

# Chapter 4

## Determination of Royalty Rates

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CHAPTER 4

*Determination of Royalty Rates*

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# Chapter 4

## Determination of Royalty Rates

### 1. INTRODUCTION

The main objective of this chapter is to describe the factors that guide the determination of royalty rates for licensed intellectual property (IP) rights. Key principles of IP valuation are also discussed, since royalty rates and value are flip sides of the same coin; both are driven by the earnings capability and risk profile of the asset. A final section describes how value-based IP management enables organizations to develop value maximizing strategies, set appropriate budgets and track the return on IP investment.

The most obvious need for a royalty rate is the negotiation of a license; however, royalties are required for a variety of other purposes, including:

- (1) *Transfer pricing*: Within multinational corporations, the use of IP by related entities operating in different tax jurisdictions can result in a transfer of earnings. Tax authorities in developed markets are paying considerable attention to protect the tax base and prevent profit shifting.<sup>1</sup> This places greater emphasis on the market value and arm's length royalty rates for IP and other intangible assets. Guidance is provided in the Organisation for Economic Co-operation and Development (OECD) Transfer Pricing Guidelines and country specific tax rulings.
- (2) *Litigation*: Damages claims resulting from IP infringements can be influenced by the level of royalties that are likely to have been agreed upon by the owner of the IP and the infringer.<sup>2</sup>

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1. The 2017 edition of the OECD Transfer Pricing Guidelines incorporates substantial revisions resulting from 2015 reports on Base Erosion and Profit Shifting (BEPS).

2. The legal issues associated with the calculation of damages in an infringement suit are beyond the scope of this Chapter, particularly since such issues often are dependent upon the law in the jurisdiction where suit was brought and thus, the jurisdiction calculating damages. For example, in

- (3) *Strategic planning*: The management of IP portfolios benefits from the quantification of the current and potential strength and earnings of each asset. Royalty potential is an important metric in a review of an IP portfolio.
- (4) *Valuation*: One of the income-based methods of IP valuation is based on the notional royalties that the property could generate.

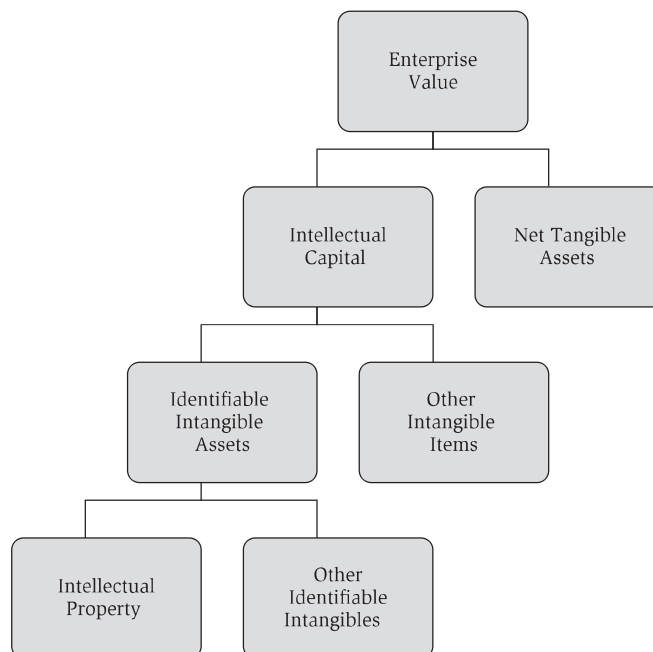
In turn, IP valuation can be required for financial reporting, tax compliance, pre-acquisition due diligence, and strategic IP management.

At the outset, it is helpful to compare different definitions of intangible items. Accountants use the term ‘*intangible assets*’ to describe non-monetary assets without physical substance that are identifiable, controlled by the owner, and expected to generate economic benefits. IP rights are a subset of intangible assets. The term ‘*intellectual capital*’ is generally used in a broader context, referring to all non-monetary and non-physical resources that contribute to value creation. This will include items such as human capital which does not meet the accounting definition of an intangibles asset.

