

Intangible Asset & Intellectual Property Valuation: A Multidisciplinary Perspective

By Paul Flignor and David Orozco

When you measure what you are speaking about and express it in numbers, you know something about it, but when you cannot (or do not) measure it, when you cannot (or do not) express it in numbers, then your knowledge is of a meager and unsatisfactory kind.

Sir William Thompson, Lord Kelvin (1824-1907)

Intellectual property (IP) and intangible asset (IA) issues abound throughout the business world, touching nearly all aspects of a company, from product development to human capital, and staff functions such as legal, accounting, finance to line operations such as R&D, marketing and general management. This wide diversity of IP applications and stakeholders is a leading contributor to the complexity of managing IP, as each field has its own legal, regulatory and practitioner history.

One aspect all these disciplines have in common is the need for valuation. Valuation, as noted by Lord Kelvin, provides the potential to enhance our knowledge of intellectual property and to bridge the gap between these disciplines by providing a common set of methods to capture and describe the business, legal and financial aspects of the intangible asset in question. While the applications and even the vocabulary of these fields can differ, the underlying valuation methods bear striking similarities, which in turn reduces complexity and helps shed light on key management issues.

In particular, this paper highlights the importance of valuation context – why do we need a valuation? – and the importance of premise – what do we assume about the use of the intangible asset? – in determining the valuation game plan. We demonstrate how a small number of methods can be used to value IP across the range of issue areas and assess strengths, weakness, critical assumptions and practical applications of each.

This paper is an overview of some of the critical elements of intellectual property and intangible asset valuation and is intended for two audiences: the person with an interest but relatively little direct experience with intellectual property valuation and

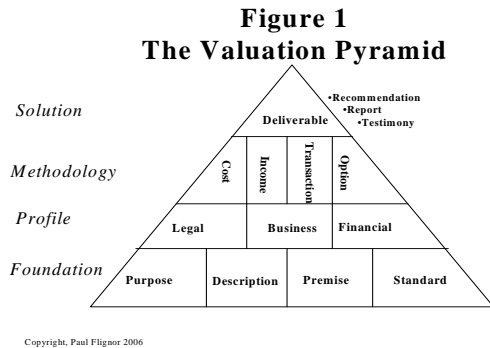
the person with deep knowledge of one application but an interest to learn about the implication of valuation across IP issue areas. It combines both academic perspective on IP management issues and a practitioner's experience in valuing these assets for a number of different business purposes.

The first section of the paper presents the Valuation Pyramid as a device to structure the valuation game plan. The second section describes briefly the legal attributes of each type of asset under consideration and their implication for valuation. The third section presents the four valuation method families – transaction, cost, income and option/binomial. Case studies will be presented throughout the article to illustrate key concepts.

The Valuation Pyramid: The Basics

Any valuation exercise can be viewed as a 'pyramid,' where each level supports the analysis generated on the level above (see **Figure 1**). The first level of the pyramid is the 'Foundation' level – the underlying rationale for and key assumptions of the IP valuation. The second level is the 'IP profile' level, where the business, legal and economic attributes of the IP asset are defined. The third level is the 'Methodology' level, where the specific quantification and financial analysis is performed to generate a financial result. The top level is the 'Solution' level. IP is never valued for curiosity, it is always valued to resolve a specific business issue. This highest level of the pyramid addresses the important issue of how the valuation analysis solves a business problem or generates a recommendation to a specific business question.

The Valuation Pyramid: The Foundation



The Foundation of IP valuation analysis consists of four building blocks, each with an associated question:

- Purpose** – Why are we valuing the asset?
- Description** – What is the asset?
- Premise** – How will the asset be used?
- Standard** – Who is the assumed buyer of the asset?

These foundation questions frame the context of the valuation and define the focus, depth, completeness and general working parameters of the analysis. For instance, a litigation matter requires complete and thorough documentation whereas for a technology transfer valuation, a lower level of documentation will suffice, generally. Moreover, understanding these foundational questions will ensure the valuation is performed within the context of acceptable standards of the field associated with the issue area and that the valuation will address all relevant considerations.

Valuation Purpose

The *Valuation Purpose* refers to the primary usage of the valuation analysis. The purpose of the valuation defines the legal or regulatory statutes,

jurisdictional court of resolution, acceptable methodologies and ‘rules of thumb’ that have developed in that particular field. There are dozens of reasons why an IP asset may be valued -- six key reasons are presented in **Figure 2**.

Transaction Strategy: A strategic purpose for valuing IP is when one is considering buying, selling, or transferring the asset in a licensing arrangement or acquisition. Usually, the transaction strategy end-purpose is a ‘go versus no go’ recommendation. That is, at what price am I willing to enter into this proposed transaction?

Financial Reporting: Valuing IP and other prescribed intangible assets for reporting on public financial statements. In 2001 the Financial Accounting Standards Board (FASB) established detailed new regulations for the reporting of certain intangible assets acquired through acquisitions and business combinations. These regulations specify the valuation, amortization and reporting of goodwill and other intangible assets. The end deliverable is usually a report specifying the value and change in value of the subject assets.

Litigation: A high-profile purpose of intellectual property valuation is to compute damage awards in an infringement lawsuit. The court history for determining IP valuation for infringement is rather lengthy, and a separate court system, the Court of Appeals for the Federal Circuit, is dedicated to resolving IP disputes.

Bankruptcy: During a corporate bankruptcy and reorganization, often the most valuable assets remaining are IP-related. Valuation is required by the Bankruptcy Court to properly dispose of the assets and reorganize the company, if necessary.



