Assessment of commercial feasibility of the device for the combined cutting of conducting materials by calculation of integrated koefficient

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Abstract. Authors have considered the problem points connected with commercialization of university intellectual property items in the field of electrochemistry, namely the device of electrochemical cutting of conducting materials. Key criteria for evaluation of an intellectual property item are designated. The method of calculation of commercial appeal which is most acceptable for this development on the basis of the generalized integrated coefficient, theoretically is offered and its commercial value is almost proved.

Important indicator of efficiency of innovative development is her realization in the market, or production applicability as process of commercialization is based on the basis of those intellectual property items which have sufficient degree of commercial appeal to potential investors. If to address statistics, then it states not consolatory data regarding a ratio of the invested capital on carrying out scientific research, developments, ensuring protectability of OIC.

Authors were interested in a question of determination of "the commercial value" of scientific and technical development, namely the device for the combined cutting of conducting materials (the patent for the useful RUS 134097 model 4/23/2013) [5]. The useful model belongs to the field of mechanical engineering, is intended for receiving openings of any contour in conducting metals by means of electrochemical processing, the rights for which belong to the Kazan (Volga) Federal university.

As a rule, check of the knowledge-intensive product before execution of the offer to the customer/investor demands carrying out a complex of analytical researches - novelty and the inventive level, an opportunity and reliability of legal protection, the period of action and territorial accessory of the exclusive rights to the patent, the size of the market, the feasibility study and degree of commercial risk.

These indicators traditionally are considered in expert community as the most acceptable for evaluating a kommeretsializuyemost of scientific and technical development. The three-level ball scale of estimation allows to determine the commercial value of an intellectual property item depending on the gained score. Undoubtedly, use of this method reserves also high degree of subjectivity. Advantage is that the method of ranging allows to estimate prospects of commercial realization at once of several OIC (further OIC) [1].
Authors for evaluating useful model suggest to use the expensive method based on compilation of all financial investments actually on research implementation, registration of the rights and ensuring protectability. In order that assessment had complex character, a necessary condition is acceptance in attention of distinctive features of the device. First of all, it is the novelty level promoting improvement of competitiveness, scientific and technical importance and industrial applicability with a possibility of variable use of the offered device for the combined cutting of conducting materials as the last two requirements will allow to reach the most powerful economic effect.

For this reason, it is important to carry out assessment of "commercial appeal" by several techniques, and then to construct integrated model for generalization of all key indicators. In turn, creation of integrated model demands introduction of such concept as "correlation coefficients" (correction coefficients), the quantitative and qualitative characteristics of a subject of the analysis intended for definition of influence on commercial appeal. "Correlation coefficients" are offered to be calculated by means of ball assessment of qualitative and quantitative characteristics of the device.

Thus, assessment of commercial value of OIC by an expensive method by means of creation of integrated model it is feasible according to the following scheme:

\[ CV_z = \text{Int.} z \sum_{r}^{t-rk} 3, \]

where \( CV_z \) - level of commercial appeal of scientific and technical development;
\( \text{Int.} z \) - the integrated coefficient received on the basis of generalization of "correlation coefficients" (correction coefficients) (tab. 1);
\( \sum_{r}^{t-rk} 3 \) – the generalized indicator characterizing financial investments on carrying out scientific research, compensation of developers, providing legal protection and the other incurred expenses for the entire period of research activity [2].

| Coefficient | Essence of coefficient | Admissible range of possible values of coefficients | Calculated values of coefficients (on the basis of expert assessment) |
|-------------|------------------------|----------------------------------------------------|---------------------------------------------------------------|
| Kp1 | Obsolescence of the device | \( K1 = 1 - (Tf/Tn) \), where \( Tf \) - the actual period of validity of the patent, years; \( Tn \) - nominal period of validity of the patent, years. from 0 to 1 | 0,5 |
| Kr2 | Physical wear of the device | from 0 to 1 | 0,7 |
| Kr3 | Level of complexity of the device | from 1 to 2 | 1,5 |
| Kr4 | Consumer value of the device | from 0 to 1,8 | |
| Kr5 | Level of the technical and economic importance | from 1 to 2 | 1,5 |
| Kr6 | Novelty of the device | from 0,4 to 1,2 | |
| Kr7 | Level of legal security of the device | from 0,6 to 1 | 1 |
| Kr8 | Level of prevalence of copyright of useful model | from 0,6 to 1 | 1 |
| Kr9 | Level of possible industrial use of useful model (readiness for introduction to economic circulation) | from 0,2 to 1 | 1 |
The risk level of introduction of useful model to economic circulation is from 0.3 to 1, 0.9.

The generalized integrated coefficient - is the work of values of quantitative and quality indicators (correlation coefficients) influencing commercial appeal of the device. Pays off depending on the applied assessment method.

We will explain that the expensive method at assessment of commercial potential of useful model takes into account basic correction coefficients - moral, physical wear, level of complexity and its relevance. The comparative method imposes more expanded requirements to assessment factors, than previous, and demands obligatory calculation of consumer value, level of the technical and economic importance, novelty and legal security, industrial applicability and that size of risk which the customer will face, having given preference to this useful model. Complexity of use of a method - receiving reliable information on the compared analog.

The profitable method as one of the most often used in practice, assumes establishment of relationship of cause and effect between unique features of technical solution and receiving the predicted profit on his use. Appraisers a number of additional factors, such as discount rate, planned character of settlement indicators therefore the subjectivity of assessment still remains at the high level is taken into consideration. Application of a profitable method isn't expedient concerning assessment of this useful model as the risk level of the potential customer at introduction of this scientific and technical development to economic circulation rather high, negatively is reflected in integrated coefficient. The risk is connected, first of all, with the high competition in the field of scientific research and inaccuracy of the predicted volume of future cash flows.