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the US, a reasonable royalty for purposes of a damages calculation often is determined in a ‘hypothetical’ negotiation that evaluates various so-called *Georgia-Pacific* factors. See *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F. Supp. 1116 (S.D. N.Y. 1970). Moreover, in the US, damages in an infringement suit could include the patentee’s lost profits and the US Courts apply a four-factor test for determining the propriety of lost profits damages, including: (1) demand for the patented product, (2) absence of acceptable non-infringing substitutes, (3) manufacturing and marketing capability to exploit the demand, and (4) the amount of profit the patentee would have made. See *Ericsson, Inc. v. Harris Corp.*, 352 F.3d 1369, 1377–1379 (Fed. Cir. 2003); *Micro Chem., Inc. v. Lextron, Inc.*, 318 F.3d 1119, 1123 (Fed. Cir. 2003). See also *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152 (6th Cir. 1978).

Figure 1 Terminology



The figure shows that IP rights are a subset of intangible assets, which in turn are a subset of an enterprise's total asset base.

## 2. THE ECONOMICS OF IP

Patents, trade secrets, trademarks, designs and copyright are typically combined with other assets in order to generate cash flows. Within an operating enterprise, the capabilities resulting from these asset clusters are the building blocks of value.

Knowledge of the value contribution of each of these assets, and the linkages between them, is essential for corporate strategy, IP management, and IP valuation. Competitive advantage is increasingly driven by the development, integration and reconfiguration of intangible assets. Yet, few companies have a clear appreciation of the current and potential value contribution of their IP and other intangible assets.

The economic characteristics of IP are significantly different to tangible assets:

- (1) IP is not diminished by use, and can generally be used simultaneously by many parties. In some instances, value is enhanced by increased users, through a network effect.
- (2) There is seldom a linear relationship between the cost of creating IP and its value. The risk of wasted investment is high, but this is countered by a high upside potential if the IP is successfully commercialized.
- (3) The value of IP often results from linkages with other assets.
- (4) IP is commonly licensed on a standalone basis, but is usually sold as part of a business combination. Market-based royalty rates are often available, but comparable sales transactions cannot always be identified.
- (5) IP markets are not efficient, and this can result in the selling price of standalone IP being less than its intrinsic value.
- (6) Most companies have inadequate metrics regarding the strength, performance and value of their IP.

Value creation maps can be used to identify the relative importance of IP within a business, and the linkages with other resources. These maps illustrate how the resources of an organization are deployed to create a differentiated market position and generate cash flows. The direction and extent of the resource inter-relationships, and their role as value drivers, can be estimated through a combination of market research, statistical analysis of historic data, and Delphi techniques.

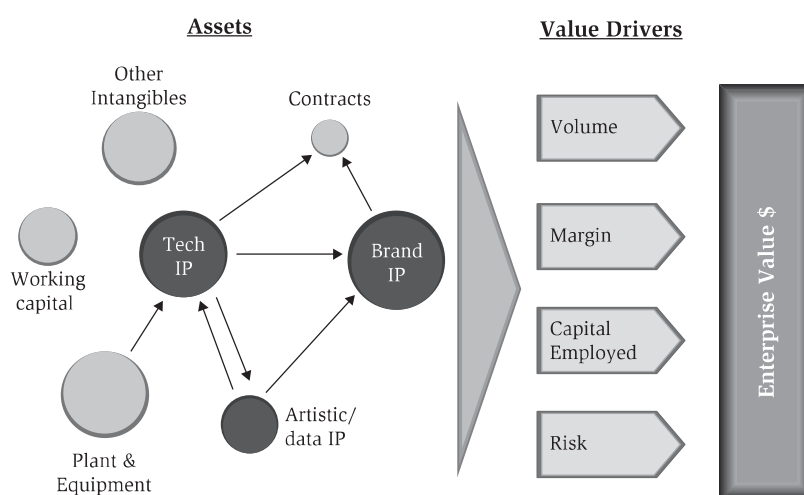
Figure 2 is best read from right to left. The concept that the value of a business is the net present value of future cash flows is not contentious; nor is the premise that corporate strategy should be directly linked to driving future cash flows. The challenge is to link demand and efficiency drivers back to the contributing resources, tangible and intangible, and ultimately to investment decisions. This is best achieved by identifying the sequential stages in the value chain, and the relative importance of each resource (illustrated by the size of each bubble). The importance of each resource will differ according to the sector in which a company operates, its core competencies, and its means of differentiation.

