

## THE EVALUATION OF INTELLECTUAL PROPERTY USING QUANTITATIVE METHODS

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*ABSTRACT: Currently the importance of intellectual property continues to rise. The market where the intellectual property assets are traded supports significant changes, which increase the importance of how assessment methods are applied to it. In present economy, the share of intellectual property assets in the total value of a company has greatly increased, which brings greater importance to a correct evaluation. This article aims to analyze the quantitative methods and the situations in which these methods must be used according to the assessment principles, context and purposes as well as the requirements that must be taken into account in preparing the assessment report. The article contains a case study that analyses the world's top 10 brands based on a ranking compiled by Interbrand. There are being analyzed the trends on the leading brands market, the value evolution, their origin and structure.*

*Keywords: intellectual property, assessment, quantitative methods, patent, trademarks*

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### Introduction

To be competitive in the context of an economy based on knowledge, the companies offer great attention to the intangible part of their heritage. Thus, a great importance is given to the way in which trademarks, patents, copyrights, industrial designs and models are being evaluated. They offer the holders advantages over competitors, offering them opportunities for growth and development.

Determining the value of intellectual property assets is important for the following reasons (Smith, G. V., Parr R. L., 2005):

Making the transactions – since the intellectual property assets are sold on the market and the external assessment has an important role in making a decision, when the buyer wants to make a purchase an impartial assessment is recommended because that provides a reference price around which to carry out future transactions.

The licensing – when a license is provided, the owner is interested in knowing the value of the asset to determine the royalties and future profits that will be generated. In case of strategic alliances, the evaluation is necessary because the share of the new entity must be determined, by finding the value of the companies composing it.

The bankruptcy – the value of intellectual property presents great importance to creditors who are in a position to recover the debt.

In case of litigation - to determine the compensation that must be paid by the person who infringed intellectual property rights, commonly encountered piracy and counterfeiting cases where the evaluation is very important and sometimes difficult to perform because of large differences in price between an original and counterfeit product. The question in this case is if the buyer was really misled or, taken his financial possibilities into account, he could have afforded an original product.

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Warranties – when a credit is contracted and the prevailing assets of the company are intellectual property assets, such cases becoming increasingly common, given the fact that intangible assets begin to be more and more important in the patrimony of many companies.

Legislative regulations - when the legislation requires the assessment of these assets and its evidence in the accounts, offering various tax incentives or tax exemptions to income derived from intellectual property.

The methods used in evaluation can be divided into two groups: quantitative methods and qualitative methods (Kamiyama et al, 2006). Quantitative methods use numerical information based on measurable data while qualitative methods make an analysis of present and future use of intellectual property asset which is being evaluated. Using these two different types of methods the results will be different, as the qualitative method has a high degree of subjectivity because the characteristics of the methodological foundation are not numerical. Expert followers of the quantitative method say that this is the only method based on a scientific approach. But when an assessment of an intellectual property asset is made, the subjective elements should not be neglected. To make a clear distinction between the quantitative and the qualitative method is not entirely correct, as qualitative data can be quantitatively coded when quantitative information is based on qualitative reasoning (Trochin, 2006).

An important element in the process of assessment is to determine what is being evaluated. Establishing and identifying the intellectual property asset that is under assessment requires certain steps.

To illustrate how an evaluation method is applied, a case study was made on the world's top 10 brands. The study is based on the values and ranking made by Inter-brand. There are being analyzed the trends on the leading brands market, the value evolution, their origin and structure.

