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FORMS AND METHODS TO IMPROVE THE COMMERCIALIZATION INTELLECTUAL PROPERTY IN RUSSIA

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ФОРМЫ И МЕТОДЫ СОВЕРШЕНСТВОВАНИЯ КОММЕРЦИАЛИЗАЦИИ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ В РОССИИ

Science is the foundation for the development of civilization, any society or a nation. This is a recognised fact which does not require any further justification. However, currently it is understood both in the whole world and in Russia that the key strategic resource for survival, increased competitiveness of manufacturing enterprises and other organization is information. A shift towards science-driven production in the second half of 20 century was accompanied by the emergence of new types of information exchange. The dependence of economy on sources, volumes and quality of information (scientific and technical, economic, political one, etc.) has increased as well as the dependence on the level of information access, which resulted in appearance, in the 1980s, of a principally new economic category – national information resources. An intensive development of the economy becomes impossible unless there is effective information support. Information has turned into a strategic resource, the role of knowledge has increased dramatically.

RESEARCH AND INFORMATION ACTIVITIES. ECONOMIC EFFICIENCY. FINANCING R&D. INTELLECTUAL PROPERTY ITEMS.

Тот факт, что наука является основой развития цивилизации, любого общества и государства, общеизвестен и не требует дополнительного обоснования. Переход к наукоемкому производству во второй половине XX в. сопровождался возникновением новых видов информационного обмена. Возросла зависимость экономики от источников, объемов и качества информации (научно-технической, экономической, политической и др.), от уровня развития средств доступа к этой информации, что привело к формированию на рубеже 80-х гг. XX столетия принципиально новой экономической категории – национальные информационные ресурсы. Интенсивное развитие экономики становится невозможным без эффективного информационного сопровождения. Информация превратилась в стратегический ресурс, существенно возросла роль знаний.

НАУЧНО-ИНФОРМАЦИОННАЯ ДЕЯТЕЛЬНОСТЬ. ИНФОРМАЦИОННЫЕ ПРОЦЕССЫ. РЕСУРСЫ. ЭКОНОМИЧЕСКАЯ ЭФФЕКТИВНОСТЬ. ФИНАНСИРОВАНИЕ НИОКР. ОБЪЕКТЫ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ.

When seeing information as a resource for development of a society or organization, they identify its major specific features: information is the most important resource for the society, enterprise or organization to develop. It decreases demand for land, labor, capital, minimizes the use of raw materials and energy; brings to life new industries; adds value to other resources, in particular, to labour: indeed, a worker with higher education is more appreciated than the one with secondary education. Scientific information is an important resource of social and historic practice for forecasting and the change of reality.

At the same time, modern economic conditions and common practice resulted in the situation when activities, initiated in the 1960s in order to provide enterprises and scientific research organizations with scientific and technical information, have practically been stopped. Departments and bureaus of scientific and technical information, even if they exist, are not involved in selective dissemination of information, differentiated and initiative service of scientific staff.

The theory of Information Systems is developing inefficiently, too, especially in the field

of scientific and technical information. This issue is important due to the fact that scientific research in the modern world is practically impossible without scientific communication, and an individual researcher cannot obtain new scientific results without collective work over the problem. The issue under consideration is getting exceptionally important in the conditions of modern Russian economy. On the one hand, modernization and upgrade of IT facilities of the home industry and demand for effective technology and innovation is growing. On the other hand, the IT, communication and intellectual property market in Russia is in its infancy and its mechanisms still do not fully contribute to the efficient distribution of intangible resources. The development of market transaction mechanisms in respect of intellectual property items (hereinafter IPI) and information resources (IR) is impeded by the insufficient theoretical elaboration of issues connected with essence of transactions on implementation of IPI and IR in the market, reasoning of different forms of commercialization and their specific influence on pricing of this particular economic resource. IPI commercialization in the market cannot be researched unless the essence of intellectual property relations and their specific features are identified. Moreover, issues related to the content of intellectual property and its functional characteristics have been developed enough, similarly, issues concerned with the understanding of its specifics compared to tangible property items and distinctions of the subject-object membership.

Problem of scientific communication. As scientific information activities are developing, it is becoming more and more obvious how important is scientific communication, the interaction between scientific institutions which is based on scientific and technical information, its distribution, provision of access to it, an increased efficiency of information maintenance.