IP that typically exists in the capabilities illustrated in the value map are listed below:

- (1) Technology related IP: patents, patent applications, registered designs and trade secrets.
- (2) Brand related IP: registered trademarks, unregistered trademarks, copyrights and registered designs.
- (3) Artistic IP: copyright and design rights.

When evaluating the earnings generated by IP in its current use, it is necessary to disaggregate the earnings of the enterprise. Estimating the earnings of commercialized IP to a licensee, or new owner, requires consideration of the incremental earnings that the property will generate when combined with the resources of that party. Later in the chapter, we also consider how to assess the earnings and risk profile of early stage technology.

Figure 2 Illustrative Value Map



### 3. ROYALTY RATE DETERMINATION

Royalty payments are a profit sharing mechanism. Parties to a license are free to select whatever basis of royalty calculation that meets their commercial requirements. The most common method is the expression of the royalty as a percentage of revenue, other methods include:

- (1) A single upfront payment.
- (2) A pre-determined amount that is paid periodically, similar to a property rental.
- (3) A charge based on units of manufacture or sales.
- (4) For early stage technology, royalties can be based on development costs or linked to development hurdles.
- (5) A combination of the above.

Whatever basis is used, consideration should be given to the detail. For instance, a royalty based on sales revenue can be calculated on either retail or wholesale revenue, and can be calculated pre- or post-returns and discounts.<sup>3</sup>

When considering alternative royalty bases and rates, it is recommended that the expected cash flows are modelled over the duration of the license for a number of potential scenarios. Failure to quantify royalty scenarios can prove costly. For instance, a multinational company licensed the trademarks for a key brand in a major market for a sub-optimal royalty and upfront 'sweetener'. Surprisingly, the license was in perpetuity. Although the upfront payment benefited short term cash flow, it was dwarfed by the diminished ongoing royalty. As there was no escape from the license, the trademarks were ultimately sold to the licensee.

There are several fundamental factors that influence a royalty rate. Specifically, the earnings expected to be generated by the IP; the extent of development risk and market risks; reliance on complementary assets, and how the risks and rewards are shared between the owner and the licensee. Royalty determination is often complicated by uncertainty regarding these factors

A proxy for the royalty potential of an asset can be gained from benchmarking royalties achieved in arm's length licenses of similar IP. At a superficial level, this transactional approach seems simple – providing that information from comparable agreements is available. However, the distinctive characteristics of IP rights and the nuances of licence agreements can complicate matters.

Application of the income approach and transactional approach to royalty determination is discussed in the following sections. These should not be regarded as alternatives as they are best used in combination as part of an assessment of the functional, economic and legal characteristics of the subject IP.

