, its supply diminished (Evrodol 2011). On the one hand, it means that Russian companies which are disposed to derive financial funds by obtaining loans will not be tempted to take too much debt. Consequently, the risk of their bankruptcy will be restricted. At the same time, really profitable innovation projects could be refused because of lack of debt finance.

Attracting financial resources by Initial Public Offering (IPO) is questionable because of current negative performance of financial markets. For instance, the index of Russian Trading System Stock Exchange (RTS Index, RTSI) in 2010 was 1 770.28 points and in 2007 before the world 2008-2009 economic crisis it was 2 290.51 points. Thus, the percentage decrease of the RTS Index over the period of 2007-2010 amounts to 23%. Figure 2 illustrates graphic representation of RTS Index dynamics.

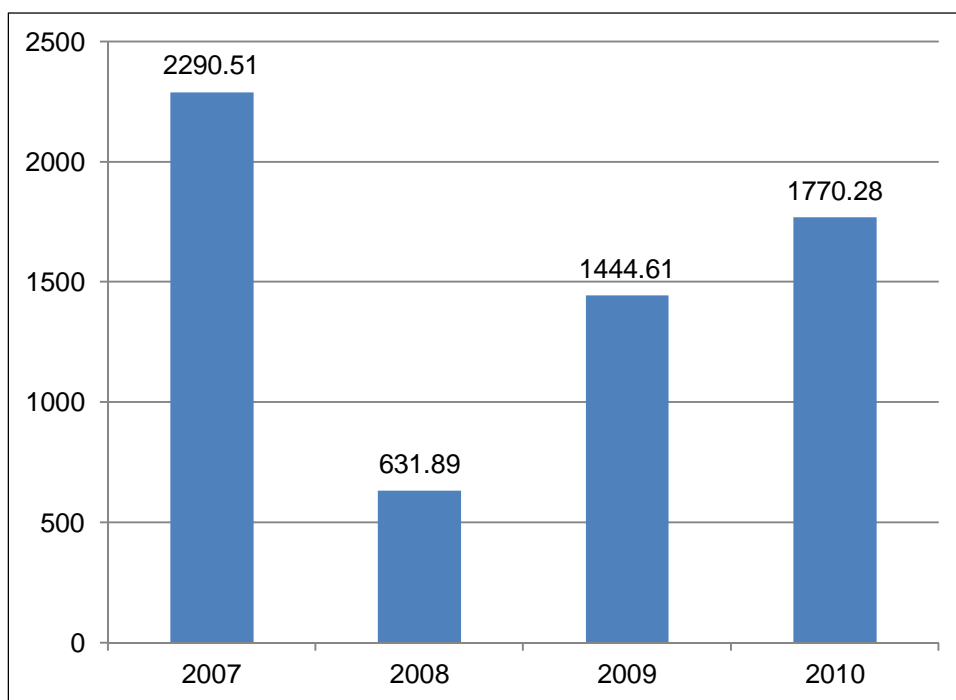
Figure 2. RTS Index dynamics

Figure 2 shows that Russian Trading System Stock Exchange performance is recovering after 2008-2009 recession but still it is far from its normal condition. Consequently it is unlikely that obtaining financial resources by IPO could be effective at the present moment.

Apart from self-financing the demand for funds can be satisfied by external equity finance. However, the amount of these funding sources is limited, too. So nowadays the problem of capital structure shaping for Russian companies is in particular critical.

The main recommendations concerning capital structure choosing for Russian innovating firms are as follows.

One should exercise benchmarking, i.e. monitoring debt-equity ratios of the most successful companies in certain industries and comparing them with one's own measures in order to reveal unfavorable tendencies.

Nevertheless, the capital structure problem should be solved individually. That is why apart from benchmarking it is worth developing capital structure optimization techniques which would take into consideration both industry peculiarities and

innovation strategy special features. The main factors which should be taken into account within a framework of such techniques include:

- interconnection between debt-equity ratio and cost of equity, determining minimization of weighed average cost of capital (WACC);
- level of financial slack (i.e. borrowing capacity) impact on the effectiveness of innovation strategy realization (Geiger and Cashen 2002, Ozcan S. 2005).