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Figure 2 Valuation Purposes & Standards

Transaction – M&A / Licensing	Financial Reporting	Bankruptcy / Reorganization
<i>Audience:</i> Management Investors <i>Standards:</i> Company Specific	<i>Audience:</i> Investors SEC <i>Standards:</i> GAAP FASB	<i>Audience:</i> Bankruptcy Judge Creditors <i>Standards:</i> Statute / Case law Bank requirements
Tax	Legal	Financing / Securitization
<i>Audience:</i> IRS, Foreign Tax Authority <i>Standards:</i> Per Tax Code (§§ 367; 482; 350; 197; 170)	<i>Audience:</i> Trial court <i>Standards:</i> “Georgia Pacific” “Panduit” Factors Statute / Case law	<i>Audience:</i> Creditors Investors <i>Standards:</i> Statute/ Case law

Financing/Securitization: An increasing area of activity is the securitization and financing of IP assets. This can be achieved through a number of ways, including borrowing against the license stream (similar to factoring) or securitization of IP.

Tax: The U.S. tax code has several provisions that require IP and intangible asset valuation for tax planning and compliance. These include charitable donations of IP, the sale or license of IP across tax jurisdictions (inter-company pricing), taxable reorganizations, goodwill allocations, built-in gains, among other areas. Disputes in these areas are resolved in the U.S. Tax Court.

Valuation Description

The description states the general characteristics of the intangible asset. Intellectual property refers to patents, trade secrets, copyrights, trademarks/trade dress. See **Table 1** for an overview of the IP regimes. Intangible assets refer to the broader class of intangibles that are specified in a contract between the contracting parties. Intellectual property in

contrast gives the IP owner rights against anyone, regardless of the presence of a contract, as in the case of patent infringement where a non-contracting party has made a patented product. Examples of intangibles assets that are not IP include relationship capital and supply agreements.

The intellectual property regimes have several unique business attributes. As a general advantage, they can offer high margins due to low variable costs in licensing. Each resource has distinct differentiating capabilities as well. In the domain of brands, the trademark offers the ability to leverage existing brand equity within the firm, e.g. through brand extensions, or with partners in the case of franchising where the mark’s goodwill is licensed to franchisees. Patents, if broad enough, can be powerful elements of competitive advantage. This is especially true in new technology markets where early entrants rely on differentiated functionality more than brand recognition. Before the new technology “crosses the chasm”, patents will be of paramount importance for sustaining competitive



advantage.¹ Copyrights encompass additional offerings called derivatives. For example, a powerful core media asset like the Harry Potter novels can, by virtue of the initial copyright, generate significant downstream revenues through the exclusivity rights associated with films, apparel, video games, board games, and merchandizing.

Valuation Premise

Valuation premise refers to the underlying assumption on how the asset in question will be exploited in the future. Will the use of the asset remain as it? (Valued under continued use)

Alternatively, the asset may be valued under a specific use that differs from the historical usage, such as an acquisition. A common premise is the 'best use' concept, which values the asset at the highest value under foreseeable circumstances, regardless of current usage.

An area where premise is of crucial importance is in bankruptcy, where the distinction between an orderly disposition and a distressed disposition can have a significant impact on valuation.

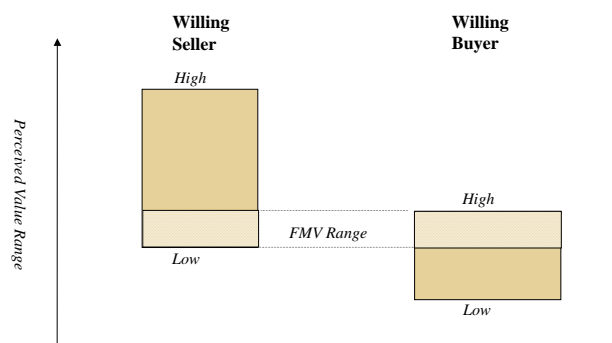
Valuation Standard

The valuation standard refers to the definition of value tied back to the valuation purpose. The most common valuation standard is the 'fair market value' standard, which is commonly defined as the price at which a willing buyer and a willing seller would transact, with each party having access to all relevant information and with neither party under the compulsion to transact. Alternative standards include 'fair value,' which is often used in court cases to compensate a party for the involuntary use of an asset, such as eminent domain, where there is no reasonable assumption of a fair market value transaction.

The Valuation Pyramid: The Profile

The *Profile* refers to the legal, business/strategic and financial characteristics of the asset in question. The profile level of the pyramid articulates the business and legal issues that dictate the opportunities and limitations of the asset, and ultimately its ability to generate income and create value. Much of the hard work and creative energy of a valuation analysis takes place at this level.

Figure 3
Fair Market Value Standard



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¹ Geoffrey A. Moore, "Darwin and the Demon: Innovating With Established Enterprises" Harvard Business Review, July 1, 2004.

Legal Profile

All assets, tangible, intangible or IP-related, have legal ownership aspects.² The majority of non-IP intangible assets such as customer relationships, water or air rights, and workforce intangibles, are given substance by some form of legal contract. For IP, which has no physical form and for which the marginal cost to replicate is often close to zero, the legal protection provides an important component of value. However, because each IP form has unique characteristics each must be examined within the larger business question at hand.

Side Bar 1 presents some of the important characteristics.