The illustrated IP evaluation process includes the following:

- (1) *Legal assessment*: Technology can consist of a number of distinct legal rights, and the ownership of these assets can vary between jurisdictions. The strength and breadth of legal protection provides the foundation for the IP's royalty potential.
- (2) *Functional assessment*: This is at the heart of the IP's earnings potential as its incremental functional utility is what differentiates it from

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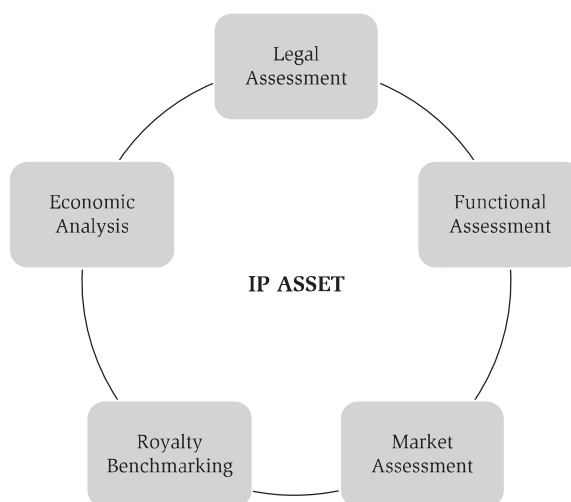
3. As previously stated, legal issues associated with the calculations of damages for infringement are beyond the scope of the Chapter. However, it should be noted that in the US, recent decisions from the US Court of Appeals for the Federal Circuit have addressed issues pertaining to the use of the 'entire market value' when calculating damages. *See Lucent v. Gateway*, 580 F.3d 1301 (Fed. Cir. 2009). Moreover, before an expert can present the entire market value theory to a jury, the expert must demonstrate 'that the patented invention was the basis for demand of those products'. *Cornell Univ. v. Hewlett-Packard Co.*, No. 01-CV-1974, 2008 WL 2222189, \*2 (N.D.N.Y. 27 May 2008) (internal citations omitted).



alternative technologies. Patent landscape analysis can provide useful insights to the functional assessment.

- (3) *Market assessment*: However, impressive the science behind an invention, its earnings capability is influenced by the size, growth and competitive forces in the markets in which it is applied.
- (4) *Royalty benchmarking*: Royalty rates for comparable IP can provide useful insights to royalty determination, but are best combined with the other components of the evaluation. Further discussion is provided later in the chapter.
- (5) *Economic analysis*: Estimates of the expected incremental revenue or cost saving resulting from the technology are intrinsic to royalty determination. However, estimates of these benefits usually require insights from the first three items mentioned above.

Figure 3 IP Evaluation Process



In arm's length licenses the royalty is subject to negotiations, whereas for litigation and transfer pricing it is purely based on analysis. Licensing practitioners might feel that economic analysis is superfluous, as royalty rates are dependent upon their negotiating ability. A word of caution, negotiation that is only supported by 'gut feel' and rules of thumb has a high risk of a sub-optimal outcome.

### 3.1. INCOME APPROACH TO ROYALTY SETTING

It is relatively straightforward to identify the earnings of existing technology used on a standalone basis, so all that is required to determine a royalty is a basis for splitting the earnings between the IP owner and licensee. Payment of all of the earnings as a royalty would negate the purpose of the license for the licensee (unless there are synergistic benefits). At the other extreme, allowing the licensee to retain all of the earnings is unlikely to appeal to the owner. The appropriate point within the earnings spectrum is influenced by:

- (1) the earnings capability of the IP, which stems from its commercial utility relative to competing technologies;
- (2) the extent to which legal rights enable the protection of the differentiating features of the IP;
- (3) the number of suitable licensees;
- (4) the risks born by the two parties and their respective levels of investment;
- (5) each party's rights and responsibilities in terms of the license.

#### 3.1.1. Incremental Earnings

Even if IP is exploited in combination with other assets, it can be possible to isolate and quantify the incremental profit that it generates through cost savings or a price premium. When the IP has not yet been commercialized, estimates of cost savings can be based on the performance of pilot plants or prototypes. Price premiums can be verified by consumer research.

#### 3.1.2. Applying the Profit Split Method to In-Use IP

In some situations where IP is integrated with other assets, it is not possible to directly calculate its earnings contribution. The Profit Split or Residual Profit methods can then be used to unravel the earnings of the subject IP from the complementary assets.

