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IP for Innovation

STUDENTS HANDBOOK

Valuation Of Intellectual Property

Module 4.:

The Valuation Of Intellectual Property

"If this business were split up, I would give you the land and bricks and mortar, and I would take the brands and trade marks, and I would fare better than you."

— John Stuart, Chairman of Quaker (ca. 1900)

Intellectual Property (IP) in the form of patentable technology, legally protectable trademarks and designs, copyright and others have increasingly become the most important assets, not only for many of the worlds largest companies, but also for small and medium enterprises. Observe Table 1. indicating how important role just branding and their respective trademarks play in the strategic building of shareholder value even in case of larger multinational companies. In case of capital weak start-up companies the importance of intellectual property and its share of the overall company asset is even more significant.
Often, an organisation's sole asset is their IP.

Table 1..: The contribution of brands to shareholder value

Company	2002 brand value ($bn)	Brand contribution to market capitalization of parent company (%)	2001 brand value ($bn)
Coca-Cola	69.6	51	69.0
Microsoft	64.1	21	65.1
IBM	51.2	39	52.8
GE	41.3	14	42.4
Intel	30.9	22	34.7
Nokia	30.0	51	35.0
Disney	29.3	68	32.6
McDonald's	26.4	71	25.3
Marlboro	24.2	20	22.1
Mercedes-Benz	21.0	47	21.7

Source: *BusinessWeek*, Interbrand/JP Morgan league table, 2002

Example: The president of the well-known Coca-Cola company was asked on the value of the company's intangible assets. The answer stated that if each building, factory, office, car, truck owned would burn down in a moment, the company could get back to operational re-building and buying everything lost in 1 year due to the value and profit generated by its intellectual property, namely the income generated by its trademarks, franchise contracts, patents, licences, etc.

Table 2.: The value of global brands in 2007

2007 Rank	2006 Rank	Brand	Country of origin	Sector	2007 Brand Value ($m)
1	1	Coca-Cola	US	Beverages	65,324
2	2	Microsoft	US	Computer Software	58,709
3	3	IBM	US	Computer Services	57,091
4	4	GE	US	Diversified	51,569
5	6	Nokia	Finland	Consumer Electronics	33,696
6	7	Toyota	Japan	Automotive	32,070
7	5	Intel	US	Computer Hardware	30,954
8	9	McDonald's	US	Restaurants	29,398
9	8	Disney	US	Media	29,210
10	10	Mercedes	Germany	Automotive	23,568
11	11	Citi	US	Financial Services	23,443
12	13	Hewlett-Packard	US	Computer Hardware	22,197
13	15	BMW	Germany	Automotive	21,612
14	12	Marlboro	US	Tobacco	21,283
15	14	American Express	US	Financial Services	20,827
16	16	Gillette	US	Personal Care	20,415
17	17	Louis Vuitton	France	Luxury	20,321
18	18	Cisco	US	Computer Services	19,099
19	19	Honda	Japan	Automotive	17,998
20	24	Google	US	Internet Services	17,837

(Source: Best Global Brands 2007, Interbrand)

This growing role of IP based assets in generating new value poses a number of major challenges for the corporate sector, governments and the society at large: how to evaluate the value and contribution of IP and how to maximise its potential?

Why value Intellectual Property?

In the last 15 years there has been a marked increase in the amount of companies which have become leaders through the effective creation, extraction and leveraging of their IP through efficient IP management. Nevertheless, in most cases the fact remains that the role of IP in business is insufficiently understood. Small and medium enterprises, the building blocks of many developed economies have been slow to realise the potential of IP management in increasing their competitiveness. Understandably, many governments have taken a stand in the promotion of such IP management business practises.

The primary reason for valuing IP is to maximise its value and therefore the value of the owner organisation through optimum management decisions. There are various scenarios where valuation is required and needed, some examples are:

- **Company valuation (transactions, joint ventures, mergers and acquisitions, bankruptcy):**
  IP is a fundamental component of company value. An accurate IP valuation is required for buying or selling a company, establishing joint ventures, and executing mergers and acquisitions. In such transactions, each party will need to know the value of IP assets being bought or sold as part of the company. If company bankruptcy or reorganisation occurs, assessment of the company's value is required, and this must include the value of IP assets and the assessment of the impact of proposed reorganisation plans.