Business Profile

The value of an intangible asset is ultimately captured through commercial exploitation (either directly or indirectly through infringement damages). Exploitation, in turn, is determined by the strategic and business environment that enables or hinders commercialization. Factors that comprise the business profile include the barriers to exploitation, market lifecycle of the offering³, bundled services or other assets, competitor products and services, customer and supplier dynamics, government regulation, and new technologies.

There are many useful frameworks for analyzing the business profile of an intangible asset. Since valuation is in many ways simply the quantification of business strategy, strategic planning frameworks such as Michael Porter's 'Five Forces Analysis' are a good starting point for assessing the business dynamics of the asset.⁴ Additionally, any thorough analysis will consider the entire value chain that is required to exploit the intangible and will consider the competitive dynamics of each level of the value chain and its effect on the asset in question. An

important factor to consider is that most IP is exploited in conjunction with other IP (e.g., technologies are often bundled with trademarks and/or trade secrets), and a careful consideration of the inter-relationships among all IP in the value chain and market life cycle is often important.

The business profile will generally differ by IP or IA class. With technology patents, the question of economic useful life is typically important. The useful life (or economic life) of an asset represents the period of time that the asset will generate income or enable cost savings. The useful life of an asset may be longer or shorter than the legal life of the asset, depending on the competitive factors that are identified in the Business Profile analysis.

An important element of the business profile is the *economic characterization* of the intangible asset. Economic characterization refers to the ability of function or asset to command the *residual income* of the value chain.⁵ Value chains are composed of functions and assets which can be characterized as either routine or entrepreneurial. A routine function or asset, in principle, can be obtained from an alternative provider in an arm's length transaction. Therefore, any excess profit (above and beyond a 'routine' amount) can be retained by the contracting party and does not accrue to the owner or performer of the asset or function. In contrast, an entrepreneurial function or asset is one which is critical to the value chain and is unavailable from alternative suppliers. Therefore, entrepreneurial functions and assets are in a much stronger bargaining position than other members of the value chain and claim a larger share of the total profits.

² A useful definition of an asset is a legal claim for a future revenue stream.

³ Early in the market life cycle consumers tend to focus on product features (patents) and later rely more on branding, so the value of trademarks increases commensurably.

⁴ Michael Porter, "Competitive Advantage," The Free Press (1980).

⁵ Residual income is defined as the amount of income (or loss) remaining after all subcontractors and routine providers have been paid. It is aligned closely with entrepreneurial activities.

Table 1 U.S. IP Regimes⁶

IP Regime	Origin of Rights	Prerequisites to Protection	Scope of Protection	Life	Test for Infringement
Trade Secret	Investment of time and money, guarded from others	Recognition of value and utility	Confidential Information	Life of confidentiality	Means of Derivation
Utility Patent	Granted by Fed. Govt. on application by inventor	New, useful, and non-obvious subject matter	Useful process, machine, article of manufacture, or composition of matter	17 years from date of grant or 20 years from date of application	Manufacture, use, sale, offer for sale in U.S., or import of claimed invention.
Copyright	Creation of original "works" of authorship, fixed in tangible form	Originality, registration and copyright notice required if publicly enforced	Works of authorship	Variable on the order of 100 years or longer; life of author plus 70 years.	Copying, Performing, Distributing
Trademark	Adoption & use in commerce	Used in commerce to identify and distinguish business, goods and services, Federal registration required for federal enforcement.	Words, names, symbols, and other devices.	Unlimited as long as property is used in commerce.	Likelihood of confusion, mistake or deception.

⁶ Adapted from James G. Conley & David Orozco, "Intellectual Property – The Ground Rules", Kellogg School of Management Technical Note 7-305-501 (August 2005).

Side Bar 1: IP Characteristics & Valuation

Patents Legal Attribute	Valuation Impact
Scope - Number of Claim Elements ⁷	More elements means it's easier to substitute pieces of the puzzle and "design around" the invention
Time left before 20 year rights expire	Patents lose value as time elapses
Patent grants owner the right to Make, Use, or Sell (& Import if a process)	Allows carving out different parts of value chains in one market
Continuation Strategy	Presence of a continuation strategy can extend the scope and time of the parent patent ("evergreening")
Accused infringer has been sent a cease and desist letter	Willful (treble) damages may accrue when notice is received
Value chain position of accused infringer	More downstream may mean greater damages (value added of offering is greater)
Patenting of multiple patent forms (machines, processes, compounds, products)	Multiple forms increases licensing opportunity and defensive position

Trade Secrets Legal Attribute	Valuation Impact
Last as long as it remains secret	Value may change over time (e.g. Coca-Cola formula)
Reasonable efforts to maintain secrecy	Necessary for protection
Protection contracts	Presence secures trade secret status
Reverse engineering & Independent derivation	Allowed; What are probabilities of occurring?
Complexity	Limits probability of independent derivation

Copyrights Legal Attribute	Valuation Impact
Life of author + 70 years duration	Value may increase or stay constant over a long period (e.g. Disney animations).
Right to copy, perform, distribute, publish	Allows different value chains to be segmented ⁸
Downstream control	No derivatives owned by others, increases value of copyright
Complexity	Limits independent creation risk
Can be reverse engineered	In the case of software. What is the probability?