### **Literature review**

The intellectual property of an entity is part of its intellectual capital. The intellectual capital is considered to be the sum of everything that everybody in the company knows and which gives the company a competitive advantage or it can represent the intellectual material composed of knowledge, information, intellectual property, experience that can be used to create wealth (Stewart, 1998). John Kenneth Galbraith emphasizes the growing importance of intellectual capital compared with the technical one and thus a transition of power it is made in industrial enterprises from the capital to organized intelligence (Galbraith, 1971). David Kleina and Laureance Prusak define in Stewart's book 'Intellectual Capital- The New Wealth of Organizations' the intellectual capital as 'Intellectual material that has been formalized, captured and used to produce an asset of greater value or the knowledge that exists within an organization and can be used to create a competitive advantage' (Steward, 1999 ). Conceptually speaking, we distinguish two directions concerning the definition of intellectual capital. The first direction is given by the organization's competitiveness and obtaining competitive advantage on competitive markets by exploiting the intangible resources. This refers to information, knowledge, brands, patents, industrial designs. The second direction is given by the difference between market value and financial value shown in the balance sheet of the company. The situation is common, and the differences are significant between the two values in the context of the new economy in which evaluation using classical instruments that are used for tangible assets cannot be applied to the intangible ones. The two directions converge because: "What you can measure, you can manage, and what you want to manage, you must be able to measure. The intellectual capital constitutes a fusion between the two schools of thought. Intellectual capital ultimately means how to measure and achieve better management of knowledge and other intangibles of a company."(Ross et alt.1997). The intellectual capital over which the company has contractual or statutory rights includes trademarks, patents, designs, licenses, copyrights. The criteria to be cumulatively met for an intangible asset, in this case for an intellectual property asset to be subject of evaluation, are (Schweihs, Reilly, 1998):

- to be easily identified and described;
- to have a legal existence and to be legally protected;
- to make the subject of a private ownership rights and can always be transferred;
- to have tangible evidence of its existence by a contract, license, patent;
  - the moment when it was created should be identifiable ;
  - the time or the events when the asset would cease to exist should be identifiable.

After verifying if these criteria are met, cumulatively, one can proceed to choosing the appropriate method for assessment.

### **Quantitative methods of evaluation**

There are three methods of quantitative evaluation that use cost, market and income techniques as a basis for reporting the obtained value.

The cost-based method is founded on the principle that there is a direct link between the final value of an intellectual property asset and the costs of its development. The approach based on costs measure future benefits of ownership by quantifying the amount of money that would be necessary for its replacement (Parr, 1998). Further on, the replacement cost method is discussed (Schweihs, Reilly, 1998), which is founded on the economic principle of substitution. The replacement cost method estimates the actual costs that would be incurred to develop an asset equivalent to that assessed element. There are situations where the profits made from intellectual property assets are much higher than the cost of production or its replacement. This request for a new product would be high and would cause higher prices, which would exceed the actual cost of product development. Given the specificity of these types of asset the cost-based method can result into many long-term errors. It provides only an indicator of value in the absence of other cues to determine it.

Market-based approach provides valuable guidance by analyzing comparable market transactions of similar assets to the one that is evaluated. This can be summarized by comparing a virtual transaction with a current one on the market. It is difficult to apply this method for certain assets which are characterized by high degree of uniqueness. In this situation it is hard to find an asset for comparison. The method based on the trading price on the market demands the following cumulative requirements (Hangelin, 2002)

- the market must exist and be active;
- there is a time identity for the virtual transaction;
- performance on the market of a significant number of transactions with similar assets;
- transactions have been made between independent parties.

The approach in terms of income consists in calculating the present value of future cash flows resulting from the exploitation of intellectual property assets during the expected economic life (Kamiyama et al, 2006). One method used is the method of updating the cash flow. By this is created a projection of future income flows, to an updated net value, by applying a discount rate. The key element of this method is the choice of discount rate. Inflation, liquidity and risk for the future can affect the size of this rate.

Another method which relies on income is the Option-based method (Pitketly, 1999). Considering this approach we distinguish three methods used in evaluating an intellectual property asset: the method of analyzing the decisional tree, real options method and the Monte Carlo method.

The decisional tree method, used especially in pharmaceuticals, is based on creating a chart that reveals the multitude of possible outcomes of future events. By analyzing this chart one can choose the way to potentiate the best use of the asset in achieving its goal. Thus it creates an overview of all possible options, which create a base for future decisions.

The real options method is founded on future income fluctuations given by changing prices. All the determinants of income variations and the uncertainty of its realization are taken into account, by means of forecasts and simulations. It is based on a binomial model or the Black-

Schools formula, which is more complex and more relevant in assessing intellectual property. This method emphasizes the basic value of an asset, marketing costs, the average market value of products incorporating similar assets, research and development costs before obtaining income, the risk and rate of profitability, the life of the asset.

The Monte Carlo method uses a predominantly statistical approach to analyze the risks of financial evaluation (Hagelin, 2002). By applying this method is assigned not a unique value, but a series of values for each variable, which were considered when calculating the final value, each value associated with a probability of realization. Methods based on options, although they have a greater technical complexity than the others, are sensitive to changes related to the assumptions and to the parameters of the evaluation process.

