

# Valuation Of Technological Intangible Assets



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## Abstract

*From knowledge management to intangible asset creation*

The intangible economy is not a virtual economy. Know-how, information, knowledge, intellectual property: these terms cover different components of an organization's "cognitive property," the importance of which in the intangible economy is well-known. These components require new forms of "management" – with this term covering operation and strategy. They also require expertise with financial and legal tools to convert them into accounting "assets" and legal objects.

By giving them a legal form and organizing their ownership, they become a source of value for the business, quantifiable using objective and rigorous methods. The term "intangible assets" involves the rigorous organization of the ownership of rights, which involves strategic choices, particularly in groups of companies.

Financial valuation methods such as the updated future cash-flow method or the historical cost are used to establish an objective value, analytically to set a pivot price for transfers, investment or take-over mergers.

These methods may also be used to build financial management reports reflecting the progression of intangible property and completing conventional accounting indicators.

## The increasing importance of intangible assets

Economic agents, manufacturers and consumers, act, according to the neoclassic balance theory, in order to maximize

their personal benefit and use, in an environment characterized by uncertainty. Our economy is a market economy and some trends in its progression may be observed:

- globalization of trade,
- acceleration and toughening of competition modes,
- inter-sector technology distribution,
- increase in intangible assets,
- standardization of dominant technologies such as information technology, telecommunications and biotechnologies.

The increase in intangible assets is a recent phenomenon and, in order to incorporate it in business management, the development of new methodological tools is required.

As early as 1989 the French Economic and social council underlined its importance in its report<sup>1</sup> entitled "L'investissement intellectuel, facteur de modernisation de l'industrie française" (Intellectual investment, a factor in the modernisation of French industry). In this way, this report observes a multiplication by a factor of 1.4 to 1.8 of the proportion of intangible investment in relation to total investment, for all OECD countries. Other general indicators

prove the intangible investment is increasing at a higher rate than tangible investment.

The increase in intangible assets is particularly conveyed by the growth in the tertiary and quaternary sectors, which is essentially due to technological progress. The increasingly important role of information in productive sectors is particularly significant.

The productive assets of businesses are now composed less of buildings and machines and more of intellectual property rights and technical, commercial and organizational know-how. A study by the National Bureau of Economic Research<sup>2</sup> demonstrates the essential role of innovation in economic development, since, over the last century, the American Gross National Product has increased fourfold while the invested capital only increased threefold, the difference being explained by technological progress.

## The patent, right of ownership of capitalised technical knowledge

Intangible assets represent a set composed of very varied and disparate elements.

Firstly, intangible assets are not visible straightaway, making them difficult to determine. The very nature of intangible assets is at the root of our problems, the fact that they are nonphysical entities alters our scope for action.

From an economic viewpoint, intangible investment characterized by the absence of tangible consistency

1. Report presented on behalf of the French Economic and social council by Mr. H. BOUCHET-"L'investissement intellectuel, facteur de modernisation de l'industrie française" (Intellectual investment, a factor in the modernization of French industry)-Conseil économique et social-Sessions of 27 and 28 June 1989. Published in "Journal officiel du Conseil économique et social."

2. "Innovation & economic growth"- The journal of economics-National Bureau of Economic Research-1980.

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will be considered as an expense with no physical contra for which, in some cases, it is not even possible to convey the products obtained from this expenditure technically, not even in paper form. The same applies for training and sometimes the acquisition of know-how.

The definition of intangible assets will be different according to the vision adopted. Accountants refer to intangible assets but do not give them a real definition. Objects are considered according to the financial flow: however, this definition is not relevant since it observes an expense, and its contra is frequently invisible. It only takes a vague definition of intangible assets into account and if intangible investment is approached more specifically, accountants define it as all fixed assets other than tangible and financial assets. Therefore, its definition is not satisfactory.

In more operational terms, intangible assets appear to cover a set of concepts that contribute to a business's competitiveness: know-how, information, knowledge and intellectual property. These terms cover different components of an organization's "cognitive property," the importance of which in the intangible economy is well-known.

For legal specialists, these different components are distinguished clearly:

The right gives these cognitive components a financial reality to make them property attached to the business and justifying their economic incorporation in transactions.

### Valuation methods

Experts use three patent valuation methods based on research costs, on profits, or on updated future royalties.

