

Technological Audit as a Method of Evaluation of the Commercial Attractiveness of the Objects of Intellectual Property

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SUMMARY

Considered in this paper are the questions used to assess the commercial potential of intellectual property objects in the theory and practice of the technological audit. A mechanism for the valuation of the level of commercial attractiveness of intellectual technologies is proposed, and the theoretical provisions of principles, objectives, and outcomes of technological audit are discussed. The features of the technological audit of the results of intellectual activities of industrial enterprises are determined. Journal of Economic Literature (JEL) code: M15

INTRODUCTION

In modern society intellectual products are traded as purchases of global importance in the background of the rapid and comprehensive development of science and industry. Sustainable success in business and development can be achieved by the enterprise or country that closely follows technological novelties and is at the forefront of scientific and technical progress. Analysis of products of the machine-building industries allows to assert that any firm that does not use the achievements of the past five years in their field of activity becomes uncompetitive and is much less effective than companies paying due attention to scientific achievements.

Evaluation of the commercial attractiveness of the objects of intellectual property (OIP) is the most important task in the innovation strategy of the economies of developed countries of the world (Abramov A.A., 2012). This is due to the fact that the solution of this problem directly affects the international competitiveness of national production. The object of the cognitions of objects of intellectual property goods is the commercial realization of forming a new feature of industrial organizations (Allen K., 2007). Intellectual property consists in the creation of a specific product which can be introduced into the economic turnover (Brett A., 1995; Zabelina I.N, 2006).

A STUDY OF THE EXISTING SITUATION

In an innovation economy, the competitiveness of an organization is determined not only by its ability to satisfy the public demand for production and realization of products, but also the ability to create, implement legal protection and to implement intellectual property on the domestic and the world market (Allen K., 2007). Today the majority of domestic organizations are in the typical situation where the composition of their assets includes the objects of intellectual property, which for many years not only were "dead weight", but which even at the stage of creation were not intended for actual use (Zabelina I.N, 2006). The company regularly continues to bear the costs for maintaining a patent in force, despite the absence of any economic effects of it (Kletkina Y.A., 2008). However, the realities of the modern Ukrainian economy are such that the need to protect the innovations which are able to improve the efficiency of production and generate income should be put in first place. This is necessary because of the diversity of the results of scientific-technical activities, so that promising objects of intellectual property with the greatest commercial potential need to be highlighted.

THE ADVANTAGES OF THE PROCESS OF COMMERCIALIZATION

The commercialization of intellectual property is the process of the involvement of the objects of intellectual property in economic turnover, using intellectual property in the business activities of enterprises. We list here a number of practical advantages of commercialization (Kozyrev, A.N., 2003; Pestunov M.A., 2006; Rodionova E.M., 2009; Spiridonov E.A., 2009; Kocziszky G., 2012; Rogers E.M., 1995):

- owners of intellectual property to be founders of companies without paying real money: money replacing the intellectual property contributed to the share capital of the company;
- additional income can be received for the transfer of the right of use of intellectual property;
- intellectual property can be used as collateral for obtaining credit;
- intellectual Property secures new products from competitors in the early stages of its life cycle, as well as protection against unfair competition;
- intellectual property contributes to the creation of the advertising image in providing information about the legal protection of the products or work on the license of a well-known manufacturer;
- intellectual property enables the reduction of the tax on profits by reducing the taxable base by the amount of depreciation of intangible assets and the amount of expenses for creation of objects of intellectual property;
- intellectual property allows to reduce the tax to the added cost, if the transaction is executed as a patent, license or creator's agreement.