The classification made in the three groups of methods that are based on a quantitative approach shows that there is a clear differentiation between them.

Cost-based methods are oriented towards the historical aspects of the evaluated asset; market-based methods are connected with the present because they link the evaluated asset with the current transactions made with similar assets; while the methods based on income look towards future benefits derived from the exploitation during the predicted lifetime of the asset.

Choosing one of the methods to incorporate all the determinants of the value is a sensitive issue, taking into account the specificity of intellectual property. It can be acknowledged that, in addition to these quantitative factors, which are numerically measurable, there are also others, in different proportion, which can significantly influence value.

### **The assessment report of an intellectual property asset**

Whatever the method chosen by the evaluator, the final work must meet all the following requirements:

Identification in its content of all the elements which led to the preparation, data being analysed, the subject, the purpose and objectives considered for evaluation.

Objectivity. The report must highlight the positive and the negative factors, the evaluator must remain impartial, without subjective evaluation. The degree of objectivity results from the way it highlights the strengths and weaknesses of assessed element.

Intangibility. The report should be concise and easy to understand, by avoiding using very specific and technical terms and taking into account who will analyze its contents. When technical language cannot be adapted the evaluator must adequately explain what he intended to say by using terms or judgments less accessible.

Specificity. It is recommended that the report refers to a single intellectual property asset in order to clearly distinguish the isolated value. Making a report on a group of assets is increasing confusion about the value of a single element, and thus the report no longer attains the intended target.

Coherence. There must be a consonance between the empirical data used for analysis in the evaluation and its outcome. There should not be any discrepancies between the application of assessment methods and the conclusion reached after their application.

Documentation. In the report each support should be properly documented. The assessor must explain the choice of the method used and how it matched with the analysis. The person who uses the report should learn from its content the empirical data sources used, the quantitative and qualitative analysis used, the analyst's decisions related to the professional judgment.

Meeting the professional standards. The evaluator must determine which are the specific standards used in the assessment.

If the report is to be used to solve a litigation, it should be prepared observing the existing legislation applicable to the dispute in question, so that it can be used in elucidating it.

The usefulness of the evaluation report depends on how the evaluator takes all these requirements into account, and thus the occurrence of errors is avoided.

**The most valuable global brands in 2011**

In order to illustrate the size of the business and the value of an intellectual property asset evaluation results I have made the analysis of the world's top 10 brands, based on rankings compiled by Inter-brand. (Table no. 1)

The method used by Inter-brand is based on ongoing investment and brand management as an intangible asset by taking into consideration all the benefits that the brand brings to the organization by attracting, maintaining and meeting customer expectations.

The evaluation is based on three aspects: the financial performance of leading products and services, the role of the brand in making the purchase decision and the trademark power.

Table no. 1

**Top 10 the most valuable global brands**

2011	2010	Change	Company	Industry	2011 (\$m)	2010 (\$m)	YoY%
1	1	0	Coca-Cola	Beverages	\$71.861	\$70.452	2%
2	2	0	IBM	Business Services	\$69.905	\$64.727	8%
3	3	0	Microsoft	Computer Software	\$59.087	\$60.895	-3%
4	4	0	Google	Internet Services	\$55.317	\$43.557	27%
5	5	0	GE	Internet Services	\$42.808	\$42.808	0%
6	6	0	McDonald's	Restaurants	\$35.593	\$33.578	6%
7	7	0	Intel	Electronics	\$35.217	\$32.015	10%
8	17	9	Apple	Electronics	\$33.492	\$21.143	58%
9	9	0	Disney	Media	\$29.018	\$28.731	1%
10	10	0	HP	Electronics	\$28.479	\$26.867	6%