- **Sale and license transactions:**
  Before a company buys or sells IP it must be aware of its worth. Likewise, when negotiating a license contract, both parties must be clear about the values involved. Often, a due diligence report is required outlining the details of the IP being purchased, sold or licensed.

- **Raising finance (bank loans, venture capital, investment):**
  To finance their development plans, many knowledge intensive companies can only offer their own IP as collateral. More recently, there has been increasing debate about the collateralisation of IP in both cash flow based financing and asset based financing. Due to insufficient knowledge about IP and valuation, banks are as yet reluctant to accept such assets. In the future this type of collateralisation will be more accepted in the industry and IP valuation will become a key process. Financing through venture capital is also important for many (especially knowledge based) companies. When making decisions about possible investment and associated risks, these organisations must be clear about the value and commercial viability of the IP belonging to the benefactor and often the reason for investment.

- **Taxation planning and compliance:**
  For legal entities, knowing the value of their IP is important for possible tax deductions and tax compliance.

- **External reporting and accounting:**
  Accounting standards are generally not helpful in representing IP in company accounts and as a result these are often under-valued and mismanaged. Accurate IP value is needed for many aspects of reporting and accounting, including the reporting of fair value estimates in annual reports.

- **Litigation support and dispute resolution:**
  Accurate IP appraisal is required in the event of IP rights infringement or breach of contract.

- **Internal management:**
  The successful exploitation of IP (for example in the ways outlined above) can lead to a company's success or failure. IP exploitation and creation of business strategies requires effective management internally within the company. Research, development, legal, industrial protection application and commercialisation decisions involve high but measurable levels of risk. IP valuation facilitates cost effective decision-making and helps to understand and deal with the risks involved.

How do companies value IP?

Depending on the reason for the IP valuation, a specific valuation approach or a combination of approaches must be chosen, depending on what kind of value is required. For example, IP valuation for the purpose of internal management will require an internal value, while sale or licensing will require a market value. These may not be equal. A number of approaches have been proposed and each has their own set of unique strengths and weaknesses. To get optimum results, it is important to choose the appropriate method or toolbox of methods for each individual case. In practices each valuation toolbox is likely to include more than one of the methods listed below.

The most important factors to consider when valuing IP and selecting the appropriate toolbox are the following:

1. **What is the IP being valued?**
   The valuation of IP is only possible if it can be exactly identified and differentiated from other material and immaterial assets. In theory, each IP should be valued individually, but in practise this is far from an easy task. For example, if separate appraisal is required, it can be difficult to separate two interdependent patents which complement each other, or a technological breakthrough with a trademark name.

2. **What is the purpose of the valuation?**
   The type of value (internal, market etc.) and the type of value result (qualitative, quantitative) required is determined by the purpose of the valuation.

   For whom is the valuation being done?
   Different valuation approaches are required if the target audience are prospective investors, internal management etc.

3. **Who is doing the valuation?**
   The appraiser may have expertise in a particular field of valuation, and this can influence the choice of methods. However, this may also introduce bias into the valuation.

4. **Date of the valuation**
   The date of the valuation will influence the methods used and, in the case of income based methods, the discounting process.

Methods used for business purposes can be generally divided into two groups, **quantitative** and **qualitative** methods. Quantitative methods attempt to calculate the monetary value of the IP and include cost, market, income and option pricing approaches. Qualitative methods provide a value guide through the rating and scoring of IP based on factors which can influence its value.

Which methods are employed in which situations? Is there a general rule or best practise tool for valuation? Below are a few commonly used general methods. Many more exist which are not covered here.

Quantitative evaluation methods

1. Cost based methods

Cost based approaches measure, quantitatively, the value of IP through the calculation of the costs incurred if the company were to develop a similar asset either in-house or externally. The costs to produce the IP are taken to be its value.