Trademarks Legal Attribute	Valuation Impact
Infinite life as long as used in commerce	Value may change over time
Anything that identifies the offering's source can be trademarked	Cognitive touchpoints of the user experience can be trademarked (e.g. robin's egg color blue as Tiffany's trademark, or unique design of the Hershey's Kiss)
Downstream control	Control of all derivatives, increases value
Protection limited to discrete fields of use where commerce is being conducted	How valuable is the market of the offering?
Used as a vehicle for goodwill	Often leveraged to enter new markets or attract partners

⁷ Patent claim elements are: steps in a process, structural components of a product, interacting parts in a machine, and/or elements of matter.





⁸ David Bowie securitized the cash flows from performances (economic rights) but kept property rights to songs.

Legally protected IP, which has an exclusive monopoly on exploitation of a given asset, can be either routine or entrepreneurial. Routine IP is one whose benefits can be obtained from a non-infringing alternative. In the pharmaceutical industry, the patents of the compound tend to be entrepreneurial, as the patent is unique and is a critical factor in the success of the drug while other elements such as manufacturing, sales and distribution tend to be obtainable from a multiple of sources. Conversely, in manufacturing industries, manufacturing IP tends to be routine as the benefits of the technology are likely available from other sources and can provide an ‘upper bound’ on the value of the asset.¹² In complex industries, such as the automotive industry, there can be several entrepreneurial assets, including platform technology and trade names / trademarks.

Financial Profile

The financial profile quantifies the impact of the intangible asset on the value chain of the product or service. This includes typical accounting data, such as revenues, costs and capital investment, but also can include strategic information such as price premiums, cost savings, excess (of saved) capital, or any other financial result of usage of the subject intangible for directly or indirectly creating value. Indirect benefits include the impact of the intangible on revenue streams outside the direct value chain (also known as ‘convoyed sales’ or ‘bundled sales’) that include aftermarket sales, potential brand extensions, etc. The financial profile is usually performed iteratively with the valuation methodology described below.

Economic Characterization of IP:

Value Chain Bio-Technology	<u>IP Intensity</u>	<u>Economic Characterization</u>	<u>Strategy</u>
Market		Routine	Joint Venture
Manufacture		Routine	Outsource
Develop		Entrepreneurial	Internal Development
Discover		Entrepreneurial	License

¹² But exceptions clearly exist as in the case of Dell, and its innovative manufacturing processes.

Usual questions associated with the financial profile include:

- Projected revenues, costs and capital requirements associated with commercializing the intangible
- Estimated time to commercialize the asset
- Estimated cost of non-infringing alternatives
- Time value of money (cost of capital) associated with the intangible
- Impact of the commercialization on working capital (accounts receivables and account payables)

The financial profile should typically cover the entire useful life of the asset.¹³

The Valuation Pyramid: Methodology

An understanding of the foundational questions: Why is the valuation required? Who is the presumed purchaser? What are the conditions of the transaction? What are we valuing? Combined with an understanding of the legal, business, and financial attributes of the asset help ensure the proper selection and computation of the valuation methodology. While they each have several names and a myriad of permutations, all valuation methodologies boil down to four methods:

- Transactional;
- Cost;
- Income;
- Binomial/Option.

Transactional method

A transactional method is in many ways the most simple method to understand. It is actual price paid for a *similar* intangible under *similar* circumstances. This can be used either for direct acquisition or purchase or for the right to use, a license. The transactional method also goes by the name of the ‘market approach.’ The transactional approach is appealing because it is a direct measure of the value of the intangible asset. As such, it is often considered to be the most reliable of methods when it can be performed credibly.

The intuitive appeal of the transaction method lies at the heart of many standards of valuation, as described above. ‘Fair market value,’ and ‘arm’s length standard’ two of the most common valuation standards derive from the transaction method. Therefore, as a general rule transaction data can never be ignored in a valuation exercise – it either must be incorporated or affirmatively rejected as part of the analysis.

The key to performing a successful transactional approach is to ensure comparability between the outside evidence and the subject asset. Comparability factors to consider are based on the factors discussed in the *Profile* level of the Valuation Pyramid. Due to the depth of the required information to ensure comparability, often the only good transactional data is from a transaction where there is complete access to the legal agreement. As these are generally private documents and difficult to obtain, often only transactional data where one party of the subject transaction is a member is useful under this approach. Also, transactional methods are more difficult to apply in contexts where objectivity is critical such as financial reporting, tax, and litigation support and easier to apply in a consulting context where the deliverable is more dependent on the subjective experience of the valuation specialist.

Typically, there are two steps to a transactional method valuation – screening and adjustments. Screening refers to the selection process of identifying candidate third party transactions with sufficient information on pricing, scope and terms and conditions to be deemed comparable to the intangible asset in question. Adjustments refer to an explicit quantifiable change in the valuation due a specific rationale. Adjustments are typically grounded in a baseline transaction (or transactions) that are sufficiently close to the subject intangible asset, and for which sufficient information is available to analyze the technical, legal, business and financial terms. Adjustments are then based on either ‘hard,’ quantifiable data where there is an explicit difference between the subject intangible asset and the outside evidence or subjective estimates by the analyst.¹⁴ Adjustments must be used with care, as too many may limit the comparability of the outside evidence and can compromise the credibility of the transactional method.

¹³ The useful life (or economic life) of an asset represents the period of time that the asset will generate income or enable cost savings. The useful life of an asset may be longer or shorter than the legal life of the asset, depending on the competitive factors that are identified in the Business Profile analysis.

¹⁴ In practice, adjustments range from complex statistical modeling to subjective practitioner experience.