4 ABOUT GOVERNMENTAL SUBVENTIONS FOR SPECIFIC INNOVATION PROJECTS OF PRIVATE BUSINESSES

As we tried to show before, for private businesses in Russia it is presently very difficult to eliminate the technological backwardness in many industries. Those who still risk to radically innovate, in order to stay in business and compete with coming western companies, faced and face huge problems.

The Russian government has declared their priorities in modernization and technological innovations. After having done this, the Russian state in times of the recent crisis had to save from bankruptcies many companies who have dared to borrow much money to spend it for major innovations. This has been accomplished through making the Central Bank of Russia to use practically 100 % of its previously accumulated international reserves (about \$520 Bln.) for special subordinated long-term loans to the big banks who had to transfer them as loans to such companies (like “Rusal”, “Mechel” and “Nornickel” in metallurgy, “Suchoi” in aircraft production – a list of nearly 120 of such end-users was specially adopted in 2009). The Ministry of Finance also massively bought out bonds of these companies.

After such a sad experience,

- *on the one hand*, innovating private businesses in Russia prefer to divide financial innovation risks with the government from the very beginning of major innovation projects, i.e. they want either direct governmental subventions for these projects, or direct state investments in these projects; the latter means that they let the government to participate in relevant companies, primarily, project start-ups, as a minority shareholder;

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- *on the other hand*, the Russian state understands that this might be financially (and, perhaps, socially – because of jobs) better than using much greater reserves to save innovators from eventual bankruptcies afterwards.

Two corresponding trends resulted.

First, the state corporation “Rosnano” appeared. This corporation got \$110 Bln. as the government contribution to its chartered fund. This money has to be used: (1) as subventions for starting the radical innovation projects based on use of nanotechnologies (for constructing the so called “nanocenters” including “clean rooms” with not more than 100 particles per 1 cubic meter of space, for experimental equipment, research and development, R&D) and (2) as direct investments in companies who organize production using the results of relevant R&D.

The networks of creating eight regional “nanocenters” of the depicted type is being already financed by subventions of “Rosnano” corporation. Two newly constructed plants already work that belong to the denoted project start-ups. One of them (“Vibrial Inc.”, its chartered fund is equal approximately to \$660 Mln.⁴) is already presently the world biggest producer of new extra-hard nanoceramic cutting elements and bearings. The other (a joint venture with a firm that belongs to former Russian emigrants to Germany who earlier worked in Russian Academy of Sciences) produces economic electrolamps and is supposed to cover one fourth of the national demand in them.

Second, a special state foundation for supporting private innovation start-ups operates. Although it has been created in the end of 90-s, in the recent two years its budget has been drastically increased. This foundation also at first gives grants for R&D (including establishing intellectual property rights) and afterwards invests as minority shareholder in companies who implement results of relevant R&D.

The denoted foundation is not specialized so narrowly as “Rosnano” (although practical prospects for nanotechnologies are quite wide). However, it is much more oriented at small and medium sized businesses.

⁴ 49 % of stock belong to “Rosnano”, 30 % - to private founders of this firm, a little more than 5 % - to a private company “Siberian Organics” and 15 % - to a Scandinavian foundation for direct investments “Capman” which entered the capital of “Vibrial” in Spring 2011 – Kommersant, 22.08.2011.