- **Historic Cost**
  The historic cost approach measures the costs incurred through the development of the IP, at the time it was developed.

- **Replication Cost**
  The replication cost approach measures the amount of investment needed to develop similar IP, at the present time, in exactly the same way and achieving the same IP as currently exists. The whole cost of research and development must be included in this calculation, including the costs of unsuccessful prototypes etc.

- **Replacement Cost**
  The replacement cost approach measures the amount of money that would be needed to develop the IP as it currently exists, but as the term "replacement" signifies, the costs of failed and unsuccessful research is not included. It is easiest to think of this as measuring the cost of buying the already developed IP from an external source.

When are they used?

Approaches based upon the measurement of cost are generally used in accounting, bookkeeping and in accordance with accounting rules. It is commonly agreed that cost based methods are only useful for bookkeeping purposes or as a supplement to an income approach (see later). They are only relevant in historical cost based accounting systems or where taxation methods dictate their use.

Advantages and disadvantages of cost based methods

One advantage of the method is that IP becomes visible in the company's books and IP awareness is increased. The method is also a useful indicator of IP value in the case of IP assets whose future benefit is not yet evident.

There are many pitfalls associated with using the measurement of cost to determine the value of IP. The main disadvantage is that there is no direct correlation between cost of development and the future revenue potential of assets. It is a fact that IP that costs the most to produce, may not necessarily be the most valuable. The same applies to IP which is many years old and has been written down in value. This IP could still be the most valuable to the company, even though the historical cost approach does not show this. The measure of historic costs is unreliable with rapid technological advancement. It is not always possible to provide accurate information on the resources spent on development and there will always be a practical challenge to determine which costs to include or exclude. Most importantly, cost based methods make no allowance for the future benefits which might accrue from the IP.

2. Market based methods

Market based methods value IP through comparison with prices achieved in recent comparable or similar IP transactions between independent parties. Observing the prices of comparable assets traded between parties in an active market gives a value to the subject IP. The idea behind these approaches is that the market decides the accurate price and therefore the value of the IP. Market based methods include IP auctions, comparable market and comparable royalty rate methods.

- **Auction**
  In a perfect auction, there are many potential buyers with perfect information about all aspects of the IP. The value of the IP is determined by the price reached through bidding.

- **Comparable market value**
  The value of the IP is given by comparison with similar comparable independent IP or similar transactions.

- **Comparable royalty rate**
  Market based valuation methods may also be based on the comparison of royalty rates used when licensing similar IP. Many sectors often use industry averages as a basis for setting royalty rates in license agreements or in establishing damages in litigation. The value of the IP is given through the comparison of the subject IP with the royalty rates in similar license agreements.

When are they used?

Market based methods are useful when a market value is required for any given subject IP. These methods require an active market, a comparable exchange of IP between two independent parties and sufficient access to transaction price information. However, there are limited formal markets for IP and the relevant pricing information is not usually public. As a result, the use of the comparable market value approach to valuing IP is rare. The use of comparable royalty rates are more widespread, especially as databases of industry royalty rates and comparable transaction information have been collated by larger IP right-holders and independent companies offering valuation services. In the future, when IP markets become active and public, the use of market based approaches can become more established.

Advantages and disadvantages of market based methods

Observing the market is a relatively straightforward valuation method. It is useful to check the validity of other approaches.

As well as the issues raised about the lack of IP markets and information, there are many other disadvantages to these approaches. Firstly, the uniqueness of IP makes direct comparison difficult. There is a risk of comparing the subject IP with other IP which has been traded but which has still not been utilised to the full extent possible. In these cases the IP can be undervalued. When royalty rates are compared there are also some potential distorting problems. Royalty rates set using returns to R&D costs, return on sales figures or industry averages run the risk of valuing costs or other factors rather than value.