Over a long period of civilization development, both government action and action of an individual which exceeds the limits of material production and service have been referred to unproductive expenses. Economic status of a nation was determined by existing material and energy resources, an effective financial distributional system.

During the research, the following major problems are to be tackled:

1. Assessment of the dominating role of science in the world progress of processes and technology, growth of the economic power of this country.

2. Development of science as an independent social institution and evolvement of its basic elements during transformation into a national competitiveness factor (technology, economic, socio-political and military competitiveness) starting from the middle of the 20 century.

3. To look into major properties of scientific information, such as practically non-decreasing potential effectiveness of information, replicability and frequency of use, dependence of actual implementation and effectiveness on the degree to which information is used, presence of value, cumulativeness, etc.

4. To analyze types and forms of scientific and technical information considering their use in new economic conditions, to characterize them and reveal risks they entail.

5. To suggest forms and methods to increase efficiency of information provision for scientific research.

6. To suggest economic methods and models for intangible assets economic efficiency assessment in order to maintain competitiveness of domestic producers.

7. To investigate ways for the efficient financing of national science through tax incentives and national monetary policy, internal sources of an enterprise.

Estimation of research subvention losses due to taxation of legal entities. Let us look into the leakage of money researchers experience as a result of the current taxation system. So, as a result of work done by a team of researchers (http://csr.spbu.ru/pub/RFBR_publications/es.html «Thin-film multilayer coatings beat cracks» by V. Tabakov, M. Smirnov, A. Cirkin 2007, 2008), there has been found a solution to increase cutting tools durability with the use of the new three-layer coating TiZrFeTiZrFeNTiZrN. This technology has been applied by a machine-building company OAO «Klimov», the leading Russian developer of gas turbine engines (http://en.klimov.ru/about/general). Let us calculate the amount of grant subsidies for the researchers and losses resulting from the current

taxation system. We assume that the Russian Fund of Fundamental Research (RFFR, www.rfbr.ru) has supported the scientific research project and paid, at the first stage (state of fundamental research development), 200 000 rubles to one of the scientists and the next year, at the second stage, paid 1,500,000 rubles to a team of 3 researchers as subsidies to put the technology into practice. According to the legislation, the team can receive the grant only through a legal entity.

The organization, through which the grant is financed, has the right for a specific «premium». Its amount is strictly limited: for the Russian Liberal Scientific Fund (RLSF, www.rfh.ru), it cannot be larger than 15 % of the total grant amount, whereas for the RFFR it is limited to 20 %. From the financial standpoint, this premium is justified by the necessity to cover expenses related with finance monitoring and technical maintenance of the research project. However, this is a direct deduction from the grantees' income. Furthermore, in case the money is transferred to the account of a legal entity and takes the form of salary, it is subject to the same taxation as salary payments (mandatory payments to insurance funds before 2011 were 26 %, in 2011 – 34 % and after 2012 – 30 %.) This is one more serious deduction from the grantees' income. This deduction appears automatically when converting an individual (researcher) into a legal entity (organization). Therefore, such a conversion influences destructively on the researchers' work motivation. The income of the researchers is automatically liable to income tax (13 %). This form of deduction cannot be controlled by researchers either and comes in force automatically. If we represent the initial amount of the research grant as GR, and the amount of money paid to the researcher as net income as NCF, the dependence between them within the current taxation system can be shown in the following way (in general):

$$NCF = \frac{(1-\alpha)(1-\beta)(1-\gamma)}{(1+\omega)} GR. \qquad (1)$$

And, in case some equipment should be purchased (R&D):

$$NCF = \frac{((1-\alpha)(1-\beta)GR - \text{R\&D})(1-\gamma)}{(1+\omega)}, \qquad (2)$$

where α is the share of overheads, related to the registration of scientific research work in RFSTIC (Russian Federal Scientific Technical Information Centre), bank commission for salary transfer into plastic cards, etc.; ω – salary payments quota in percentage (Mandatory payments to insurance funds, 30 %); β – the percentage of grant amount paid to finance monitoring and technical maintenance of the project (15 %); γ – income tax rate (13 %); R&D – expenses related to the equipment purchase in rubles.

Let us calculate the amount of grant paid to the project participants after taxes: the percentage of overheads α includes expenses on registration of the scientific research work in RFSTIC, bank commission for salary transfer to plastic cards and deductions for increased value of company's tangible assets. As a rule, this amount is not big and for average grants is $\alpha = 3–4$ %.