THE SOURCES OF THE EFFECTIVENESS OF THE OBJECTS OF INTELLECTUAL PROPERTY

The economic sense of the commercial realization of intellectual property relations is in receipt of income. The form of the receipt of income is determined by the dual nature of intellectual property objects (Zabelina I.N., 2006; Kocziszky G., 2012; Rosenberg N., 1982). On the one hand, the objects of intellectual property may serve as a factor of production, representing a part of the resource potential of the enterprise or its intangible assets. On the other hand, objects of intellectual property may be a separate object of purchase, that is, the goods. Moreover, another option may be equally effective, to use the results of intellectual activity. The scheme of

receipt of income from the commercial realization of intellectual property is represented in Figure 1.

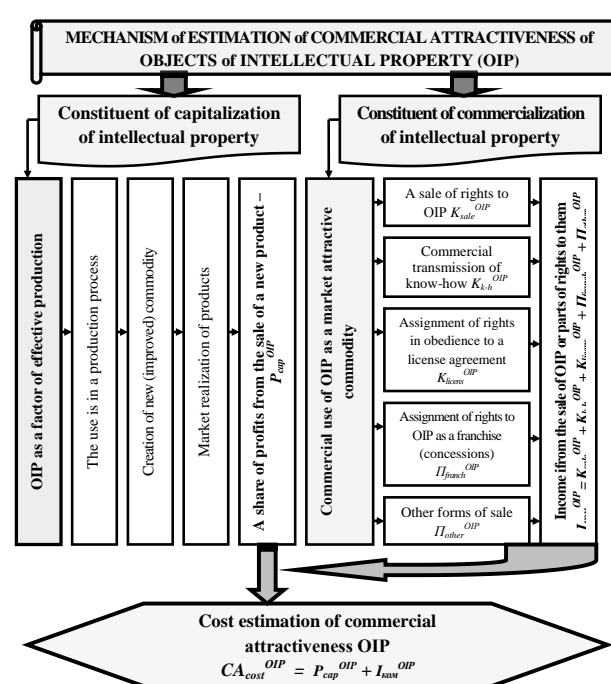


Figure 1. The mechanism of reception of the income from commercial realization of intellectual property

In the process of commercialization of objects of intellectual property as a factor of production there is a gradual transfer of value of intangible objects based on the value of the products produced, the so-called process of capitalization. In this case, the income is a part of the profit from the sale of the finished product, created with the use of innovations.

The implementation of the economic interests of the owner of the results of intellectual creative activity is possible not only at the stage of production, but also in the process of exchange through the commercialization of intellectual property, when the transfer of the rights to the income arises in the form of revenue from sale of the object or of some powers from the range of intellectual property rights. Capitalization and commercial use of intellectual property objects have a significant economic effect (Zabelina I.N., 2006).

TECHNOLOGICAL AUDIT AS A METHOD OF EVALUATING THE COMMERCIAL POTENTIAL OF OIP

Studies have shown (Brett A., 1995; Kletkina Y.A., 2008; Kocziszky G., 2012) that a technological audit is an important method of assessing the prospects of innovative development of an organization and its current technological condition and health.

In a general sense an audit is a process of accumulation and evaluation of information related to a particular economic system, in order to compare it with the established criteria. A technological audit is a variation of the operational audit and is an examination of the OIP, technological processes, methods, techniques, and procedures used in the organization, with the aim of evaluating their performance and effectiveness (Kocziszky G., 2012).

The implementation of the operational audit is, as a rule, a more complex task than that of other types of audit, as the efficiency of operations is usually much more difficult to evaluate objectively than, say, the financial statements based on generally accepted accounting principles. The criteria for the assessment of technological information are less stringent than in the case of financial statements, and are more subjective in nature. Therefore, an operational audit (and in particular, a technological audit) is to a certain extent similar to a consulting company's administration (Table 1).