3. Income based methods

The most basic definition of 'value' is based on the ability of an asset to generate future income, and this is especially true for IP. Income based methods measure the potential future benefits of the subject IP in an effort to determine its worth. There are many income based valuation methods, each with many variations according to the reason for valuation and the type of industry. Some examples include the discounted cash flow (DCF), risk adjusted net present value (rNPV) and relief from royalty methods.

- **Discounted Cash Flow (DCF)**
  This is the most fundamental and widespread of the income based valuation approaches. The discounted cash flow approach attempts to determine the value of the IP by computing the present value of future cash flows from the IP, over its useful life. The methods under this category are all centred around evaluating these future cash flows and then discounting them back at a discount rate to achieve a present value.

  The two key factors that must be accounted for in a DCF calculation are the time value of money and
  riskiness of the forecasted cash flows. These are dealt with through the use of a specific discount rate chosen specifically for the subject IP, which accounts for both factors at once. Alternatively, the forecasted cash flows can be adjusted to account for their riskiness and changing riskiness over time. These are then discounted at a risk free rate, which accounts for the time value of money. Both versions are widely used.

- **Risk adjusted net present value (rNPV)**
  This approach is an extension of the DCF method mainly used in the pharmaceutical and biotechnology industries. It was specifically developed to deal with technical risk during the development of IP assets, for example medicines. To account for risk, the method adjusts the cash flows of each stage of development by fixed probability rates based on established industry indicators. For example the statistical probability of successfully competing the first stage of clinical trials may be 20%, second stage 30% and so on. The cash flows are risk adjusted using these probability rates and discounted as with the DCF method.

- **Relief from Royalty**
  The relief from royalty method measures the royalty that the company would have to pay for licensing-in the IP being valued, from a third-party. The royalty represents the rental charge, which would be paid to the licensor if this hypothetical arrangement were in place. The method assumes that the value of the IP is defined as the rental charge other companies would pay to use it. Estimating this royalty rate is only a first step, a reliable sales forecast is also required in order to estimate the income that flows directly from the IP. As with other income approaches, the royalty rates are then discounted through an appropriated discount rate.

- **Technology Factor method**
  The technology factor method firstly calculates a risk-free net present value for the IP (similarly to the DCF method) and multiplies this with a risk-factor, or "technology factor". The technology factor value is worked out from attributes reflecting the commercial strengths and weaknesses of the IP. The aim is to account for technical (in the case of technology), legal, market and economic risks related to the IP being valued.

When are they used?

Income approaches to IP valuation are only accurate if the following variables are available or can be accurately estimated: an income stream either from product sales or license of the IP, an estimate of the duration of the IP's useful life, an understanding of IP specific risk factors for incorporation into the valuation and a valid discount rate.

Advantages and disadvantages of income based methods

The advantage of these methods is that it is relatively simple to assess the value on the basis of the conditions set up. With the likely availability of many of the required inputs from the firm's financial statements and market information it may be possible to identify and or forecast particular cash flows.

The methods are conceptually robust but can prove difficult to implement in high-uncertainty environments. This task always includes some uncertainty and subjective assumptions. A significant disadvantage of these methods is that both uncertain and distant cash flows and the discount rate have to be estimated. For example, there is rarely an experience base when estimating the market potential and therefore cash flow of early stage IP developments. In addition, all risks are lumped together and are assumed to be appropriately adjusted for in the discount rate and the probabilities of success, rather than being dealt with individually (such as legal risk, technological risk etc.).

A significant drawback of the relief from royalty method is that a royalty rate can always be assumed, when in reality it may never materialise. Nevertheless, in specific circumstances this method is useful, especially if there are suitable comparable transactions involving third parties or industry standard royalty rates.

4. Option pricing based methods

The theory behind option pricing was primarily developed for use in pricing financial options but can also be applied to a number of other situations other than directly financial assets. The valuation of IP still in development or being commercialised is one such framework. Option based methods essentially belong in the income based methods category as they too use expected future cash flows to measure value.

The basic definition of an option is a right but not an obligation, at or before some specified time, to purchase or sell an underlying asset whose price is subject to some form of random variation (Pitkethly 2002). Options are priced using the Black-Scholes option-pricing model, which is a mathematical model for the valuation of options.