The amount of grant β, paid to finance monitoring and technical maintenance of the project is $\beta = 15$ % for RFFR. Although the regulatory documents stipulate the figure of 15 % as maximum (formally it can be equal to zero), in practice, it is the one used when dealing with grant subventions. According to the R&D conditions, some equipment should be bought in the amount of 500,000 rubles.

As one can see, at the second stage, instead of 1.5 million rubles, the researchers received 493,056 rubles after taxes, which is equal to 32,9 % of the initial amount. By now, the federal law «On amendment to article 217, part two of the Tax Code of the Russian Federation» has been passed. In accordance with the new version of the Tax Code (www.garant.ru, www.nalog.ru), taxes are not imposed on the incomes of individuals received by taxpayers in the form of grants (gratuitous aid) which have been given to support science, education, culture and arts in the Russian Federation by international, foreign and (or) Russian organizations included in the list of such organizations which has been approved by the Government of the Russian Federation. This list, according to decree No. 602 of 15 July 2009, includes Russian State Scientific Fund and Russian Fund of Fundamental Research.

We recalculate this figure without the income tax and receive the amount equal to 566,731 rubles. Anyway, the taxes are too high for individuals and the tax burden on grant

Table 1

Calculation of tax burden

Key figures	1 year		2 year		Total
	Rate	Amount, RUR	*Rate*	Amount, RUR	Amount, RUR
Amount of grant on R&D in machine-building (GR)		200 000		1 500 000	**1 700 000**
Overheads (a)	*3 %*	6 000		45 000	51 000
Finance monitoring of the legal entity (b)	*15 %*	29 100	*15 %*	218 250	247 350
Purchase of equipment and test samples (R&D)				500 000	**500 000**
Mandatory payments to insurance funds (w, MPIF = 30 %)	*30 %*	38 054	*30 %*	170 019	208 073
Net income of the researchers excluding personal income tax (as labor compensation fund)		126 846		566 731	693 577
Calculation of the personal income tax (13 %)	*13 %*	16 490		73 675	90 165
Net income of the researchers including personal income tax (NCF_1)		110 356		493 056	**603 412**
or in % of the grant amount		*55,2 %*		*32,9 %*	*35,5 %*
Net R&D costs (NCF_2), RUR.		**110 356**		**993 056**	**1 103 412**
or in % of the grant amount		*55,2 %*		*66,2 %*	*64,9 %*
Financial and tax burden, RUR.		89 644		506 944	**596 588**
or in % of the grant amount		*44,8 %*		*33,8 %*	*35,1 %*

subventions does not comply with any international or Russian standards. If we bear in mind the fact that grants themselves are a specific form of charity (in this case, state charity), this tax system seems to be absolutely absurd. Thus, the current Russian tax system is built in such a way that about a half of the given grants returns to the state treasury. Such a size of the tax burden is considered to be unacceptably high even for legal entities involved in commercial activities.

Methodical approaches to the assessment of scientific results effectiveness. One of the major conditions for science management optimization is the development of methodical approaches to the assessment of scientific results. In order to ensure comparability of different R&D types (Iakovleva E. (2011), Dzhazovskaya I. (2010), Lemechenko P. (2011), Novozhilov A. (2006)) – from fundamental research to development and demo programs – the most general criteria which reflect three fundamental aspects inherent in any R&D program should be defined: relevance – justification of importance, possibility and necessity for federal investment in a program; quality – justification of the way how the invested budget funds can provide the best quality of R&D; performance – justification of the effective use of investment (Internal corporate guidelines for assessment of R&D cost-effectiveness STO Gazprom).

To assess the effectiveness of technology during the operational stage, cost, profitability, elasticity and other factors are primarily used. Shareholder value of the company is often used to measure its financial performance. For the management of the company, the proportion of the expected free cash flow and weighted average cost of capital is the shareholder value of the company. Thus, economic assessment of R&D should arise from the system influence on this proportion. As a result, the following factors should be analyzed: cash flow, related with the commercialization of R&D results; capital investment for the introduction of the new system (problem of financing); an effect of the new system on the monetary evaluation of the risk for all company's activities; institutional constraints (taxes, duties, direct constraints, etc.).