#### A. Research cost or "historical cost" method

The value of the patent is equal to the total sum of research and development expenses incurred to complete the invention or make the patent application. It is calculated both for the know-how and the patent. We have already seen that the costs incurred to produce an asset do

not represent its market value. At the very most, the value determined in this way will enable the grantor to set a reasonable price threshold, since by selling at this price, the acquirer will not have to invest the same expenditure and obtain the same result after many years. However, an invention may sometimes have incurred costs higher than its value. Therefore, it will be necessary beforehand to meet certain conditions so this is not the case, in particular:

- the market for the product using the technology exists, and is not protected by barriers to entry;
- industrial operation proves to be possible, at a production and marketing cost level in line with that which the market is prepared to pay, taking competition into account. This industrial operation will not require disproportionate investments in relation to the expected profitability.

Once it has entered the public domain, a patent will be of no value since it can be used by anyone. However, know-how draws its value from secrecy, or at least its difficulty or the time required to obtain it. Medical research sometimes takes over 10 years of development, but its value is considerably greater than its cost in most cases.

Given that there does not appear to be a direct relationship between the cost and value of a patent or know-how, we will opt for a method based on the income generated from these assets.

#### B. Profit method

The patent is valued at 20 percent of the projected profits for the period covering its use.

$$V = 20\% \sum_{j=1}^n B_j$$

where,  $B_j$  = projected profits for the year  $j$ ,  $n$  = the planned number of years of use of the patent, which cannot exceed the maximum period of legal protection provided by the patent, i.e. 20 years from the application date. Note that  $n$  depends on the state of the art in the sector and its foreseeable progression which

could render the valued technology obsolete through competition.

The choice of the 20 percent coefficient is based on a distribution of future profits between the grantor and acquirer, who will take on the risks of future use. In this way, 20 percent is assigned to the grantor as a remuneration for their research work, 80 percent of the profits being allocated to the transferee who will generally need to use industrial operation and marketing resources for the product covered by the invention. This 20/80 distribution will vary according to the transfer conditions, and in this case of a patent already in commercial use, this ratio will increase considerably.

The future profit determination method remains vague and this simplistic method does not enlighten us on the essential parameters involved in its determination. No method produces systematic characteristics specific to the techniques, i.e. it may be contained in a document the importance of which is vital in the production of an asset. It may also represent an easily replaceable secondary element, and, in this case, its value does not systematically depend on the results obtained by the use of the overall product.

#### C. Updated future royalty method

This method is of great interest since it accounts for the patient's economic potential and the associated risks and uncertainties, on the date on which the valuation is carried out. It is conducted by updating the projected royalties paid for a license, calculated according to the expected turnover, weighted by a risk factor representing the resulting legal risks and technical and commercial risks.

In finance, risk is defined as the relative variability of expected income, i.e. the probability of seeing income vary upwards or downwards. There are many potential causes of variation which are difficult to measure, but they must be studied to represent the value more accurately. The formula is expressed as follows:

where:

$T_r$  = Royalty rate usually applied in the technical sector  
 $CA_i$  = projected turnover “ex works” for year  $i$   
 $\beta$  = Update rate resulting from risk analysis  
 $n$  = Update period, or project period of application of right  
 $R_j$  = Legal risk coefficient  
 $R_t$  = Technical and commercial risk coefficient

The application of the updated future royalty method includes three steps:

1. Determination of legal risks, in the form of an audit of the patent(s) and attribution of a coefficient representing the estimated level of risk. This work is conveyed by an argued report, enabling the acquirer to check the basis for the coefficients, and, if required, objectively discuss the risks for which a divergence is found. The technical and commercial risks are determined in relation to the progress of the project concerned by the patent.

2. Determination of economic potential, by analyzing the record of the use of the patent, and, failing this, using a market study.

3. Determination of financial parameters: update rate according to the risk summary, and royalty rate with reference to practices in the field in question.

### Determination of legal risks

Legal risk factors account for the uncertainties liable to affect the use of the patent. These uncertainties are quantified by a coefficient  $C_j$  determined after an analysis of the patent’s status with respect to the main risks:

- insufficient technical scope to prevent patent being bypassed
- limited territorial scope preventing effective control of certain markets
- weakness of intrinsic and extrinsic validity, liable to result in a rejection or cancellation of the patent
- questionable freedom of use, liable to give rise to disputes
- Know-how is defined as a “substantial and formalized set of knowledge that is not directly accessible.” It

only exists in a “legal” sense when the concept of formalization (in the form of a report, specifications, an operating manual, etc.) is presented, and it may be the subject of a transaction, for example in the form of know-how transfer agreement.