<http://www.interbrand.com/en/knowledge/branding-studies.aspx>

The table shows the ranking of the most 10 valuable global brands. The table is illustrative, to create an image of intellectual property market and more precisely to see which are the main players on it. From the analysis of this classification drawn up under the evaluation made by Inter-brand Company, some characteristics can be outlined. The country of origin of first 10 brands is The United States of America - which leads to the conclusion that in the matter of top brands the U.S. is by far on the first place, perhaps because of the importance they give to the policy of creating and supporting a brand. There are 6 IT companies in top 10, supported by many intellectual property rights. They are producers of added value, incorporating important results of research and development embodied by intellectual property assets. The evolution in 2011 compared to 2010 in the top 10 was not significant, but rather showing stability, with one exception - Apple climbed nine positions, from 17 to 8 due to the increase recorded on the market by launching new high technology products. In terms of percentages, Apple is the best, with an increase of 58%, much higher than any of the competitors. In total there is a growing of the value of the most valuable global brands in 2011 compared with 2010. This evolution is due to the sectors which are targeted by the brands and emphasizes once again the importance of understanding the value of brand creation. The challenge for the future is to create new valuable brands. Behind an actual very valuable brand stands an idea that was successfully protected and implemented. By this, intellectual creation led to such amounts of money.

## **Conclusions**

We live in an economy where resources are assessed and capitalized in a great diversity. In the future, a little more importance given to the protection and correct evaluation of intellectual property assets will give economy another face. This market is not, unlike others, purely speculative and zero-sum; intellectual property creates added value. The way in which those who produce such assets are paid depends on their new results in research work. The accurate assessment of such an asset is also given by the market. Changes on the market, its exogenous factors can lead to significant value increases or decreases.

The methods analyzed in the article provide an overview of the past, present and future of an intellectual property asset. Choosing one of the methods depends on when the evaluation is made and the data that can be analyzed at that time. The basic characteristic of this type of asset is its uniqueness. If a good assessment from another category can be done by using some classic standards, in this case they cannot be applied. To achieve the desired goal the evaluator must start from the requirements of the assessment report, and what it wants to attain. Starting from this, the data and information that can be used in conducting the evaluation must be analyzed, and ultimately the selection method that can be applied must be chosen. Another problem encountered during the evaluation process is to distinguish how much of the value obtained is on intellectual property and how much on other component assets. The consumer often pays a higher price on a 'brand' product than on one whose name is not so well-known. On a global scale, more and more of such intangible assets are traded, fact which makes the importance of their evaluation even greater. A brand creates in the consumer's mind the idea of the quality associated with it. Brand creators invest considerable amounts in its construction and in the battle against counterfeiting. This phenomenon can bring considerable damage, but at the same time it can have a reverse effect of popularizing the brand for the consumer with fewer opportunities; but this effect was less studied.

In this article we have only discussed quantitative analysis methods, that is the most commonly used. But the reasoning behind a quantitative assessment is qualitative. Any creation or product, even of the human mind, addresses to a consumer who needs to capitalize it by his/her own rules. This consumer, - named in analyses a medium - an inappropriate term as far as I am concerned, reacts differently (reaction differs from one individual to another). The presented methods provide the necessary benchmarks in exchange for others, but they cannot be ineffable. The cost of obtaining intellectual property does not always reflect the final value - the cost can be many times much lower that the asset obtained. On the market, a wide range of similar products can be traded, but never one identical with the one assessed. Eventually, the lifetime of an intellectual property asset is uncertain, depending on the new research results and the innovative field. The methods only provide quantifiable benchmarks, providing the evaluators the instruments that they need.

From the analysis done on the most important brands according to Inter-brand, the following characteristics result:

- the growth of the value of the first 10 global brands in 2011 compared to 2010, from 433.125 m\$ to 460.777;
- the origin of the top 10 brands is exclusively the U.S.;
- stability in the ranking; except for Apple brand which rose in top 10 replacing – Nokia, the only European brand placed in top 10 in 2010;
- the top is being dominated by IT companies that have significant portfolios of intellectual property rights and could face the new market trends;

The elaboration and publication of the rankings of the most valuable brands have an effect on the market on which they operate; both on customers and on the firms with which they initiate business relations. One of the criteria taken into account in the assessment done by Interbrand is the role that the brand plays in the purchase decision. The impact of this ranking on the consumer contributes to the purchase decision, and through this, to the growth of the brand value. The way a

brand is perceived and evaluated by a renowned organization such as Interbrand acts directly on the actual and potential market. Because the trademark addresses to that part of the human psyche that gives importance to symbols, a rank in top 100, or better still, in top 10 Interbrand, strengthens the position of the brand.

Studying the impact that the Interbrand ranking has on a brand and how it influences promotion or demotion is one of the directions of our future research. Making an extensive analysis on Top 100 brands, one can determine the last few years' trends on activity sectors, i.e. the share of the first 10 brands, as well as the evolution of their value.

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