Innovation cost-effectiveness. The relative cost-effectiveness of innovations ($EEff_{\text{R\&D}}$) can be calculated on the basis on elasticity factor (Novozhilov A. (2006)):

$$EEff_{\text{R\&D}} = \frac{P_{aac\ eff\ \text{R\&D}}}{P_{on\ \text{R\&D}}} \div \frac{C_{new}}{C_{old}}, \qquad (3)$$

where $P_{aac\ eff\ \text{R\&D}}$ – accumulated effect on R&D implementation in RUR; $P_{on\ \text{R\&D}}$ – profit on innovation activities (profit on R&D) in RUR; C_{new} – new expenses in RUR; C_{old} – old expenses in RUR.

Innovation company value growth. Appraisal of the value growth and effectiveness of an innovation company based on R&D multiplier (Iakovleva E. (2008), Kozlovskaya E. (2012)):

$$Eff_{Value} = V' - V = \\ = 0,5\left(\frac{V}{\varphi}\varphi' - \frac{V}{1-\varphi}(1-\varphi')\right) - V, \qquad (4)$$

where V is a market value of the company (RUR); V' is a market value of the company after having new R&D costs (RUR); φ – share of R&D costs; φ' – share of R&D costs of a new product; Eff_{Value} – multiplier effect in rubles.

Company's market value multiplication (R&D multiplier). The implementation of any investment project requires capital investment in fixed assets and working assets, as well as R&D costs. R&D multiplier can be used to build different factors of project effectiveness (as modification of profitability factor). It is believed that, since the long-term limitation of a company is fixed assets, the company's goal is not to return R&D costs within a short term, but to ensure increased company value. In some cases, especially for innovation companies, these two things coincide.

We can extend the definition of R&D multiplier as relation of R&D costs and new product development costs to the accumulated expenses of the company (Lemechenko P. (2011), Novozhilov A. (2006), Kozlovskaya E (2012)).

$$\text{R\&D multiplier} = \frac{\text{Costs of new product development}}{\text{Capital investment for production and sales of this product}}. \qquad (5)$$

Then, under the conditions of limited resources, expenses can be relocated to increase the share of R&D and new product costs and the effect (only related to costs relocation) can be expressed as shown in Fig. 1. Proportions between R&D costs and capital investments can be expressed through a so-called R&D multiplier.

We go back to our example and calculate the direct savings on cost for a machine-building enterprise OAO Klimov when using a new three-layer coating TiZrFeTiZrFeNTiZrN 1 «Thin-film multilayer coatings» (Tabakov V. (2008)).

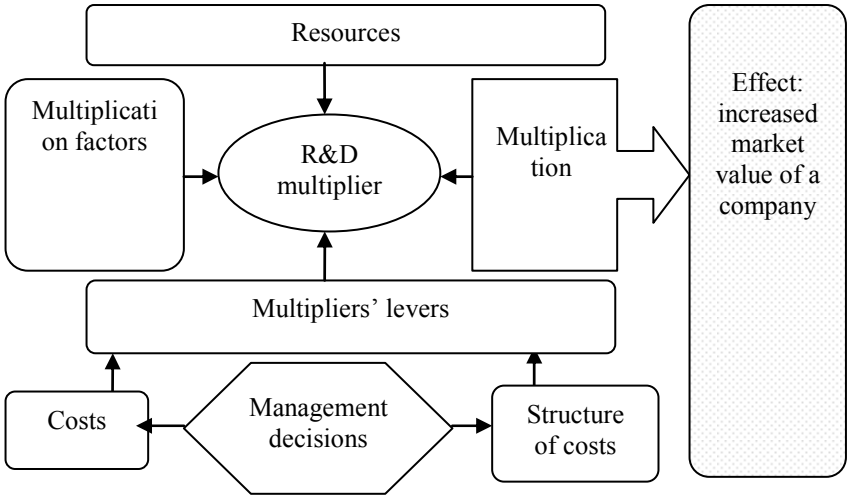

Fig. 1. Multiplication effect of the company's market value

The financial statements of the company say that the annual prime costs of OAO Klimov's products were 2,558,750,000 rubles in 2009. A considerable proportion of machine components and mechanisms are manufactured with the use of cutting. As the abstract of the scientific research says, the share of tooling costs can be 3–10 % of the products' prime cost, and the doubled life period of the tools, all other things being equal, can result in a decrease in prime cost up to 5 %.

