

## Systematization of Expert Evaluations in Terms of Intellectual Property Commercialization

Aleksey V. Shusharin, Aidar M. Tufetulov and Fatikh Sh. Nugayev  
Kazan Federal University, Kremlyovskaya Street 18, 420008 Kazan, Russian Federation

**Abstract:** An increasing significance, within the framework of sustained development of the Russian economy is taken on by innovative economy, since this is where occurs the transformation of scientific and technical products, based on the results of fundamental and applied research into market products with high consumer properties. The need to accelerate the commercialization of the most advanced innovations is caused by aggravation of competition in the world markets under rapid development of science and technology, accompanied by a huge number of new ideas, inventions and discoveries. It is imperative to choose the most preferred, in terms of maximizing the benefits, uses of intellectual property. In the context of this research, it is suggested reviewing the method of expert evaluations a questionnaire method of ranking for direction of the commercialization of intellectual property by way of the example of a patent for “Method of Core Examination via the Analysis of its Coloration” (hereinafter, the object of intellectual property). The ranking method is applied to organize the information according to a factor when it is not required or impossible its precision measurement. According to the results of the survey in terms of the group peer review, it has been defined the most preferred direction of the commercialization of intellectual property for the “Method of Core Examination via the Analysis of its Coloration”. The proposed method is applicable in the areas where quantitative assessment of the object is impossible or extremely difficult.

**Key words:** Intellectual property, study core, ranking method, commercialization, expert evaluations, exploration

### INTRODUCTION

Today in Russia an increasingly important role is played by the processes taking place in the intellectual sphere where it is created as scientific-technical potential not only of an individual company but also of the states a whole. The results of R and Dare the intellectual property that is one of the most important factors in Russia’s transition to a post-industrial society based on high technology, therefore, the questions of creation, protection and commercialization of intellectual property today acquire a special significance.

Ever greater importance is assumed by innovation sector of the economy, as this is where the transformation of scientific and technical products, based on the results of fundamental and applied research, into market products with high application properties occurs. The need for the accelerated commercialization of the most prospective innovations is caused by aggravation of competition in the world markets under the conditions of rapid development of science and technology, accompanied by a huge number of new ideas, inventions and discoveries (Andreychikov *et al.*, 2015; Anonymous, 2010). The process of commercialization of innovations

requires considerable investments, the efficiency of investments of which is subject to a variety of risks (financial, technical, organizational and others). Thus, it is extremely important to choose the most preferred use of intellectual property in terms of maximizing the benefits.

### MATERIALS AND METHODS

**Expert evaluation method questionnaire method of ranking:** In the context of this research, it is suggested reviewing the method of assessments-questionnaire ranking method (Garayev and Ryazantseva, 2012) to select the direction of commercialization of the object of intellectual property by way of the example of a patent for “Method of Core Examination via the Analysis of its Coloration” (hereinafter, the object of intellectual property) (Valdaytsev *et al.*, 2002; Kletkina, 2008).

This method is aimed at solving the problems of geology and allows within the shortest possible period of time (3 days per 100 m of core) to obtain more precise information (up to a few tenths of a millimeter) of lithological rock structure as well as the location of reservoir rocks and average number of permeable intervals of the well profile.

As the introduction of the specified areas of intellectual property into economic circulation it has been identified:

- Use for auxiliaries (production)-area 1
- Pledge of property rights-area 2
- Formation of the charter capital of a legal entity-area 3
- Transfer of rights to the use according to license agreements-area 4
- Assignment of property rights-area 5

The ranking method is used to organize the information according to a factor when it is not required or impossible its accurate measurement. An expert assigns numerical ranks to each of the factors listed in the questionnaire: the most unimportant; the next in rank, etc.