- Knowledge may be qualified as a precursor to know-how. It may become know-how by means of a formalization operation and “expertise compilation” methods developed elsewhere (MKSM, KOD, etc.)

- Information becomes knowledge when those skilled in the art attempt to understand to associate it with this knowledge (giving meaning to the information known)

The patent represents the final stage of formalization, provided that the validity conditions are regulated in a very detailed manner. Initially, the individual embodies the idea or technique, the right will represent the intangible object by means of a document, the patent, which, through its claims, defines the scope and limitations of this know-how in relation to other know-how. Embodied by a person, the invention cannot be used, except by its creator.

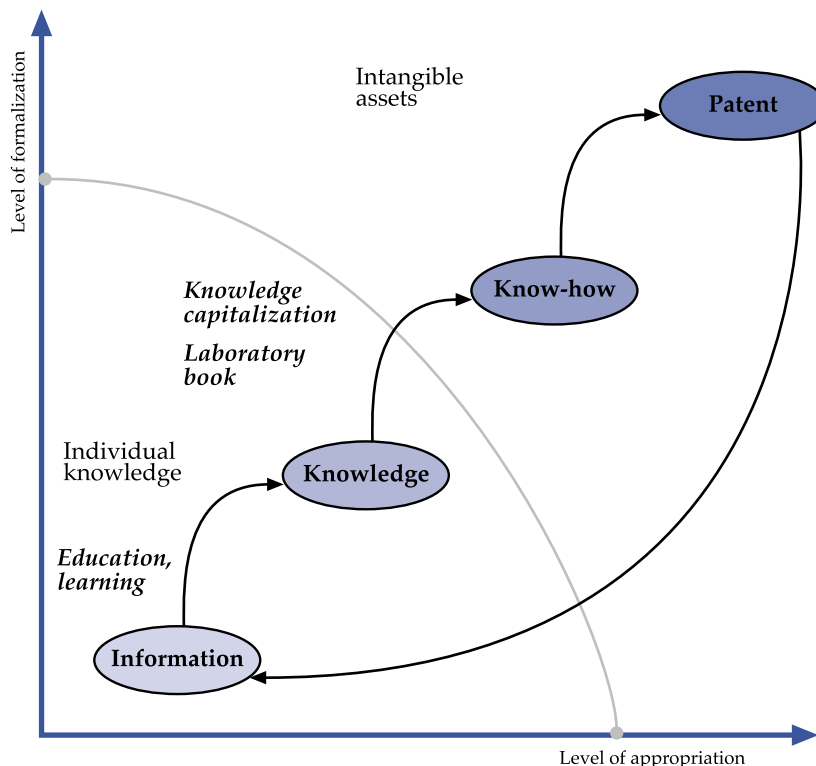
With the patent, it becomes accessible to others and thus gains in value, it is simply necessary to exchange it for the technique to be used and valued at another scale.

Each of these parameters is subject to arguments justifying the choice of coefficient. These arguments may be discussed when the report is presented.

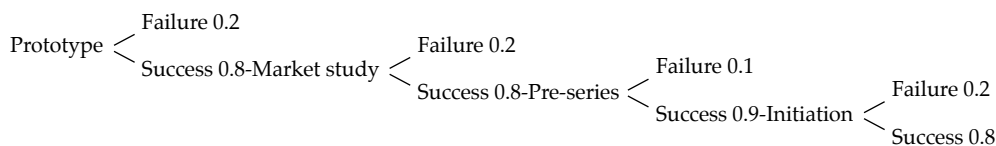
The determination of the technical risk coefficient is based on the life curve of the product covered by the invention under valuation. This life curve is broken down into four phases. Each phase is governed by the success of the previous phase:

- the initiation phase;
- the rapid growth phase;
- the operating phase (stabilized market share);
- the period of decline.

