

## INDICATORS SYSTEM FOR MONITORING INTELLECTUAL PROPERTY MANAGEMENT IN COMPANIES

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*Organizations and companies with a high level of competitiveness had developed intellectual property management systems that aim at assuring information and indicators for decision-making. Furthermore, the systematization and monitoring of information on intellectual property management contributes to the improvement, reliability, quality and efficiency of managerial efficiency, offering, in the end, to the company an image of its competitive advantages, generated by the intellectual property.*

*The purpose of this work is to identify a system of indicators (benchmarks) that can be used for monitoring through self-evaluation of the intellectual property management as part of a methodic approach on researching the intellectual property management system in companies.*

*The main results achieved following the investigations were the development of a set of indicators (benchmarks) for monitoring the management of intellectual property in companies. Also, being based on this group of indicators, an integrated indicator for assessing the effectiveness of the management system of intellectual property in companies had been developed.*

**Keywords:** *intellectual property, intellectual property management, monitoring, intellectual property monitoring indicators, company.*

*Organizațiile și întreprinderile cu un nivel înalt al competitivității au elaborat sisteme de gestiune a proprietății intelectuale care au drept scop asigurarea cu informații și indicatori pentru luarea deciziilor. O sistematizare și monitorizare a informației privind gestiunea proprietății intelectuale la întreprindere contribuie la îmbunătățirea, fiabilitatea, calitatea și eficiența deciziilor manageriale, oferind în final întreprinderii o imagine a avantajelor sale competitive generate de proprietatea intelectuală.*

*În articol sunt prezentate rezultatele studiului cu privire la identificarea unui sistem de indicatori (repere) ce poate fi utilizat pentru monitorizarea prin autoevaluarea activității de gestiune a proprietății intelectuale, ca parte a unei abordări metodice privind cercetarea sistemului de gestiune a proprietății intelectuale la întreprindere.*

*Principalele rezultate obținute în urma investigațiilor se referă la elaborarea unui set de indicatori (repere) de monitorizare a gestiunii proprietății intelectuale a întreprinderii, în baza cărora a fost elaborat un indicator integrat de apreciere a eficienței sistemului de gestiune a proprietății intelectuale la întreprindere.*

**Cuvinte-cheie:** *proprietate intelectuală, gestiune a proprietății intelectuale, monitorizare, indicatori ai monitorizării proprietății intelectuale, întreprindere.*

*Организации и компании с высоким уровнем конкурентоспособности разработали системы управления интеллектуальной собственностью, направленные на предоставление информации и показателей для принятия управленческих решений. Систематизация и мониторинг информации по управлению интеллектуальной собственностью на предприятии способствуют повышению надежности, качества, эффективности управленческих решений, обеспечивая предприятию, в конечном счете, картину ее конкурентных преимуществ, связанных с интеллектуальной собственностью.*

*В статье представлены результаты исследования по определению системы показателей (ориентиров), которые могут быть использованы для мониторинга управления интеллектуальной собственностью, как часть методического подхода к исследованию системы управления интеллектуальной собственностью на предприятии.*

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На основе результатов исследования был разработан набор показателей (ориентиров) для мониторинга управления интеллектуальной собственностью на предприятии, а также интегральный показатель для оценки эффективности системы управления интеллектуальной собственностью на предприятии.

**Ключевые слова:** интеллектуальная собственность, управление интеллектуальной собственностью, мониторинг, показатели для мониторинга интеллектуальной собственности, предприятие.

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In the process of the companies' operation, intellectual resources are both used and created. Once intellectual outputs are transferred into intellectual property objects, which can take the form of a new or considerably improved product/process, these can have a considerable impact on the company's competitiveness. At the same time, intellectual property objects (IPOs) can become the object of the purchase-sales relations, being an additional source of income.

To protect intellectual property (IP) assets, companies must manage the IP which they own, which would contribute to the increase of their competitive advantages on the market. This is valid, first of all, for innovative and industrial companies, since they are, largely, based on knowledge, and require, thus, to manage a wide range of IPOs: inventions, trademarks, industrial designs, copyright, etc.