If the survey is conducted (to increase the objectivity of the results) of several experts, then one ranks the factors in terms of relative sum of ranks of individual experts. For this purpose, one calculates the value which is determined by Eq. 1:

$$W_j = \frac{R_j}{\sum_j R_j} \quad (1)$$

Where:

$$R_j = \sum_{i=1}^n a_{ij}$$

the sum of ranks assigned by all the experts to the factor with number j. The next step is to calculate the coefficient of competence of the experts K which is calculated by Eq. 2:

$$K = (k_1, k_2, \dots, k_n) > 0 \quad (2)$$

Where:

- $k_j = 1/n$  = The initial value of competence of the experts
- $n$  = The number of the experts involved

Further, it is necessary to calculate the vector of the current group estimate:

$$\left[ y_i^{(0)} = \sum_{j=1}^n k_j^{(0)} \times y_{ij} \right]_{i=1, \dots, m} \quad (3)$$

In case of using the method of valuation, each expert a number in the interval from 0 to 1 assigns to each assessed factor. The result in gweight of the jth factor that determines its importance, is calculated as follows:

$$W_j = \frac{1}{m} \sum_i w_{ij} \quad (4)$$

Where:

- $m$  = The number of expert participating in the survey
- $w_{ij} = b_{ij} / \sum_j b_{ij}$  = The relative weight of the jth factor based on estimates of the jth expert

In the process of implementing a questionnaire method of ranking of the commercialization of intellectual property, professional experts of ten people have been engaged. The evaluation results of the areas of commercialization of intellectual property by ten experts on the ten point scale (0-10 points) are summarized in on the basis of the stated above evaluations to confirm the experts' opinions with the help of tools economic modeling, we have done the following calculations (Vishkaryov, 1984):

- Evaluation of relative significance of each of the areas of commercialization of the object of intellectual property
- Evaluation of competence of each expert

At the same time, not <2 iterations of calculation have been used to realize the given task.

## RESULTS AND DISCUSSION

First of all, let us find the sums of evaluations of each of the expert (bottom line in Table 1). Further, divide the valuation given by each of the experts from Table 1 by sum total of his valuations, as a result, we will obtain the matrix of normed valuations presented in Table 2. To find the original competence often experts ( $K_0$ ), let us divide 1 by their number (Fig. 1).

Further, on the basis of multiplying the arrays of Table 1 and Fig. 1 we will calculate the estimate of the current group ( $Y_0$ ) of the areas of the commercialization of intellectual property by ten experts (Fig. 2) using in Excel operator "MMULT" returning the product of matrices, stored in arrays. The result is an array with the same number of columns as array 1 and the same number of columns as array 2 (Fig. 2). If you use this operator, after supplying arrays references, shown in Table 2 and Fig. 1, press the keyboard shortcut: CTRL+ SHIFT+ ENTER.

Then the initial data needed to calculate the values of competence often experts  $K_1$  by multiplying out and summing the corresponding elements in Table 2 by values ( $K_0$ ) are formed. The results of calculation of input data for  $K_1$  are shown in Table 3.

The values of competence of experts ( $K_1$ ) are calculated by dividing the initial values for calculating ( $K_1$ ) by their sum total = 2.5489 (Fig. 3).

Table 1: The evaluation results of the areas of commercialization of intellectual property by ten experts, points 0-10

Areas of commercialization	Experts									
	1	2	3	4	5	6	7	8	9	10
1	0	0	2	1	3	4	1	2	0	1
2	2	3	4	5	5	3	4	7	0	2
3	2	2	3	5	4	4	7	0	2	1
4	7	8	9	9	7	5	4	7	8	9
5	4	5	7	2	3	6	1	2	4	8
Sum	15	18	25	22	22	22	17	18	14	21

Table 2: The matrix of normed valuations for each of ten experts on five areas of intellectual property commercialization

Methods of commercialization	Experts									
	1	2	3	4	5	6	7	8	9	10
1	0.0000	0.0000	0.0800	0.0455	0.1364	0.1818	0.0588	0.1111	0.0000	0.0476
2	0.1333	0.1667	0.1600	0.2273	0.2273	0.1364	0.2353	0.3889	0.0000	0.0952
3	0.1333	0.1111	0.1200	0.2273	0.1818	0.1818	0.4118	0.0000	0.1429	0.0476
4	0.4667	0.4444	0.3600	0.4091	0.3182	0.2273	0.2353	0.3889	0.5714	0.4286
5	0.2667	0.2778	0.2800	0.0909	0.1364	0.2727	0.0588	0.1111	0.2857	0.3810

Table 3: The results of calculation of input data for  $K_1$  (units)

Data	Experts									
	1	2	3	4	5	6	7	8	9	10
Input data for $K_1$	0.2817	0.2779	0.2514	0.2558	0.2295	0.2109	0.2130	0.2499	0.3040	0.2747
The sum according to $K_1$										2.5489