Let us assume that the share of tools' purchase for a science absorbing industry in the overall costs of the products sold (prime cost) is 3 % (the lowest limit of the range from 3 to 10 %) and the saving on costs is 5 % (maximum value). Then the value of the first component of R&D implementation effect is 3 838 125 rubles (=2 558 750 000 · 0,03 · 0,05). We shall call the value identified as the direct effect of the innovation. Let us calculate one more index of R&D direct effect multiplication as a relation of the direct effect to the actual investments (modification of R&D multiplier by formula (5)) as:

Table 2

Multiplication index of R&D direct effect

Factors	Overall R&D costs (RUR) (from Tab. 1)	Relation «direct effect / investments», (shares)
Amount of grants	GR = 1 700 000	2,26
Net research costs	NCF_2 = 1 103 412	3,48

With the use of the «direct effect/investments» multiplier equal to 3.48, it is possible to evaluate the institutional losses in the RF taxation system as the product of overall financial and tax load (596 588 rub. in Tab. 1) multiplied by the value of the multiplier. This amount is equal to 2 075 181 = 596 588 · 3.48. With the application of the well-known principle of the time value of money, one can prove that, when removing part of the cash from the economic system, the state loses future profits from R&D commercialization.

Using financial statements data and direct R&D effect, the total value of the R&D result or effect can be formed:

Table 3

Calculation of the overall effect of R&D implementation

Factors	Amount, RUR
1. Profits from R&D (according to the accounting records)	472 667 000
2. Effect (savings on direct costs)	3 838 125
=Total overall effect of R&D implementation =1+2	**476 505 125**

Total overall effect of R&D implementation in the amount of 476 505 125 RUR will be used to identify the relative effectiveness of R&D result which the company obtained. In order to use the new technology OAO Klimov has to buy it from the researchers. The price of the new technology or its marginal cost must be calculated. According to the expert data, the «R&D costs/IPO cost» multiplier has a value from 15 to 28 (shares). The reason for the IPO price identification is the amount of finance used for IPO creation.

Let us consider two options for R&D financing: including losses in the taxation systems and excluding them. Let us use the data of Tab. 1.

Table 4

Identification of R&D cost at the stage of commercialization in terms of R&D costs/IPO costs multiplier

Factors	Option 1 (including losses in the taxation system)	Option 2 (excluding losses in the taxation system)
R&D costs/IPO cost multiplier (times)	20	20
Net research costs (NCF_2), RUR.	1 103 412	–
Amount of grants (GR), RUR.	–	1 700 000
Identification of IPO cost range for the company from and to, RUR.	**22 068 238**	**34 000 000**

So, the value of the new technology can be identified from 22 to 34 million rubles, i. e. we review the process when the intellectual property object is being commercialized. Now we can estimate the effects of the new technology purchase (IPO) for the end-user, OAO Klimov.

We will do this both including and excluding the taxation (institutional) limitations. With the use of the data from the company's financial statements, we can calculate the index of the relative effectiveness of the investment costs on the basis of the elasticity principle. Traditional factors of the investment effectiveness (NPV, IRR) cannot be used here, since there are no capital forming investment costs, in the proper sense of the word, i. e. in this particular case we talk about purchase of an intellectual property object for the end-use by a manufacturer.

Table 5

The factor of the relative effect from R&D introduction (elasticity of costs connected with IPO introduction)

Factors	Option 1 (including losses in the taxation system)	Option 2 (excluding losses in the taxation system)
IPO price, RUR.	22 068 238	34 000 000
Prime costs, including direct effect, RUR.	438 216 900	438 216 900
=New prime costs of R&D, RUR.	460 285 138	472 216 900
Overall annual costs of the company prior to IPO introduction, RUR.	528 532 500	528 532 500
Total overall effect of R&D introduction	476 505 125	476 505 125
Relative effect of R&D introduction (by formula 3)	**1,158**	**1,128**

According to the accountancy requirements, the value added tax is not applicable for this transaction and the costs are written off in the current period with the reduction of the taxable profits. Further more, let us estimate costs of IPO introduction in the company. We know OAO Klimov production costs on high-technology products with account of direct savings when applying IPO (R&D results) and they are going to amount for 451 770 000 × × 0,97= 438 216 900 RUR.