Table 1
Comparative characteristics of a technological and a financial audit

Aspect of comparison	Financial audit	Technological audit
The main objective of the audit	Tests for compliance of the financial statements with generally accepted accounting principles	Assessment of the efficiency of production and management technologies
References to the time period	Largely retrospective character; focused on the past	For the prospects of economic activity; focused on the future of the business entity
The main users of the information obtained in the course of the audit	Informing external counterparties (creditors, shareholders, tax and statistical bodies, etc.) and managers of the organization	Designed mainly for managers of the organization

Clarifying the essence of the technological audit is assisted by its comparison with the audit of the financial statements on a number of characteristics. While in an audit of financial statements the auditor focuses on whether the economic operations are reflected in the financial statements, in the technological audit emphasis is placed on efficiency and productivity technologies. The audit of financial statements is focused on the past (has a retrospective character), while the technological audit for the prospects of economic activity is focused on the future of the organization. In the audit of the financial statements auditor's report, as a rule, is intended for many users (shareholders, bankers), while the technological

auditing is intended first of all for managers (administration) of the organization.

A technological audit is in operation an objective assessment of the capacity of OIP as an object of commercialization. In view of the fact that the commercialization of technologies is a long and expensive process, then, before a lot of time and financial resources are spent, it is necessary to appreciate the feasibility of the sale of the idea or invention or of its successful transformation into a market product. A study of the existing definitions of the technological audit has allowed the author to develop her own definition of this economic category. The technological audit allows us to understand the analysis of the object of intellectual property, new technologies (technology), the state of production equipment, which are involved in the production or, potentially, may be introduced in production or sold on the market. In other words, it is an evaluation of intellectual and industrial potential, as well as the technological capabilities of the enterprise from the point of view of the possibility of their promotion on the market, the economic effect of scientific and technical results, selection of optimal ways of using new technologies and the accumulated scientific developments.

The objects of the technological audit of the industrial enterprises are likely to become:

- objects of intellectual property;
- technologies;
- innovative programs and development plans or reorganization of production;
- production equipment;
- technological regulations and instructions;
- technological road maps;
- cost;
- investment projects.

As a result of these multiple objects, the technological audit of the enterprise can produce very different results. Their composition and priority depends on the tasks set. The author proposes that the main objectives of the technological audit should include the following:

- allocation of new intellectual technologies with commercial potential;
- the allocation of opportunities for their application at the enterprise (sale on the market and increasing the efficiency of production facilities);
- definition of the most probable ways to realize each opportunity;
- identification of opportunities to maximize the profit from the existing scientific development or technology;
- formation of a source of information for the elaboration of the strategy of management of the production potential of the enterprise;
- definition of ways of combining the existing production facilities with new production directions of activity;

- > definition of stages of the introduction of new production areas and their value;
- > definition of the reasons for instability of enterprises and over-consumption of resources. Development of a plan of activities ensuring a stable production process;
- > examination of conformity with requirements of process regulations, such as for production equipment; identification of causes of non-compliance with expenditure norms;
- > development of measures for management of the cost price of the technological process.

The process of conducting a technological audit in organizations can be divided into three main stages.

The first step is to review the technologies being used at the enterprise, and evaluation of opportunities of the enterprise in respect of the application of these technologies.

The second phase is an overview of the technologies used in other organizations, primarily those of competitors, and the identification of technological standards, i.e. the best technology used in practice. The main management tool for solving these tasks is benchmarking.

The third step in the audit process is to compare the use of technology in the organization with the technological standards, which allows to evaluate the effectiveness, and hence the market perspective. The main tool for solving problems of the third stage is the analysis of the technological portfolio of the organization.

To evaluate the commercial potential of the idea (invention) or other object of intellectual property it is necessary to conduct research and search for answers to many questions. The author proposes a methodology for technological audit of the OIP that includes the most important provisions, the essence of which can be reduced to the following provisions.

1. Authorship. In carrying out a technological audit first of all it is necessary to find out:

- > who is the author of the object of intellectual property;
- > who funded the creation of this object.