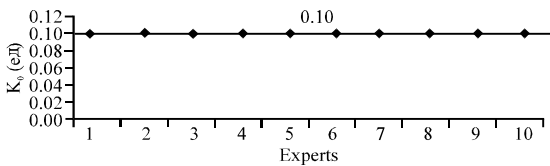


Fig. 1: The values of the original competence of ten experts ( $K_0$ )

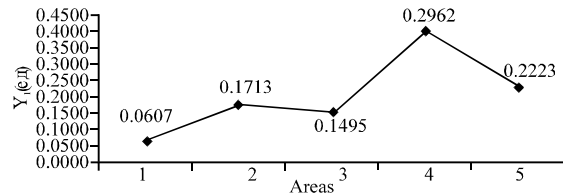


Fig. 4: The values of the current group estimate ( $Y_1$ ) of the areas of commercialization of intellectual property by ten experts

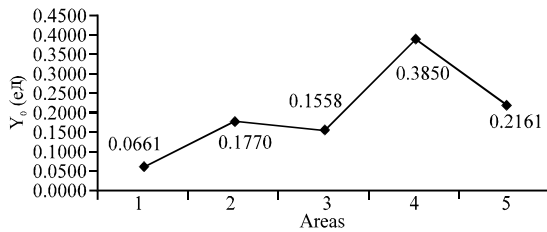


Fig. 2: Current estimate of group ( $Y_0$ ) of the areas of commercialization of intellectual property by ten experts

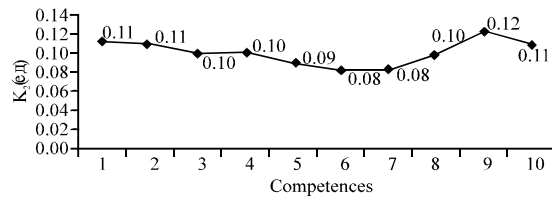


Fig. 5: The values of competence of ten experts ( $K_2$ )

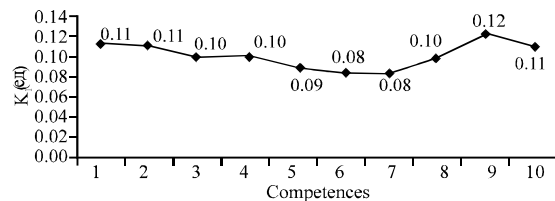


Fig. 3: The values of competence of ten experts ( $K_1$ )

The values of current group estimate ( $Y_1$ ) of the areas of commercialization of intellectual property by ten

experts are shown in Fig. 4. The results of calculation of initial data for  $K_2$  are given in Table 4. The values of competence of ten experts ( $K_2$ ) are shown in Fig. 5.

On basis of the data in Fig. 5, one can conclude that ten expert numbered 9 has the highest competence level of 0.12 units, but at the same, the competence of the other experts is quite high and a little different from the coefficient of competence of the expert.

The values of current group evaluation ( $Y_2$ ) of the areas of commercialization of intellectual property by ten experts are shown in Fig. 6.

Table 4: The results of calculations of initial data for  $K_2$ , (units)

Data	Experts										
	1	2	3	4	5	6	7	8	9	10	
Initial data for $K_2$	0.2869	0.2830	0.2551	0.2580	0.2308	0.2122	0.2117	0.2521	0.3113	0.2808	
The sum of $K_2$					2.5819						

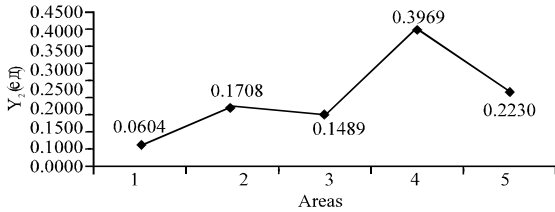


Fig. 6: The values of the current group evaluation ( $Y_2$ ) of the areas of commercialization of intellectual property by ten experts

**Summary:** Thus, one can conclude that in view of the group expert assessment, the most preferred of the areas of commercialization of intellectual property for the “Method of Core Examination via the analysis of its Coloration” is the fourth one the transfer of rights under license agreements.

**CONCLUSION**

The proposed method of determining the areas of intellectual property commercialization allows to examine the view point of each expert most objectively, it can be applied in the absence of resources and time for economic calculations on each area, or used as an adjunct to traditional methods of calculation of economic efficiency of commercialization.

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