It is also noteworthy that the economic characterization described above is important to determine the applicability of the transactional approach. Entrepreneurial IP, by nature of their uniqueness, will have a great deal of difficulty in identifying similar transactions for use in this method -- This is analogous to valuing a Van Gogh masterpiece based on the price of a Rembrandt. Both are fine art, but likely have very different market values.

Transactional Case Study: Trademark

Foundation: This is a fair market valuation to properly assess royalty rates of trademarks between a U.S. cosmetic company and several overseas affiliates for tax purposes.

Profile: At issue are the value of a series of trademarks for mid-range women’s cosmetics sold through department stores, drug stores and other retail outlets. The trademarks will be licensed for three years to a series of companies in Latin America for exclusive use in their territories. The company will also provide marketing services to the licensees on an as-needed basis. Some of the licensees will manufacture the cosmetic directly while others will outsource to third party manufacturers. The company has undisputed ownership of the relevant trademarks and manages them actively in all relevant countries. In this industry, the trademarks are characterized as

the product lines are stable, with moderate growth and constant margins.

Transaction Method Application:

A baseline transaction is identified: an exclusive license of the same trademarks/tradenames with no upfront fee and a running royalty rate of 7% of net sales to a Western European company. The license agreement is for 5 years. Adjustments were made for the following elements:

- Location: Trademark valuation can differ significantly by geography, depending on the demographics and competitive factors of the territories. In this instance it was concluded that the underlying value of trademarks in the cosmetic industries in Europe and Latin American were comparable, and no explicit adjustment for geography is required.
- Advertising support: To help launch the brands in the new territories, the licensor has agreed to provide market development support of up to \$1 million in the first year. The royalty rate was adjusted upward to compensate the licensor for this added expense. The adjustment was computed by reimbursing the licensor for the \$1m plus a one-year cost of capital to compensate for the time value of money. When capitalized over the projected sales of the three year license agreement, the net effect was to increase the royalty rate by 0.2%.
- IP Strength: Trademark protection and ability to

**Transaction Approach
Cosmetic Company Trademark License**

Base royalty rate 7% of net sales				
	Base Contract	Tested Contract	Adjustment Method	Adjustment
Location:	Western Europe	Latin America	None	0%
Advertising Support:	None	Up to \$1M in year 1	Reimburse	0.2%
IP Legal Strength:	Strong	Moderate	Subjective Estimate	(0.5%)
Length:	5 years, renewable	3 years, renewable	None	0
				6.7%

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‘entrepreneurial’ in that they are a critical element of the success of the revenue stream and have no close substitutes in the market. The financial projections of

manage the use of the marks is determined to be lower in Latin America than in Europe. The subjective estimate was a decrease in the royalty rate of 0.5% of net sales.



- Length: The length of the license agreement is an important factor in determining value. Longer licensing agreements tend to have lower royalty rates. However, in this instance the expectation is that the agreement would likely be renewed at the end of the three year period, so no adjustment was performed.

Income Method

The income method in many ways is the most fundamental of the valuation methods. The most basic definition of 'value' is based on the ability of the asset to somehow generate future income. This underlying characteristic is often referred to as the 'intrinsic' value of the asset, and is captured by the ability to directly or indirectly generate a positive cash flow. This cash flow, when appropriately discounted, is the underlying premise of the income method.¹⁵

When the period cash flows (typically annual) are 'discounted,' or adjusted by some factor that accounts for the differing value or money from one period to the next, it is called the present value of the asset. Cash flows are generally forecasted explicitly throughout the expected economic life of the IP. Beyond the economic life of the asset an estimate of remaining value, or terminal value may be appropriate.¹⁶

The income method has three components – projected cash flows, the economic life of the IP, and the discount rate. Projected cash flows are the future income attributable to the intangible asset. It is important that the analysis should capture all direct and indirect costs associated with the IP in question, including lost sales of bundled products or services, incremental overhead costs, necessary investment and the likely effects of competition on the price premium or costs savings derived from the asset. The economic life refers to the length of time that the IP will be able to command the price or cost premium. The economic life is generally bounded by

the legal life of the asset but is often much shorter. For instance, it is common in the electronics field for the technology to become obsolete in as little as 3 years, often well before the patent expires. The discount rate refers to the expected cost of financing the asset in question. For IP assets, the discount rates are generally quite a bit higher than the cost of capital of a company and should be thought of as more similar to venture capital types of investments, with a corresponding discount rate from anywhere from 20% - 50% per year.

The income method, while highly analytic, is also quite subjective. Subjectivity is employed throughout the methodology, with particular care required to assess all the business and financial dynamics that impact the expected incremental cash flows. The use of a terminal value, which captures value beyond the years, can often represent a significant percentage of the total asset value. The income method has been well analyzed and published, with texts and software readily available. While care is required for all valuation methods, the subjectivity involved in the income method can be especially tricky.

Income Method Case Study: Gasoline Trademark Valuation

Foundation: This is a fair market valuation of the value of the trademark of a retail gasoline brand name for tax planning purposes.

Profile: The subject IP was the retail gasoline trademark of a major oil company. Gasoline price is determined primarily by the underlying price of crude oil, refining, and local regulatory factors, and secondarily by location and brand. To account for the primary factors, an industry database providing price by region and brand was employed. This data enabled the determination of a price premium for the trademark in question vs. the price of a similar grade unbranded gasoline.¹⁷ This price premium is then adjusted downwards for the incremental costs in supporting the brand, including advertising, costs associated with the credit card program, and certain identifiable selling and admin costs estimated to be above those required for an unbranded product. The price premium is multiplied by the annual expected

¹⁵ The income method can go by several other names, including 'Discounted Cash Flow,' 'Excess Price,' 'Residual Income,' and 'Relief From Royalty,' among others.