However, according to certain studies [1, 7], at present stage, the companies of Moldova do not use the IPOs which they own, have no perspective vision of the advantages generated by the intellectual property which the company has and pay no appropriate attention to intellectual property management: identification of intellectual property, obtaining of protection, exploitation and monitoring of the intellectual property.

In spite of the fact that in the national literature of the last decade more attention is paid to the research of different aspects of intellectual property and its management, still, the aspect of intellectual property management in companies is insufficiently studied, which is reflected also through the limited number of methodic materials.

According to the researched literature [3, 6], there are a number of tasks which intellectual property management has: systematization and analysis of the use of the IPOs; determination of the forms of protection of the IPOs; determination of IPOs with dominant position; IPOs' registration; IPOs' commercialization; surveillance of the violation of exclusive rights.

According to Berman (1999), successful IP management can be performed through an IP management system [2]. We believe that an IP management system can act as an instrument of systematization, collection and consolidation of data on existing IP and how this is managed, offering, thus, useful information for managerial decision-making.

To effectively use the innovational process, it is necessary to appropriately organize the system of intellectual property management, which should be understood as the mechanism of the creation, identification of IPOs, protection and exploitation of IPOs, etc.

The purpose of an IP management system in companies is, first of all, to maintain the companies' competitiveness, their adaptation to the changes around. A system of IP management in companies is understood as a set of sub-systems, members of intellectual activity, as well as specific proceedings, forms and methods of management development, adoption and enacting management decisions on creating, using and developing intellectual activity.

In other words, the IP management system is being realized in the area of creation and exploitation of IPOs, which consist of functionally interdependent elements: financial, material, human, informational, organizational operational conditions, including formulating, approval and implementation of managerial decisions.

The approach proposed by the authors implies and aims at getting operational information on the condition and efficiency of the IP management system, existence of IPOs at the company, their exploitation, etc. This approach is presented as a procedure for researching the company's IP management system, which represents the monitoring of the intellectual property management activity, which would lead to the identification of the state of things in this area and would implicitly contribute to making more efficient decisions in the area of intellectual property management at the company. Thus, the authors have developed

a system of indicators (benchmarks), which would allow companies to monitor, through self-evaluation, the intellectual property management activity – identification, systematization of the intellectual property it owns and how it is exploiting, sources of information on IPOs' creation, the composition and characteristics of the human resources engaged in this area, etc.

According to [4], monitoring can be defined as a continuous function, whose main objective is to provide to the management and the stakeholders information on the progress or lack thereof, in achieving results in a certain area.

Many look at the function of monitoring as a form of control over the activities included in a project. Thus, from the projects' perspective, monitoring represents a systematic collection, analysis and use of information from projects and programs.

Applied to the intellectual property management, monitoring would allow for collecting and registering information, as well as analyzing it in relation to the intellectual property management activity, as a basis for managerial decision-making. This would allow the entrepreneur to ask the following questions: which are the company's IPOs? Which IPOs should be renewed? Are these IPOs exploited? Are they counterfeit? etc.

In the light of the above, we suggest a set of benchmarks (indicators) of self-evaluation/monitoring of the IP management activity, which was divided, conventionally, into several blocks: Elements which characterize the innovational activity; Expenses which innovational activity and the development/procurement of IPOs imply; The human potential engaged in this process; Legal protection of products/services; Activity on the IPOs market; IP management structure; Indicators which characterize the impact of IP management.

Furthermore, a more detailed presentation of each bloc of indicators follows [7].

**Block 1. Elements which characterize the innovational activity**

**Goal:** *allows understanding how the company creates new products and how creative activity is motivated.*

1.1. Ways of developing new products/services

- One's own developments,
- Procurement of licenses,
- Imitations,
- Cooperation with other companies, universities, research entities, etc.

1.2. Existence of a system of incentivizing creative activity

- Moral incentives,
- Financial,
- Mixed.

**Block 2. Indicators which are specific to expenses incurred by the innovational activity and development/procurement of IPOs**

**Goal:** *Allows knowing the amount and structure of expenses for innovative activities, creation and/or purchase of IPOs.*

- Internal research-development expenses,
- Expenses for purchasing machinery and equipment,
- Expenses for purchasing hardware,
- Expenses for purchasing software,
- Expenses for staff training,
- Expenses for registering IPOs, etc.