The legal and technical risk coefficients are then taken into account to determine the update rate. The update rate corresponds to the rate used to convert future currency into current currency. This rate accounts for the remuneration level that an invested sum would have yielded in



For example, the decision tree may have the following profile:



another type of risk-free investment (risk-free rate), for example treasury bills, and the risk related to the type of activity in which the investment is made. In this way, this rate must reflect the average level of risk of the sector, and not the level of risk specific to the business which purchases the right, since the aim is to value the asset and not the acquirer.

The data relating to the projected turnover is a result of extrapolating historical data if it exists, or an independent and objective market study. In the latter case, the update rate will

overwrite medium and long-term projections.

The updated future royalty method makes it possible to calculate an objective value, analytically and accounting for the prospects for use of the invention, influenced by the risk factors liable to hamper the operation of the patent at the time of the valuation. This method will be illustrated by a demonstration during the intervention.

**Conclusion: Financial impact of strategic patent management**

The proposed valuation methods may also be used to build financial management reports reflecting the progression of intangible property and completing conventional accounting indicators.

A definite source of expenditure, and possibly of investment, the patent application policy takes on real meaning when it aims to create real assets for the business. In this perspective, valuation tools are essential to check the value of patents at a given time, and to monitor the

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|------------------|---------------------------|--|
| <b>Assignee</b>  | XXXXXXXXXX                | <b>Comments</b><br>This is an example of use of a simplified patent valuation tool, developed by the firm Breese Majerowicz. Case of a recent patent application, undergoing examination, and a product which has not yet been launched onto the market. |
| <b>Patent N°</b> | FR01/01 xxx du 19 xx 2001 |  |
| <b>Date</b>      | 21/09/2001                |  |

| <b>LEGAL RISKS</b>  |                      | Score between 0 and 10 |
|---|----------------------|------------------------|
| Value the <b>technical scope</b> of your protection.<br>Is it easy to bypass your patent? In this case the score will be close to 0.<br>Is it a basic patent, on which all alternative embodiments and improvements will depend? In this case, the score will be close to 10.   | <input type="text"/> | <input type="text"/>   |
| Value the <b>territorial scope</b> of your protection.<br>Is your invention only protected in France? In this case, the score will be close to 0.<br>Have you made extensions in countries in which the main manufacturers are located in the main markets? In this case, the score will be close to 10.                                      | <input type="text"/> | <input type="text"/>   |
| Value the <b>intrinsic validity</b> of your protection.<br>Is the disclosure brief? In this case, the score will be close to 0.<br>Is the invention described fully? In this case, the score will be close to 10.   | <input type="text"/> | <input type="text"/>   |
| Value the <b>extrinsic validity</b> of your protection.<br>Do a large number of relevant priorities exist? In this case, the score will be close to 0.<br>If the patents were issued by the European Patent Office, in Germany, Japan and the United States, the score will be close to 10.   | <input type="text"/> | <input type="text"/>   |
| Value the <b>freedom of use</b> of your protection.<br>Does the patent represent an improvement which cannot be used without the approval of a third party holding an older patent? In this case, the score will be close to 0.<br>Can the patent be used without any risk of a third party claiming priority? The score will be close to 10. | <input type="text"/> | <input type="text"/>   |

|   |  |  |
|---|--|--|
| <b>State of progress of project</b><br>1 - Idea, concept<br>2 - Prototype<br>3 - Market study<br>• 4 - Pre-series<br>5 - Successful launch<br>6 - Operation | <b>Financial parameters</b><br>Specify the update rate corresponding to the capital payment that the acquirer could expect by investing the sum incurred to purchase the payment. <input type="text"/> | <b>RISK FACTOR</b><br><input type="text" value="100.0%"/><br>Legal coeff.<br><input type="text" value="63.1%"/><br>Economic coeff.<br><input type="text" value="42.0%"/> |
|   | Specify the standard royalty rate in the field of the invention. <input type="text"/>  |  |

|      |            |              |              |              |              |              |              |              |              |
|------|------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 2001 | 2002       | 2003         | 2004         | 2005         | 2006         | 2007         | 2008         | 2009         | 2010         |
|      | 3900 Kecus | 22,000 Kecus | 46,000 Kecus | 46,000 Kecus | 60,000 Kecus | 60,000 Kecus | 60,000 Kecus | 60,000 Kecus | 60,000 Kecus |
| < >  | < >        | < >          | < >          | < >          | < >          | < >          | < >          | < >          | < >          |

**Total updated royalties** 1,862 Kecus      **Value of patent** 493 Kecus