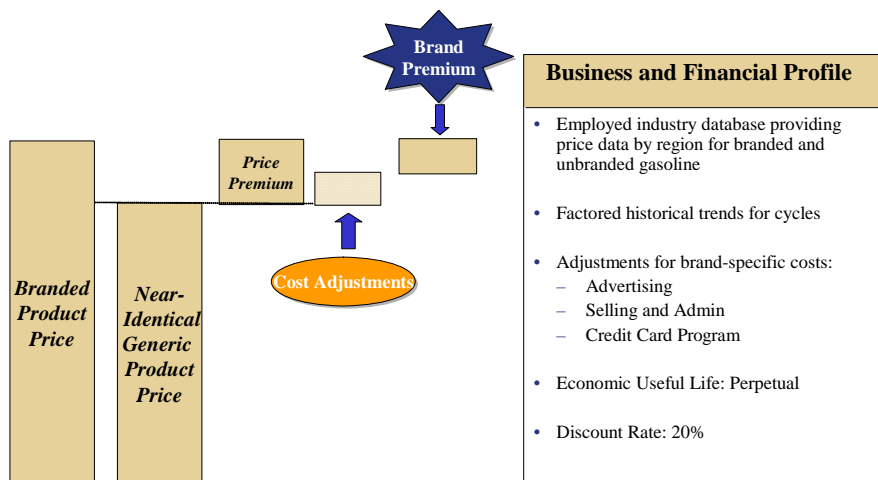
¹⁶ There are multiple, excellent references for the income method. A good starting point is the classic finance textbook: PRINCIPLES OF CORPORATE FINANCE by Brealey and Myers.

¹⁷ Quality differences in retail gasoline are minimal due to the common refining and distribution channels.

sales of branded gasoline. As trademarks have infinite life employed, and as the economic life of the trademark is also infinite if the brand is maintained properly, an infinite life was used, and no terminal value is required. A discount rate of 20% was employed, based on typical rates of return on brand-related assets.

costs and including the indirect cost related to the time required to build the replacement asset. In addition, to reflect properly the value of the IP, the replacement cost analysis should incorporate the obsolescence, or the current useful state of the asset.¹⁸

Income Method Example: Gasoline Trademark Valuation



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Replacement Cost Method

The replacement cost of an IP asset is the cost to develop similar functionality to the subject IP outside the scope of the legal protection. A common usage of the replacement cost method is the cost to design around a patent or set of patents. This method is based on the principle of substitution – an investor would not pay more for an asset than the cost to obtain similar benefits from another asset. This method is particularly useful when the legal protection is weak or the technology is relatively well-known, and the IP does not produce income currently.

The replacement cost method is a forward-looking perspective on how to create an asset with similar functionality to the asset in question – it should not be confused with historical cost or accounting cost. It must be based on the cost of resources to create the new asset today, using today's

Many commentators and practitioners believe that the replacement cost method has little role in IP valuation because a) the legal protection of IP makes replacement difficult; and b) without the legal protection the replacement cost for many IP assets is effectively zero.¹⁹ However, the replacement cost method is a valuable tool to establishing a 'floor' or

¹⁸ Some practitioners draw a distinction between 'replacement cost' and 'reproduction cost.' Replacement cost is the cost to create an asset with similar functional characteristics but a different form e.g., a patent workaround. Reproduction cost is the cost to redevelop the specific asset in question. Consequently, reproduction cost may be appropriate for trade secrets and types of intangible assets but is typically not appropriate for patents, trademarks and copyrights.

¹⁹ See Richard Razgaitis, VALUING AND PRICING OF TECHNOLOGY-BASED INTELLECTUAL PROPERTY, John Wiley & Sons, Inc, 2003.

'ceiling' price. As such, it is particularly useful in negotiating the sale or license of an IP asset.

Replacement Cost Method Case Study: Auto Dealer Network

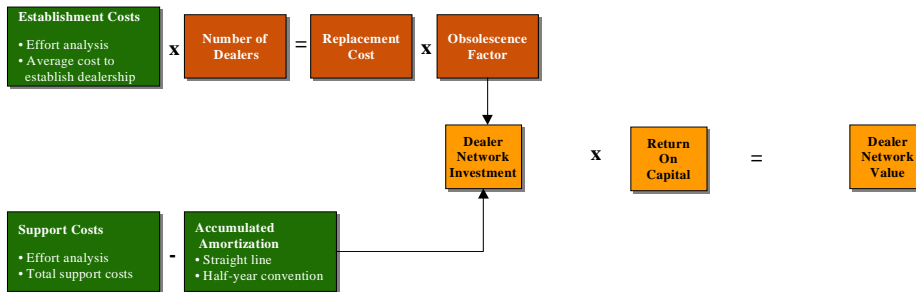
Foundation: This is a fair market valuation of the dealer network of an automotive distribution company for negotiation purposes.