Thus, the generalized integrated coefficient for each method will be various [2]:

\[ \text{Int.}_{z} = Kr1*Kr2*Kr3; \]
\[ \text{Int.}_{c.} = Kr1*Kr2*Kr3*Kr4*Kr5*Kr6*Kr7*Kr9*Kr10; \]
\[ \text{Int.}_{d.} = K6*K8*K9*K10*K11. \]

Settlement data on determination of commercial value "devices for the combined cutting of conducting materials are presented in the expensive way in tab. 2 [6]:

| Item of expenditure | Percent to the total amount of expenses | General estimate |
|---------------------|----------------------------------------|------------------|
| The financial investments necessary on idea realization, including: | | 64,84 |
| 1. Material inputs, one thousand rub: | | 64,84 |
| - purchase of accessories, materials; | | 7,3% |
| - expenses of working hours, people/hour; | | 5,0 |
| - cost of labor hour of one permanent member of staff, rub/hour; | | 320 |
| - the number of the employees involved in development | | 187 |
| Expenses on ensuring protectability of development, including: | | 1 |
| 1. Registration of the rights for OIC, thousand rubles. | | 1,0 |
| 2. Obtaining patent for useful model | | 1,8 |
| 3. Maintenance of the patent for useful model within three years | | 1,2 |
| Total amount of investments | | 86,9% |
| Obsolescence of scientific and technical development (Kr1) | | 68,84 |

\[ 1 - (10/20) = 0,5 \]
Physical wear of scientific and technical development (Kr2) | 0,7
---|---
Level of complexity of technical development (K3) | 1,5
Int.\(z^*\) = Kr1*Kr2*Kr3 (in relation to an expensive method) | 0,525

The generalized indicator of commercial appeal of technical development:
\[ CVz = \text{Total amount of investments} \times \text{Int.}z^*, \text{thousand rubles.} \]

Advantage of an expensive method of calculation of commercial appeal before comparative is that unique features, namely physical and obsolescence, complexity of technical solution is considered that meets the main requirements of the carried-out assessment, increases her objectivity.

The mechanism of assessment of intellectual property items, namely useful model, by means of calculation of the generalized integrated coefficient allows to make reasonable corrections to quantitative and quality indicators and to influence result of calculation. Statement of the purpose and problems of evaluating, division of creative process into the interconnected stages and accounting of budget expenses on each of them, reliability and fully dimension of the provided information for calculation of total integrated coefficient, and, the main thing to check applicability of this approach to assessment of commercial potential of an intellectual property item. Having taken above-mentioned factors into account, it is possible to use a well-known way of generalization of results - the calculation of the average indicator based on introduction by an expert way of the weight coefficients which are most fully disclosing applicability and efficiency of the chosen assessment method for concrete technical solution.

Authors when calculating total weight coefficient takes into account the following factors - completeness and reliability of the provided information, compliance of the purpose of assessment.

The corrected commercial value of OIC according to an expensive method:

\[ CDVz = WCVz \times CVz, \]

where \(CDVz\) - the corrected development value;
\(WCVz\) - weight coefficient (authors have accepted - 0,15);
\(CVz\) - commercial value of technical solution.

The coordinated result of assessment of useful model for receiving openings of any contour by means of electrochemical processing taking into account the corrected coefficient is equal in conducting materials to 30,719 thousand rubles. This technical solution reaches self-sufficiency, is with other things being equal capable to make profit during her realization. Use of an expensive method has allowed to carry out express assessment, to estimate the volume of own capital investments at development, to consider specific features, in general, in a complex to analyse industrial applicability and potential of realization.

Authors see a possibility of realization of economic potential of an invention in input him in economic circulation through licensing. Sale of the rights to use OIC will allow to get profit. Having assumed that the license contract is signed for 3 years, the expected rate of payments for leasing payments will be not less than 4%, the expected output and, respectively, the price of a unit of production have every year a positive tendency of growth, we will receive the following results (table. 3):

**Table 3 - Results of the predicted profitability from licensing of useful model (the RUS 134097 patent 4/23/2013)**

| Name of an indicator | Value of an indicator |
|----------------------|-----------------------|
| Expected volume of product sales, piece. | 18 |
| The corrected cost of development, thousand rubles. | 30,719 |
| Expected rate of profitability of developers from product cost, % | 10 |
The carried-out assessment has shown that the potential of this useful model isn't used by the owner, and, respectively, it is necessary to take measures for improvement of effective management of an intellectual property item for receiving profit on commercialization. And in general, as show statistical data probability of realization university to OIC doesn't exceed 10% of that set of perspective projects which are studied within intellectual activity. The difficulties which have arisen during assessment of the useful model considered by us can be caused by a variety of reasons, first, it has become clear that RID initially hasn't been focused on commercial realization therefore it is rather problematic to reveal commercial advantages; secondly, readiness for industrial applicability of the device from the point of view of developers and investors can be various (it is necessary to address the first point); thirdly, despite the revealed commercial value, often there is an inconsistency of actions between participants of process of management of intellectual property [3,4].

Therefore, before making the decision on commercialization of OIC, it is necessary to carry out express assessment, in view of key features of concrete development, to connect to work advisory council for carrying out the professional analysis of the actual technical condition of RID and determination of its commercial value for the local markets (the industrial enterprises to which the idea can be interesting and ready to invest own financial means). You shouldn't forget that perspective development is subject to creation of the innovative project, and it is possible even the innovative business direction therefore specification when evaluating is an important condition.

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