And what concerns state-private partnerships in major nation-wide innovation projects, three things that are here important for Russia should be mentioned:

- these partnerships do not suggest any subventions from the state or joint ventures with the state: the parties only coordinate what they finance and own separately; for instance, the Russian government has financed and now owns roads to the recently constructed Ust-Luga sea port, while those private companies who wanted to own and run the sea-port business financed and built the sea-port itself; the peculiar point about innovation projects is that for them the idea of the considered partnerships is rather new;
- in state-private partnerships regarding major radical innovation projects also coordination is their essence: (1) the big private business finances R&D for inventions that are of double use, civic and military; (2) the state buys out intellectual property rights concerning the further military applications (such a buy-out at a fair market price⁵ is guaranteed from the very beginning);
- later, both parties act separately: the state finances the consequent military developments and owns their results, the private business finances and owns corresponding civic developments.

As yet there is no information published on specific examples of such a pattern. However, it seems to be accomplished and is rather innovative itself, since usually in many developed countries there is always a problem of technological transfer from military to civic and the depicted pattern can be viewed as a sort of solution to this problem.

Russia was always known for its high-tech massively exported weapons (fighters, rocket systems, war ships, etc. – the second place in the world, more than \$7 Bln. Yearly (Rostat 2011)). This is why for Russia the state-private partnerships as a means to solve the named transfer problem is of especial significance in modernization of its economy.

However, one should not forget that in 2008-2009 Russia with its dependency on oil prices was the leader among industrialized countries in recession. Its GDP fell by 13.0 % (Federal State Statistics Service 2010). The Russian federal budget stays deficient.

⁵ Defining the fair value of relevant R&D results is a matter for independent valuers of intellectual property who act according to the existing Federal Valuation Standards.

Hence, the resources of the Russian state to support radical technological innovations are as yet limited. Also there continue to exist uncertainties in the world economy as a whole.

5 CONCLUSIONS

1. Russian business owners, if they are reasonable enough, understand that if they don't introduce radical product and/or process technological innovations, they will very soon lose even the Russian domestic market. This is due to Russia's opening its markets to foreign imports and foreign direct investments accompanied with massive technology transfer from new owners. That's why they face a choice: either to innovate, or to sell their businesses while it is not too late.
2. Innovations in Russia are hampered by financial reasons. To them belong: high inflation rate, high opportunity cost of equity, and lack of self-finance and external equity finance. Technological backwardness also require lacking access to modern technologies. Administrative barriers and corruption together with property risks add to this.
3. Nevertheless, several Russian industries as a whole (large private corporations in metallurgy, chemicals, communications, aerospace, etc.) and several successful private start-ups (small and medium-sized firms in information technologies, pharmaceuticals, biotechnologies, components for motor vehicles, high tech services, etc.) risked to start big innovation projects before the world 2008-2009 economic crisis basing on massive debt finance. This has nearly ended with their bankruptcy – although some of them managed to succeed in their projects and became more competitive.
4. Presently, the cost of both foreign and domestic debt finance increased, its supply diminished. Also political risks connected with future parliament and presidential elections in Russia have grown. At the same time the government induces technological innovations with making national technical and environmental standards more severe. One also should not forget that process innovations are constantly needed and accomplished in order to continue and even increase extracting natural gas and oil under ever worsening conditions (from deeper horizons and more distant places or sea shelf).

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5. Under these conditions one should not wonder why the Russian government tries to redistribute federal budget incomes in favor of direct subventions investments for major national-scale private innovation projects. The idea of the so called private-government partnerships in radical innovations also becomes more popular. Earlier this idea was realized in Russia only in big infrastructure projects like construction of new sea-ports.
 6. The main managerial implementation is that in order to stay in business and not to lose even the domestic markets Russian companies should radically innovate in spite of financial risks. In order to minimize financial risks Russian companies should manage their capital structure. The main recommendations concerning capital structure choosing for Russian innovating firms are benchmarking and developing capital structure optimization techniques which would take into consideration both industry peculiarities and innovation strategy special features.

Correspondingly, the main political recommendation for the Russian government is to continue and to increase direct and indirect financial support of those companies and industries who start radical innovation projects. However, this should not mean a mere return to the idea of relevant tax preferences. Direct governmental investments in various above discussed forms are needed.

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