Profile: The intangible asset in question is the network of relationships between the auto distributor and the independent franchise dealerships. Importantly, the analysis does not value the dealership directly but rather the distribution channel relationship that the automotive company has established with the independent dealers. The

Replacement Cost Methodology:

The dealer network valuation method is based on establishment and support costs. The establishment costs include the effort analysis to identify site, dealer-owner, environmental impact assessment, etc. This represents the cost to create a new dealer network. This 'new network' must be lowered to reflect the changing demographics and desirability of

Replacement Cost Example Auto Dealer Network Valuation



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automotive company incurs cost to establish, monitor, and train the dealers. These costs form the basis of the replacement cost analysis. Here, the replacement cost is the only viable method to value the network, as there is no income stream directly associated with the intangible and this type of intangible is rarely sold in third party transactions for use under the transaction method.

the locations due to time, or the obsolescence of the network. These costs are supplemented by the ongoing support costs in training, monitoring, etc. This sum is the total Dealer Network Investment. To harmonize the time value of money across the different points in time used to derive the cost estimate, a return on capital is applied to the investment total to derive the dealer network value.

Binomial and Other Non-Traditional Methods

The three traditional valuation methods, transaction, income, replacement cost, are appropriate for nearly all valuation analyses. However, over the past decade or so we have seen the growth of a new family of valuation methods based on future contingent events. This family of methods includes real options, binomial models, and Monte Carlo simulations. They are all based on decision tree models where the conditional events required for the IP to generate value is modeled explicitly. At the core of each of these methods is a two step process: first, compute the probability of the favorable event occurring that will make the IP valuable (or ‘in the money’), and second, compute the payoff if the favorable event occurs (usually using one of the traditional three methods described above).

The real option method is based on the successful Fischer-Black valuation model for pricing options (calls and puts) of financial stocks. The basic premise behind the real option method is that an investment with an asymmetric payoff (i.e., a potentially large payoff and only limited losses) will have an increased value as the level of uncertainty, known as volatility, increases. Consequently, real option methods have been most useful where large capital investments are required with a highly uncertain and far away payoff, such as the pharmaceutical and oil exploration industries. Monte Carlo simulations, named for the gambling games popularized at the Mediterranean resort models a low probability payoff over multiple iterations. Monte Carlo simulations are used to estimate the spread of diseases, engineering tolerances and even the probability of the Chicago Cubs winning the World Series! The binomial expansion method, or decision tree, is the most intuitive of these methods. In the binomial expansion the required events and decisions are modeled explicitly, each with their own probabilities. An important aspect of building a binomial expansion is to ensure all potential alternatives and scenarios.

Each of these alternative methods should be used with care. The intuition behind each of these is often difficult for the reader of the valuation analysis to follow, and clarity in the purpose and approach of the valuation is always a prime objective of any analysis. Indeed, the intuition behind these methods can be so confusing that often the analyst can become absorbed

with the model parameters and lose sight of the original valuation purpose.²⁰ Despite (or because) or the technical complexity of these methods, they require extreme care in building models that are a highly sensitive to changes in underlying assumptions and parameters.

For instance, when using a real option or Monte Carlo model, it is always best to create a detailed binomial decision tree to ensure that all potential outcomes have been incorporated into the analysis. With the increased importance of IP in the business world and the increasing sophistication of valuation techniques, these alternative methods will become increasing useful tools to value IP in the future. However, we offer caution in their use and application and suggest the reader acquaint themselves with one of several resources on these methods before application.²¹

Binomial Method Case Study: Non-commercialized Agricultural Patent

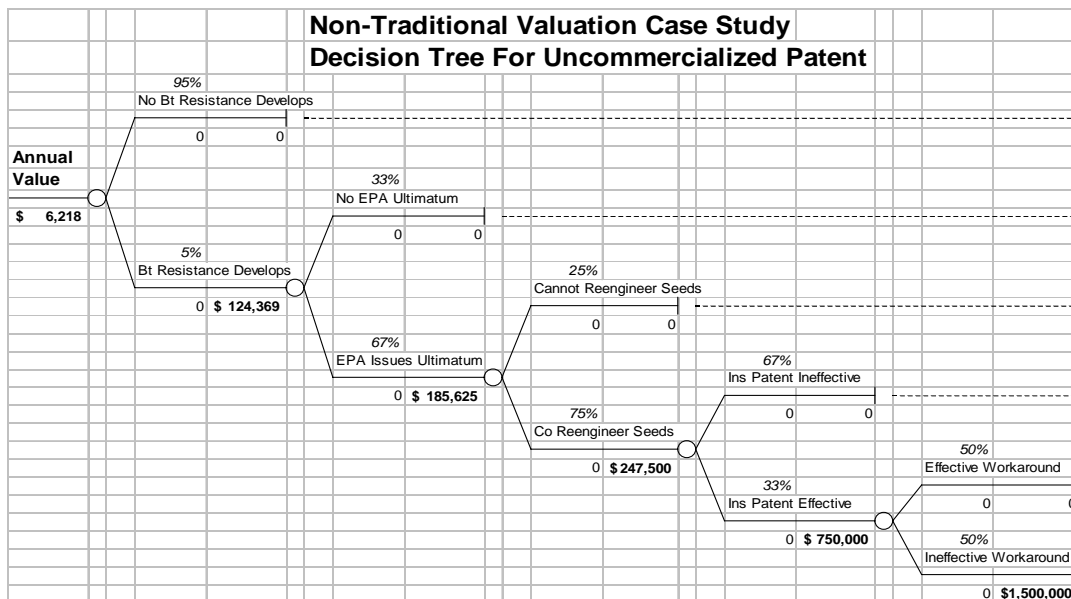
Foundation: This is a fair market valuation of a non-commercialized patent for purposes of negotiated sale.