**Block 3. Sources of information in the area of IPOs creation**

**Goal:** *The company must be aware of the latest approaches in the area in which they operate. Therefore, it is necessary to identify basic sources of information on IPOs development.*

3.1. Internal sources:

- Research activities,
- Marketing,
- Manufacturing and distribution.

3.2. External sources:

• internet, clients, research entities, magazines, consultants, exhibitions, conferences, data bases, competitors, other companies, suppliers, etc.

**Block 4. Human potential**

**Goal:** *Allows knowing the composition and the characteristics of the company's human resources and the trends in the area, with a view to personnel evolution and changes.*

4.1. The personnel composition as to their level of qualifications:

- the number of staff with general education, vocational schools, professional schools, university and post-university degrees,
- the number of staff with technical education, professionals in science (engineering, physics, chemistry, biology, etc.), other professionals.

4.2. Human resources engaged in innovational activities (IPOs creation)

- number of staff engaged in IPOs research, innovation, creation,
- qualification of the staff engaged in IPOs research, innovation, creation.

4.3. Staff training

- type of training (IT, technological process, administration, quality management, stimulation of creativity, training in innovation, intellectual property, marketing of new products, etc.),
- number of trained persons.

**Block 5. Legal protection of products/services**

**Goal:** *Allows identifying and systematizing IPOs existing at the company, to what extent they are protected by intellectual property protection titles.*

5.1. Size and structure of the company's IPO portfolio:

5.1.1. Number of the company's intellectual property objects:

- Inventions,
- Industrial designs/models,
- Utility models,
- Trademarks (collective trademark, certification trademark, etc.),
- Appellation of origin,
- Geographical indications,
- Guaranteed traditional specialties,
- Plant varieties,
- Data bases,
- Know-how,
- Software,
- Scientific, literature or art works,
- Other outputs of intellectual activity.

5.1.2. Number of applications submitted to obtain protection titles over IPOs

- Domestically,
- In other countries.

5.1.3. Number of protection titles obtained

- Domestically,
- In other countries.

**Block 6. Activity on the IPOs market**

**Goal:** *Allows seeing to what extent the intellectual property rights are exploit, as well as to identify violations of intellectual property rights and monitor the resolution of conflicts which involve violations of intellectual property rights.*

6.1. Number of concluded licensing agreements (cessation, pledge, etc.), of which:

6.1.1. Number of purchased licenses

6.1.2. Number of issued licenses

6.2. Number of intellectual property rights violations in companies

6.3. Number of trials concerning violations of intellectual property rights

6.4. Number of resolved conflicts in the area of intellectual property (pre-trial, after the trial)

**Block 7. The structure of the intellectual property management**

**Goal:** *To pay the company's management's attention to the need to formalize business processes, given that one of the basic conditions for an efficient intellectual property management is a formalization of business processes – definition of tasks, responsibilities, the sequence of their execution, resources, as*

well as other parameters. Lack of formalized procedures of intellectual property management leads to various difficulties, such as: incompatibility between documents, doubling of functions of different departments, limited level of staff information, etc.

7.1. Existence of an intellectual property management sub-unit or a person in charge of this area

7.2. Existence of the internal rules of procedures at the company in relation to the intellectual property

7.3. Existence of the internal rules of procedures on the motivation of the personnel involved in activities related to the innovation and IPOs creation

**Block 8. Indicators which characterize the impact of intellectual property management**

**Goal:** Allows evaluating the effects of IPOs' exploitation on the company's performance.

8.1. Revenues from the commercialization of rights over IPOs

- Licenses,
- Cessations,
- Franchises, etc.

8.2. Value of intangible assets (8.2.1. Inclusion of IPOs in the company's balance sheet)

8.3. Indicators' trends concerning intangible assets (growth indexes)

8.4. The share of intangible assets in total assets

Monitoring the intellectual property management can be started with the compilation of the information basis. An information basis for the analysis could also be the information from the balance sheets of the studied enterprises, statistic forms, such as: form 4-tn Submission, implementation and use of inventions and rationalization proposals, form no. 1 – science, etc.