Unfortunately, the authors of the invention often do not attach due importance to the issue of financial sources of their development. However, if the invention was made in the course of implementation of scientific research, experimental design or technological work under contract, then according to Ukrainian legislation, the customer has the right to use the results of the work provided to it by the executor, including those capable of legal protection, and the contractor shall have the right to use the work results obtained by him for his/her own needs. This means, if the contract did not specify the distribution of the ownership of the treaty in the course of work results, all rights to inventions made during the execution of the work and transferred to the customer, the customer owns and authors can get a return

on their invention with the consent of the customer (the usually - written).

2. Patent search. This is carried out with a view to:

- > the search for similar inventions;
- > search of alternative decisions of task the technological audit of which is conducted.

The existence of a patented identical invention invalidates the further development of the idea (invention). The presence of other solutions to this problem leads to the need to assess the prospects of an idea (invention), not only from the point of view of competition with existing products on the market, but also to the possible competition from another unsold on the market as a product of the invention. Moreover, due to lack of information on the authors of these inventions intention, evaluation must be conducted in any case, even if the invention in the future will not be converted into a marketable product.

A patent search can be done:

- > independently, using the available database of patents, the search systems, the Internet, etc.;
- > on the server Ukrpatent to conduct a search of Russian patents (a search is partly paid, partly free of charge);
- > on the servers of the European patent organization, with the help of the free search engine system Espacenet;
- > on the network server Espacenet, which provides access to the interface in Russian language to the world databases of patent information and to patent funds of different countries and international organizations;
- > using the services of a patent attorney. A complete list of patent attorneys in Ukraine can be founded on the site Ukrpatent;
- > order the carrying out of a search organization, rendering services on conducting a patent search.

3. Inspection of technical feasibility. The method of obtaining the results consists of two consecutive stages:

- > checking the reliability of the concept;
- > assessment of the performance of the product in the real world.

Validation of the concept is often quite a time-consuming process, because there are only "general considerations" on the reliability of the concept, so it is necessary to confirm the calculations and test them in practice by experiments (in some cases, by simulations). A successful practical proof-of-concept should evaluate the performance of the product (technology) under real conditions of operation, which will be created on the basis of the proposed concept. This assessment will help:

- > identify some obvious obstacles to the use of an intellectual product by the end user;
- > approximately evaluate the technical characteristics of a possible intellectual product;
- > find new areas of application of the intellectual product (technology).

4. Definition of technologies for comparison. To assess market prospects of the intended product (technology) it is necessary to conduct a search of products and technologies existing on the market that solve the same problems and meet the same needs of the buyer. Such a search is best carried out with the help of search engines, which allow you to specify the parameters of search queries. Researches show that the authors of ideas on objective reasons often over-estimate the nicety of the idea, therefore in descriptions of projects, offered for practical realization, a phrase is present "unique technology, not having analogues in the world". In the vast majority of cases (although, of course, there are exceptions), this phrase means only that the authors did not conduct a patent search and search of similar technologies and products, or a search was conducted but not thoroughly. The results of the search should contain the following information:

- products and technologies available on the market and similar in purpose;
- their technical characteristics;
- their cost characteristics (including maintenance).

5. Determination of the market benefits of technology. Assessment of the market advantages of the intellectual product or technology is made up of several components.

In the case when the product has no analogs on the market, the potential market of a product may be very extensive. In this case, the manufacturer most likely will need a substantial investment of financial resources for the advertising campaign of a new product in order to convince the buyer that he (the buyer) must satisfy his need (of which he had not known) for a new product. In such a situation it is necessary to carefully assess the market of the intended product.

In the case of analogs of the prospective product being already on the market, we should:

- compare the prices of the intended product and analogs;
- assess the degree of improvement of technical and consumer properties in comparison with the analogs;
- compare the value of the intended product and analogs;
- compare the estimated operating costs and the operating costs of the analogs.