$EEff_{R\&D} > 1$ – Innovation cost-effectiveness grows, and it is going to be higher for option 1, since IPO price is lower. I. e. at the micro level (researcher-manufacturer), the stipulated innovation activity is effective. In order to identify the effectiveness at the macro level, for the whole economic system: state – researcher and manufacturer- manufacture, the relevant cash flows should be identified. To do so, the value of OAO Klimov should be calculated prior and after IPO commercialization. The value of OAO Klimov prior to IPO commercialization can be calculated via the method of direct capitalization of profit as equal to 4 274 480 000 rubles at the recapitalization rate of 15 %. At the same time, its balance value is equal to 3 837 437 000 whereas the value of the owned capital is 1 171 371 000 rubles. To identify the market value of the company after the IPO has been commercialized, by formula (*), the share of R&D costs should be defined (34.7 % before the IPO was purchased and 35.98 % after it) in the total amount of the company's expenses (2 663 971 000 RUR). The financial statements show R&D costs as 924 437 000 RUR and the IPO cost as 34 000 000 RUR, which are included into the above-mentioned expenses. Then the value growth by formula (*) is 36 832 506 or 0.86 % to the value of the company prior to R&D commercialization.

Let us calculate the relevant cash flows for the economic system (state-researcher-manufacturer):

Table 6

Projection of the relevant cash flows for the economic system (state-researcher-manufacturer)

Factors, RUR.	1 year	2 year	3 year	4 year
1. Efflux of grant subsidies, RUR.	−200 000	−1 500 000		
2. Money repayment through taxes, RUR.	89 644	506 944		
3. Direct R&D effect, RUR.			3 838 125	
4. Losses in obtaining direct effect because of the taxation system and substitution of relations			−2 075 181	
5. Growth in the company's value				36 832 506
6. Overall CF in the economic system	−110 356	−993 056	1 762 944	36 832 506
7.NPV	22 936 505			

If the same cash flows are calculated, but without losses in the tax system, the amount of the current net value will increase and NPV= 23 898 367 RUR with the discount rate of 13 %. I. e. the system effectiveness would grow by 4.2 %. The obtained amount is rather modest, but for the economic system as a whole it is quite significant, therefore the above-mentioned approach helps to tackle the problem of the use of the company's intellectual activity results, estimate the effects of the introduced R&D results both at the micro- and macro levels.

By the basis are mean a set of fundamental elements of the model. Some elements (income, capital) are deterministic in nature; others are probabilistic in nature and have features to consider when managing. For example, it would be profits from future innovation with multiplicative (explosive) character, particularly, in chains of consistent innovation and in combination with significant life cycle of innovations up to 55-60 years.

In addition, intangible assets and intellectual property that were previously seen as R&D costs, in the innovation environment must be assessed from the perspective of future benefits as factors which increase the value of the company's assets. When assessing the value of the invested capital, it is required to optimize the capital structure and justify the selection of discount rates and inflation.

In this article, we examine the individual elements of this spatial model: value and risk analysis: analysis of the institutional environment. It is necessary to develop a model of market value factors management towards the factor relevant to the indicators used for decision-making at the appropriate level of management of the company. The main problem with this is the need to integrate and share key factors accounting for risk and uncertainty, to determine the optimal capital structure in the financing of innovation. In addition to the important factors that affect the market value of companies engaged in innovation – such as the life cycle of the company, technology, product innovation, it is necessary to assess and characterize the more traditional factors, but with characteristics. Thus, some innovators have a main value of costs and their structure. Innovation costs are current and capital. Current costs are the production costs of innovative products, accounting rules for taxable business income deducted regardless of the result, and to manage the market value, they must be capitalized and the economic value of value added should be taken into account.

The analysis of the value of assets is based on the principles and approaches of economic cost-benefit analysis, including models and criteria for investment analysis, the analysis of the present value (discounted cash flows), the analysis of uncertainty and risks (methods of mathematical economy, economic theory of options, the concept of margin). There are restrictions of the practical application of VBM concept in the value chain management due to the absence of the adapted management methodology and mechanisms for the formation of the companies' market value available for companies' management in the face of innovative development and environmental variability.

Resume. The scientific and technical activity in this country is one of the most complicated areas from the standpoint of social and economic mechanisms, legislative environment, transparency and accessibility.

Unfortunately, so far, the government has not taken steps in order to transfer scientific and technical activity into a full-fledged sector of the national economy. So far, no definite mechanisms have been worked out for the use of scientific and technical activity results, i. e. intellectual property in the economy. It is the government that must pay special attention to the scientific and technical activity and create economic and legal framework which will enable an exchange of scientific information, the commercialization of scientific research and development results. Commercialization in the information system and technology market, intellectual property items cannot be studied without understanding the essence of economic and information relationships and their specifics. This is exactly the major scientific result of the declared research.

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