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# Valuation of Intellectual Property

## *Introduction*

This document is an extension of the well-received AIC publication “Realistic Valuations of Intellectual Property, August 2004“. It provides additional information on the valuation of intellectual property and the specific techniques used to establish the value of intellectual property and/or early stage ventures. The two documents should be read together to gain a complete overview of valuation techniques.

## *Valuing the Opportunity*

Business is not all about profit, but without profit there is no business. Once an opportunity has survived screening for fatal flaws, the entrepreneur should find out whether it forms the basis of a profitable enterprise. Six main factors determine whether a profit will be generated by a new venture:

- What is the selling price to the final consumer?
- How many units will be sold at that price?
- What is the variable unit cost, including all materials and subcontract labour on the inward side, and all commissions, allowances and discounts on the outward?
- What are the fixed costs of operating a business, including staff salaries, utility charges, site value taxes and the like?
- How much capital is needed to operate the business?
- What is the minimum risk-weighted rate of return to be applied to the capital?

The economic profit, if any, is given by the formula:

$$\textit{Profit} = \textit{units} \times (\textit{selling price} - \textit{variable unit cost}) - \textit{fixed costs} - \textit{rate of return} \times \textit{capital}$$

For many technology ventures the concern about selling prices and unit sales is foreign or too early to be considered during the discovery stage of a long development pipeline. The value of the technology venture is therefore related to the exit strategy or when the intent to divest is likely to occur in the life cycle of the venture. In many cases the customer is usually another company and the relationship with final consumers of the product is generally limited. Therefore the feasibility analysis and the business plan have to consider the audience which will be interested in the product (the same can be said of the IP, where the user should be considered in drafting the patent documents).

What is the value of an opportunity? The question applies equally to the venture as it does to a final product. Both are linked strongly to the valuation of the IP, especially when the venture is in its start-up phase. The following section outlines a number of valuation techniques and methodologies for early stage ventures or IP.

## ***Valuation Techniques***

Valuation of IP or early stage ventures continues to remain one of the most difficult and subjective tasks in the technology industry. The valuation of an opportunity is an important element in the capital raising process and when equity calculations are being determined. Because of the long time frames associated with getting a product to market

most of the value in IP is associated with the future benefits that will flow from the IP or venture. It is important to note that the ultimate value of the IP is the price that someone is prepared to pay. This section presents an overview of the three different valuation methodologies available: cost-based, priced to market, or derived from future income and revenue.

A fundamental difference exists between the value and price of IP; terms that are commonly interchanged. Value represents the future benefits from IP ownership and is related to the benefits to the IP user. Price is the amount at which the IP would exchange ownership between a willing buyer and a willing seller, neither being under compulsion to deal, with benefits flowing to both parties. Value is not necessarily equivalent to price. In simple terms value is based on an opinion resulting in different answers based on the valuation technique used, while price is an outcome or commitment of a negotiation that has taken place.

A number of reasons why a valuation is required include (McGinness, 2003):

1. To assist in determining licensing royalties and negotiating deal parameters;
2. When securing financial investment in the venture;
3. As a basis for establishing potential damages for IP infringement;
4. For legal and accounting standards requirements; and
5. For taxation, particularly capital gains tax and stamp duty liabilities.

The value of an opportunity or technology is established at a specific point in time and can be done prospectively or retrospectively. It is done prospectively by deal makers entering a negotiation. This includes willing buyers and sellers, investors, lenders and acquirers. When a valuation is done retrospectively it is usually by litigators where a

judicial outcome is imposed as a result of an adversarial incident, i.e. unwilling buyers or sellers exist.

A common situation where IP valuation is undertaken is during a technology licensing deal. Technology licensing involves the following components:

- Technology rights
- Risk
- Art of deal making
- Deal parameters and economics

Different valuation methods are oriented toward different perspectives. The following Value Matrix shows the common valuation methods from different perspectives, and the situation when they are likely to be used.

Table 1.1 The Value Matrix

<b>The Value Matrix</b>	<b>Precedent</b>	<b>Paradigm</b>	<b>Possibility</b>
<b>Price</b>	Industry Standards/ Benchmark	Auction Methods	Real Options Methods
<b>Worth</b>	Rating/Ranking Method	Rule-of-Thumb	Monte Carlo Methods
<b>Compensation</b>	Rule- of- Thumb	Discounted Cash Flow	Net Present Value

Source: AUTM 2004 Conference Notes – Session on Technology Valuation: Basic Concepts and Advanced Topics

Generally, there are three broad valuation approaches commonly used: the cost-based approach, the market approach and the future income/revenue approach. However, a number of methodologies exist to provide some indicator of value. It is important to note that the different methodologies will produce different valuation results and some methodologies will be more appropriate than others depending on the particular situation. Ultimately, the true value of IP is determined by the particular price someone is willing to pay. The following section describes the most common valuation methodologies in more detail.