The ideas concerning the IPOs creation can arise from the internal activity of the company: from research, marketing, manufacturing activities, as well as from external environment: research institutes, exhibitions, etc. (*block 3*). Also, the knowledge is acquired through learning, imitation and efficient and systematic training of the company's personnel, involved in innovative activities, in IPOs' creation, etc. (*block 4*).

The IPOs' protection stage implies a number of measures on assuring legal protection of the created intellectual outputs, which, besides patenting, can also include procedures on introducing the commercial secret regime. Also, to protect the copyright, it is possible to publish articles on technical solutions, which the company has no interest to patent. IPOs which are there in the company are identified by collecting and analyzing information on IPOs which exist in the company, the number of applications for IPOs' protection titles, as well as the number of protection titles owned (*block 5*). As a result, the company can create a log of intangible assets, which would contain details on the condition of existing IPOs, used IPOs, potential IPOs, not used IPOs.

At the stage of intellectual property commercialization, the owner of the intellectual property, using its right of monopoly over protected products, protects its rights both within the country and abroad, as well as receives additional financial benefits on the grounds of existing agreements. The IPOs which are transformed into products and services (or rights over them) are sold to make sales and revenues (*blocks 6; 8*). Also, *block 6* reflects the violations of intellectual property rights and monitors the state of the art in relation to the resolution of conflicts which imply violations of property rights.

Lack of formal proceedings of intellectual property management leads to various problems, such as: incompatibility between documents, doubling of the functions of different departments, a limited level of personnel information, etc. Thus, in order to draw the company's management attention to the need to formalize the business processes it is necessary to make an assessment of the organizational structure of the intellectual property management (*block 7*).

The systematization of the information on IP management in companies would improve the quality and efficiency of management decisions in this area. Being based on a set of indicators (benchmarks) which was described above, we wanted to develop an integrated indicator of the efficiency of the IP management system, which could be appreciated as a multitude of separate indicators, which describe various aspects of the system. Since indicators are part of different blocks and they are quantified differently (qualitative and quantitative), developing an integrated indicator would provide a totaling evaluation of the IP management system efficiency. An integrated indicator of the IP management system efficiency shall mean a synthesis of a multitude of characteristics of the intellectual property management, which allows describing the achievement of the objectives of its operation.

For an easier interpretation of the results of the integrated indicator, the Harrington’s verbal-numerical scale can be used. In order to describe the results of the efficiency of the IP management system, the scale in the table below can be used. The scale is conventionally divided into an interval from 0 to 1 in sub-intervals: [0; 0.2], [0.2; 0.37], [0.37; 0.63], [0.63; 0.80] and [0.80; 1.00].

Table 1

Intervals according to the Harrington’s verbal-numeric scale

Interval	Description of the characteristic
0.00-0.20	The IP management system is in a very poor condition
0.2-0.37	The IP management system is in a poor condition
0.37-0.63	The IP management system is in a satisfactory condition
0.63-0.80	The IP management system is in a good condition
0.80-1.00	The IP management system is in an excellent condition

Source: Based on [4].

We propose that the integrated indicator of the IP management system’s efficiency is calculated based on the more important particular indicators. In this regard, the list of proposed indicators-benchmarks should be divided into 2 levels: quantitative and qualitative indicators. The group of quantitative and qualitative indicators, based on which the integrated indicator would be calculated, shall be calculated by granting to these indicators some values, between 0 and 1 (formula 1).

$$I_{ef} = \frac{\sum_{k=1}^n x_k}{n} \tag{1}$$

where,

- $I_{ef}$  – the integrated indicator of the IP management system’s efficiency,  $0 \leq I_{ef} \leq 1$ .
- $x_n$  – quantitative and qualitative indicators which describe the IP management system.
- $n$  – number of indicators.