6. Evaluation of market prospects. In evaluating the market prospects of the intended product (technology) it is necessary to take into account the following factors:

- actual presence of market of this object of intellectual property (whether there is a requirement in this commodity);
- the size of the market and its dynamics. Studying the market of any products and forecast of its dynamics over the next few years is a very difficult task and the best solution is to

contact the experts. It is quite possible that the size of the market for the new product is restricted, or negative dynamics mean that by the time of the release of the new product demand will be very small.

- competition in the market. The existence on the market of active competition and large companies—competitors with significant resources—significantly reduces the likelihood of successful commercialization of ideas or inventions.

7. Practical feasibility. Evaluation of the practical feasibility of the idea (invention) is carried out in the following directions:

- the availability of specialists, both in the technical and the commercial realization of the idea;
- estimation of the cost of ideas and the availability of funding;
- availability of materials for realization of the idea;
- term of realization of the project for the commercialization of ideas and a payback period of invested funds;
- procedural restrictions on the production of the intended product.

Now let us consider what is evaluated during the technological audit, how and according to what criteria. Selection of evaluation criteria directly depends on the purpose of the audit and can quite vary greatly depending on the branch of industry, on the situation in the business sphere of a region or country, and on the specifics of the object of evaluation. In general, though its development innovative technology can act on the various aspects of the existence and activities of both the company and its particular enterprise. Therefore, the emphasis and the importance of the criteria for the evaluation of technologies can vary considerably. Table 2 shows the main parameters for carrying out an assessment of the commercial potential and the capacity of transfer of technologies (Brett A., 1995). Comparison of the identified technologies usually begins with such a table. In the cells of the table in the mode of active discussion a score is given for each of the technologies identified in the course of technological audit. Various systems of scoring occur in different countries. In this case either a five-point system (modeled on schools) or some other five-point evaluation system (for example, from -2 to +2) seems convenient with the semantic content of each assessment:

- +2 - excellent,
- +1 - good, acceptable,
- 0 - satisfactory, medium (as well as vague, unknown),
- -1 - poor, significantly below the average,
- -2 - very poor.

Table 2
Matrix calculation for capacity for commercialization and building technology transfer

Potential for commercialization of intellectual property objects		intellectual property objects		
		№1	№...	№ N
1	The reasonable cost of the commercial establishment of the OIP			
2	The opportunity to obtain not one, but a family of products or applications			
3	The existence of a market			
4	Competitive advantages			
5	Industrial elaboration already carried out or being conducted at the present time			
Final assessment of potential commercialization of the OIP				
The potential transfer of the OIP				
1	OIP is sufficiently prepared to transfer			
2	There is a group that can help in the development or transfer of intellectual property objects			
3	OIP is worthy of attention from a market point of view			
4	Terms of commercialization are reasonable			
5	Actual or potential buyers of technology or license have been identified			
Final assessment of the potential transfer of the OIP				
Total assessment				

In addition, it is possible to go beyond these interval estimates, if any parameter of technology is fundamentally unacceptable (for example, from an environmental point of view, or by reason of dual-use prohibited by specific agreements), or promises such high profits that it may outweigh minor flaws in the other dimensions.

According to the results of completion of the summary matrix for all technologies identified by the customer in the course of the audit, the sum of the points are simply calculated as total points characterizing separately the commercial potential and the potential of the transfer, as well as the final score given as the sum of these two summary points. By the result of audit and there is a report of these three marks on all technologies, on the basis of what recommendation is formulated about the preference of work on the transfer of technologies, collecting maximal marks, and on occasion – and

recommendation about the most preferable strategy of transfer or commercialization.

CONCLUSION

The results of the study showed that technological auditing is one of the essential conditions of successful implementation of the results of innovation activities in any country. The individuality of innovative products requires each of the enterprises to develop their own approach to this process. Therefore, for the effective commercialization of objects of intellectual property enterprises need to pay particular attention to the selection of a method of commercialization. The enterprise which can not only develop an innovation, but also the right to implement it, is able to preserve its competitiveness and increase the efficiency of its activities.

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