## **I. Cost-Based Approach**

Using the cost-based approach, the value of the IP or associated technology is assumed to be equivalent to the historical cost of development and protection. Usually, a return is added to the base costs. It is important to ask if the cost to develop the IP or technology is relevant to the situation. The following areas are relevant where cost enters a license negotiation:

- For academic institutions:
  - Sunk patent costs
  - Modified Replacement Cost method used upfront
    - The Modified Replacement cost asks what it would cost you now to redevelop the technology or IP, knowing what you have learnt.  
The value is usually lower than the original cost.
- For corporations:
  - This method is used when the transfer of know-how is involved

It is recommended that the cost approach is used for legal and accounting standards requirements or when comparable market information is not available (Sullivan, 1998). It is also useful during litigation when damages from IP infringements need to be determined.

## **II. Market-Based Approach**

### **Industry standards/Comparable market**

The industry standards/comparable market approach measures the present value of future benefits by obtaining consensus from other similar transactions between unrelated parties that have occurred in the marketplace. This is the most common approach used in the licensing world since it reflects a fair market value for the technology or IP. If a comparable or market benchmark exists then this is the preferred method as this is a credible valuation technique. A number of sources are available to identify comparable transactions:

- Internal Database – licenses previously done by your organisation
- Published surveys – relatively very few in number
- Public announcements – internet searches and database services
- Word of mouth – contacts in the industry involved in deal making
- Litigation – outcomes and documents from trials
- Required disclosure – contained in Securities Industry filings

Some disadvantages exist with this methodology. Firstly, an active market with similar technologies must exist. Secondly, this method assumes that current industry norms are correct, and finally, a cost is involved to obtain accurate data from previous industry deals.

## **Rating/Ranking**

One way of comparing IP in the market is to use the Rating/Ranking Method, which compares the intellectual property asset in question to comparable intellectual property assets according to a subjective scale, using panels of experts, or to an objective scale based on measurable past experience. The five elements that comprise the Rating/Ranking Method are as follows:

1. Scoring criteria
2. Scoring system
3. Scoring scale
4. Weighting factors
5. Decision table

This approach influences people to prepare for negotiation by thinking through the relevant factors that make up licensing value. It facilitates discussions with other valuation experts as it focuses on the key components of value in the technology.

## **Auction**

The auction approach is a way to discover the market price of an asset. An auction discloses information on the IP or technology to a broad number of potential customers and accepts different sealed bids (Sullivan, 1994). This approach is useful when a number of interested buyers exist or when up-front payments are being targeted. No calculation of valuation is required using this approach as it assumes that the highest bid will reflect the true market value. The disadvantage with this method is that the willing seller has less control in setting the price as this is left to competitive market forces.



### **III. Future Income/Revenue Approach**

#### **Discounted Cash Flow/Net Present Value**

The value of property can be measured by the present worth of the net economic benefits (cash receipts less cash outlays) to be received over the life of the property (Sullivan, 1994). The discounted cash flow is the most accepted method in the financial marketplace since the majority of people are comfortable and familiar with the Time-Value of Money. Using this methodology requires compensation for the following:

- Inflation
- Risk
- A return on the investment

This methodology can be applied at any stage of development of the technology; only the ability to obtain accurate data will limit this approach. This approach also requires significant knowledge of the competitive environment.

#### **Monte Carlo**

The discounted cash flow technique can be further refined by applying Monte Carlo analysis to simulate the sensitivity of the result to variations in the assumptions. The Monte Carlo method provides approximate solutions to a variety of mathematical problems, including valuations, by performing statistical sampling experiments on a computer. The Monte Carlo method is based on the discounted cash flow approach but incorporates uncertainty to provide a more rigorous analysis. This is done by assigning a range of values to the variables used in calculating the net present value of an asset. The probabilities calculated provide greater insight and can identify which assumptions drive overall uncertainty. This approach is more involved and perhaps harder to

understand than other valuation methods. It is also difficult to estimate and obtain agreement on probability distributions.

### **Rule-of-Thumb (25% Rule)**

This method values intellectual property by calculating a royalty of 25% of the expected gross profit, before taxes, from the enterprise operations in which the intellectual property is used (Sullivan, 1994). This method, while it is a rough estimate, is useful to generate a ballpark valuation. It is also useful when the intellectual property is at a commercial stage or for litigation purposes. It should always be used with caution since it does not consider a fair return on investment nor potential profitability.

### **Real Options**

Real options analysis is based on theories of market behaviour, and is designed to explicitly incorporate and analyze risk and uncertainty associated with real assets. The real options method applies financial options theory to quantify the value of intellectual property. It views an opportunity as a process that managers can continually reshape in light of technological or market changes. Because the real options approach recognizes that risks can be managed, to avoid bad outcomes or take advantage of good ones as they become apparent, the use of real options practically always leads to higher values for the same project than the traditional methods, precisely because the options perspective recognizes that managers make future decisions about a project as uncertainties become resolved. The downside to real options valuation is that it can be a difficult and time consuming process.

## ***Conclusion***

It is recommended that where possible, a number of methods outlined above be used. In addition, any available industry standard or benchmark provides a level of objectivity that is easier to support in negotiations than projected revenues. The exception to this rule is where the market is undervaluing the type of IP, which sometimes does occur. It is also important to note that different industry sectors will require different approaches to valuation.

## ***References:***

AUTM 2004 Conference Notes - Session on Technology Valuation: Basic Concepts and Advanced Topics

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Sullivan, P. 1994 Profiting from Intellectual Capital – Extracting Value from Innovation, John Wiley & Sons, New York