Table 2

Groups of indicators which are needed for calculating the integrated indicator for assessing the IP management system’s efficiency

Quality indicators					
<i>Ways of developing new products/services (x<sub>1</sub>)</i>					
Current ways	1	2	3	4	Missing
Values	0.25	0.5	0.75	1	0
<i>Existence of a system of motivating creative activity (x<sub>2</sub>)</i>					
Current ways	1	2			Missing
Values	0.5	1			0
<i>Sources of information in IPOs creation (x<sub>3</sub>)</i>					
Current sources	1	2			Missing
Values	0.5	1			0
<i>Existence of an IP management sub-unit (x<sub>4</sub>)</i>					
Ways	Yes				Missing
Values	1				0
<i>Existence of the internal rules of procedure within the company with reference to IP (x<sub>5</sub>)</i>					
Ways	Yes				Missing
Values	1				0
<i>Existence of the internal rules of procedure on motivating the personnel involved in innovation and IPOs’ creation (x<sub>6</sub>)</i>					
Ways	Yes				Missing
Values	1				0

## Quantitative indicators

<i>Share of personnel with higher education and post-graduate degrees (x<sub>7</sub>)</i>					
Share	1-25	25-50	50-75	Over 75	Missing
Values	0.25	0.5	0.75	1	0
<i>Share of qualified personnel (x<sub>8</sub>)</i>					
Share	1-25	25-50	50-75	Over 75	Missing
Values	0.25	0.5	0.75	1	0
<i>Share of personnel involved in innovational activities (IPOs creation) (x<sub>9</sub>)</i>					
Share	1-25	25-50	50-75	Over 75	Missing
Values	0.25	0.5	0.75	1	0
<i>Share of trained personnel (x<sub>10</sub>)</i>					
Share	1-25	25-50	50-75	Over 75	Missing
Values	0.25	0.5	0.75	1	0
<i>Number of IPOs in the company (x<sub>11</sub>)</i>					
Number	1-5	5-10	10-15	Over 15	Missing
Values	0.25	0.5	0.75	1	0
<i>Number of submitted applications for the IPOs' protection titles (x<sub>12</sub>)</i>					
Number	1-5	5-10	10-15	Over 15	Missing
Values	0.25	0.5	0.75	1	0
<i>Number of purchased licenses (x<sub>13</sub>)</i>					
Number	1-5	5-10	10-15	Over 15	Missing
Values	0.25	0.5	0.75	1	0
<i>Number of granted licenses (x<sub>14</sub>)</i>					
Number	1-5	5-10	10-15	Over 15	Missing
Values	0.25	0.5	0.75	1	0
<i>Number of IP rights violations by the company</i>					
Number	1-3		Over 3		Missing
Values	0.5		0		1
<i>Number of resolved conflicts in IP PI (x<sub>15</sub>)</i>					
Modalities	Resolved			Unresolved	
Values	1			0	
<i>Revenues from the commercialization of IPOs rights (x<sub>16</sub>)</i>					
Interval	Up to 10000 MDL	10000-40000 MDL	40000-80000 MDL	Over 80000 MDL	Missing
Values	0.25	0.5	0.75	1	0
<i>Annual economic effects from IPOs' implementation (x<sub>17</sub>)</i>					
Interval	Up to 100 thousand MDL	100-400 thousand MDL	400-800 thousand MDL	Over 800 thousand MDL	Missing
Values	0.25	0.5	0.75	1	0
<i>Inclusion of IPOs in the company's balance sheet (x<sub>18</sub>)</i>					
Modalities	Included in the balance sheet			Missing	
Values	1			0	
<i>Share of non-material assets in the total assets (x<sub>19</sub>)</i>					
Number	1-25	25-50	50-75	Over 75	Missing
Values	0.25	0.5	0.75	1	0

Source: Developed by the authors.

### Conclusions

The systematization of information on intellectual property management at the company and its monitoring would improve reliability, quality and efficiency of management decisions in this area. This set of benchmarks can be obviously adjusted and completed depending on the specifics of the company (type of activity, size of the company, activity on the external market, innovational composition, etc.).

Thus, the monitoring of these indicators would allow solving such tasks as:

- improving the assurance of the intellectual property management system with different types of resources (human, informational, organizational, etc.);

- developing the intellectual property management strategy;
- formulating the intellectual property management structure;
- arguing for and improving the quality of the managerial decisions;
- decreasing the level of uncertainty concerning the operations with the results of the intellectual activity.

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