The European corn borer caterpillar (“ECB”) is a ravenous pest, destroying millions of dollars of U.S. corn each year. For years a bacterium, *Bacillus thuringiensis* (“Bt”), has proved an effective insecticide for the ECB. A transgenic corn was developed that maps the effective genes from the Bt bacteria into the seed corn, creating what is referred to as ‘Bt corn.’ One of the primary environmental

²⁰ These methods are sometimes referred to as ‘answers in search of a problem,’ due to the sometimes dizzying complexity required to solve an often straightforward problem.

²¹ Several recent books have been published on this subject. Two of the more popular ones are ‘Tom Copeland & Valdimir Antikarov, REAL OPTIONS, Texere, 2001 and Richard Razgaitis, VALUING AND PRICING OF TECHNOLOGY-BASED INTELLECTUAL PROPERTY, John Wiley & Sons, Inc, 2003.

Event	Probability
1) ECB larvae resistance development	5% per year
2) EPA ultimatum to seed companies to develop solution to ECB resistance	67%
3) Seed companies unable to modify seed effectively to manage ECB resistance	33%
4) Patent insurance regime is successful	33%
5) No effective work around of the patent is developed	33%



and farm policy concerns raised by use of any transgenic seed such as Bt corn is the development of resistance by the target pest. Here, the concern is that extensive use of Bt corn will lead to the development of a resistant strain of ECB to the Bt bacterium, making both the modified corn as well as conventional insecticides ineffective. To combat this potential, the Environmental Protection Agency (“EPA”) has mandated use of a ‘refuge’ planting policy.

A refuge policy mandates that a certain percentage of the acreage be planted with conventional hybrid corn that excludes the Bt genetic enhancement. Planting 20-40% of the acreage with hybrid corn creates a refuge where non-resistant strains of ECB can develop and mate with the resistant strain, creating offspring that will most likely *not* carry the resistant gene to the Bt bacterium. A main obstacle in implementing the high-dose refuge strategy is the dependence on the voluntary compliance of the individual farmer. Compliance efforts have been hampered by the difficulty in monitoring seed and crop management practices, especially among smaller farmers. If compliance does not increase, the EPA may pull the approval for Bt corn, and prohibit the sale of a profitable line for several seed companies.

To help ensure compliance with the refuge policy, a business method patent was obtained to bundle an insurance policy with Bt bacteria in the transgenic seed. The patent has 6 years of remaining life. A binomial model is appropriate here because the patent is of no value unless the resistant gene within the ECB mutates and spreads. Here a decision tree is employed to derive all the conceivable scenarios, with the associated probabilities. The value of the patent is then the probability of resistance developing and the patent becoming valuable times the payoff (license value) of the payoff *if* the favorable scenario develops.

With an expected licensing fee or \$1.5M per year if the above scenario comes true, the expected income is still quite small due to the low probability. The cumulative value, expressed as a net present value using the income method, is just under \$25,000.

The Valuation Pyramid: Solution

As with any well-planned exercise, IP valuation should always be performed with the end in mind. The final step of the valuation process is to express the analysis in a way that meaningfully helps resolve

a business issue. The general forms of deliverable solutions general fall into 3 categories that derive from the issue areas described in the Valuation Purpose section above: planning recommendation, compliance, or dispute resolution.

Planning Recommendation is generally related to a new use of the IP, and typically revolves around the question of whether to enter into a IP sale or license transaction. The deliverable it generally a management report on the feasibility of the proposed transaction and the likely financial costs and benefits. Planning could be to support a license strategy, a tax management issue or bankruptcy dissolution.

Compliance refers to the financial reporting of IP or IA value to comply with a regulatory requirement. The most common compliance issue today concerns the business combination reporting requirement of FASB, but significant reporting requirement exist in the tax code as well. In addition, compliance reporting may also be required for non-governmental purposes including fairness and solvency opinions of business enterprises or financing and lending.

Dispute resolution refers to the settlement of infringement claims of IP or contractual violations for IA. The deliverable here is often expert testimony to compliment the expert’s report. The specific standards are determined by the relevant court and jurisdiction.

Selecting and Prioritizing Valuation Methods

Selection of the most appropriate IP valuation method depends on a number of factors developed in the *Valuation Pyramid*. In the *Foundation* level, the context and issue area of the valuation purpose may have a relevant statute or court history suggesting one method over another. Critically, proper execution of the *Profile* level will identify the availability, reliability, and suitability of data to employ the methods. Given that each method requires extensive knowledge of data, this is typically the determining point on method selection. If the IP is not commercialized, then one of the alternative methods may be most appropriate. As a general rule, the reliability of a valuation method decreases as the number of adjustments and assumptions increases, therefore the best method is usually the simplest and most straightforward one given the facts and circumstances.

For most IP valuation applications there is no hierarchy of methods, and all methods are in principle applicable equally. In addition, most practitioners would concur that all valuation methods, if applied properly, should converge near a similar valuation estimate. As a consequence, many practitioners suggest employing multiple valuation methods for a given IP asset to demonstrate robustness and completeness of the analysis. In practice this is often difficult as data for multiple methods is often unavailable or the economic characterization of the asset precludes use of a method (i.e., an entrepreneurial IP asset by definition will not have a meaningful replacement cost method application). The field of IP valuation has been evolving as rapidly as the explosion of IP in the economy and the complexity of IP in the legal field. However, while the methods will certainly change over time, the requirements to ground the analysis in the key *Foundation* issues and to *Profile* the business, legal and financial issues will remain critical to IP valuation.