- **Real Options Method**
  Real option valuation methods treat the development and commercialisation of IP as a series of options. As the IP is developed and commercialised, many decisions about investment timing, when to patent, abandonment, direction of research etc. must be made. The information to make these decisions is often not available at the time of valuation, but becomes available later. The real options method, using the Black-Scholes model, takes into account the flexibility of these future decisions.

Advantages and disadvantages of options based methods

The primary advantage of the real options method is that it incorporates the value associated with the uncertainty and accounts for the flexibility inherent in the development of IP. The value associated with the uncertainty of cash flows and the ability to manage the development of the IP is accounted for. Like the DCF method it values the stream of cash flows but it also accounts for acquired knowledge. As a result, it provides a more complete evaluation than the DCF as it captures more than simply cash flows and static costs.

The main disadvantage of the real options method is the complexity of the model. It is difficult to understand and the evaluation can be costly to perform. Some experts doubt the accuracy of options based models for use with real investments such as IP. The main arguments are that option based models over-value IP through the inclusion of non-viable development and commercialisation decisions.

When are they used?

The real options method is particularly applicable when there is a high degree of uncertainty, some managerial flexibility, and not all the information is known at a particular time. It is increasingly used in the biotechnology and pharmaceutical industries and early stage IP developments.

Qualitative evaluation methods

Qualitative methods provide a value guide for the subject IP through the rating and scoring of different factors related to the IP. These factors or "value indicators" can influence the value of the IP both positively and negatively. In the same way as factors such as location, numbers of rooms, nearby schools etc. affect the value of a house, a combination of these IP related factors acts as a proxy for the value of the IP.

- **Patent information related value indicators**
  In the case of patents, there is evidence to suggest that there is a strong correlation between patent value and standardised indicators observable in patent information documents. For example, the number of references to prior patents generated during the search and examination process, and the number of citations a patent has received indicate its importance scientifically and therefore its relative value. The observable result is a network of links called a patent citations network which is a useful qualitative evaluation tool.

  Likewise the number and quality of claims, the patent family size and the outcome of oppositions to the patent application can also be an indication of value.

- **Evaluation of value indicators: IPScore**
  An example of this type of qualitative valuation method is the IPScore software developed by the Danish Patent and Trademark Office. The IPScore method is used to value technology, patents and patent portfolios internally, within companies. The tool provides a framework for evaluating and strategically managing patents.

  The IPScore assessment of a patent consists of five categories: legal, technology, market, finance and strategy, each of which has 5-10 associated index questions. Each question relates to a different value indicator. Each question is rated 1-5 according to the patents strengths and weaknesses. Together, the 40 or so value indicators form a whole picture of the patent and its relative risks and opportunities. These are then displayed in various tables and graphical forms to be used by management for making strategic decisions.

Advantages and disadvantages of qualitative evaluation methods

The main advantage of patent information related and non-patent value indicators is their relative simplicity. Once the relevant information has been researched and is available in a useable form its relatively easily to classify and evaluate the IP without the need for complex methods. Another advantage is that the data for the evaluation is often publicly available. With sufficient expertise it is possible to value IP belonging to other parties. As a result, these qualitative methods facilitate the comparison and ranking of IP within a company's own portfolio or against competitors' IP.

Valuing IP using patent information related value indicators have many drawbacks. For example simply counting citations avoids taking a stand on questions such as how and why citations arise and what type of information they convey. Focusing on simple counts deliberately ignores any added information within the network of citations. Using value indicators as a proxy for value is only as useful as the level of expertise of those who are conducting the valuation. One must also decide which indicators are relevant to the value of a particular IP, and which are not. The quality and realism of the qualitative evaluation in IPScore, for example, is greatly dependent on the quality of information used.

When are they used?

Qualitative evaluation methods are most often used for the purpose of internal IP management. They are most useful for comparing, categorising and ranking IP within a portfolio or vis-à-vis competitors' IP. They are also useful for assessing the risks and opportunities of IP.