Both of these methods analyse the profit margin of the business in which the IP is used, in order to apportion it to the underlying assets. The starting point of the analysis can be earnings before interest and tax (EBIT), or earnings before interest, tax, depreciation and amortization (EBITDA) which also excludes depreciation and amortization. The nature of the industry and availability of data will influence the selection of the profit-level indicator.

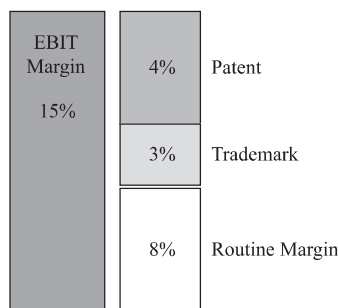
The next step is to make a charge for tangible assets and routine intangibles in order to determine the 'excess earnings' or margin attributable to the unique intangibles within the business. The routine margin earned in the subject

industry can be determined by an analysis of the profitability of comparable companies which do not own valuable IP.

In the illustrated example, the EBIT margin of the business that owns the subject IP is 15%, and the routine margin has been estimated as 8%. Let us assume that the purpose of the exercise is to determine a royalty rate for a patent, and that the profitability of the business unit also benefits from a well-established trademark. Further analysis is therefore required to split the excess earnings of 7% between these two assets. If the arm's length royalty rate for the trademark is known, then the margin attributable to the patent is established on a residual basis. In the illustration, the residual margin attributed to the patent is 4%.

If the trademark royalty is not known, it is necessary to split the excess margin of 7% between the patent and the trademark according to an evaluation of their relative economic contribution. This requires an analysis of the extent to which each asset differentiates the firm's product from its competitors, or the extent to which it generates production efficiencies.

Figure 4 Profit Split Illustration



A profit split analysis can be based on quantitative research or qualitative weightings of value drivers. The latter approach provides directional guidance rather than a specific answer. In the example, the finding that the patent contributes between 50% and 60% of the excess margin would infer a royalty of between 3.5% and 4.2% of revenue. (As the operating margin is expressed as a percentage of revenue, so too is the portion of the margin that is attributed to the patent.)

The reasonableness of the findings should be cross checked against expected royalty rates for comparable IP in the industry.

### 3.1.3. 25% Rule: An Income-Based Rule of Thumb

According to this rule of thumb, a licensee should pay a royalty rate equivalent to about 25% of the expected profits for the product that incorporates the subject IP. The rule has been widely used as a starting point in royalty rate determination for several decades, despite, or because of, its simplicity and the intuitive logic that royalties are aligned with profitability. Criticism of the rule focuses on the lack of clarity regarding the appropriate profit-level indicator, the contribution of other IP within the operating business, and disputes regarding the empirical evidence.<sup>4</sup>

Goldscheider, et al. (2002) conclude that the ‘the Rule is a valuable tool (rough as it is), particularly when more complete data on incremental IP benefits are unavailable. The Rule continues to have a fair degree of both “positive” and “normative” strength’.

A more recent study conducted by Kemmerer and Lu<sup>5</sup> found that average royalty rates ‘rendered indirect support to the 25% rule. However, such a conclusion should be taken with caution, because no linear relationship was found between the reported royalty rates and operating margins’.

A more important finding of this study is that statistical analysis shows a linear relationship between reported royalty rates and profitability measures, and that this suggests that the licensing market is efficient and that ‘cost structure and profitability across industries have been factored into royalty rate negotiations’.

A detailed review of the 25% Rule is beyond the scope of this chapter; the most pertinent point is that it should not be relied upon in isolation, although it can provide a starting point for an analysis where there is a scarcity of supporting information.

## 3.2. TRANSACTIONAL APPROACH TO ROYALTY SETTING

The transactional approach determines royalties with reference to licenses for comparable IP in comparable markets and circumstances. This approach is widely used for transfer pricing where it is referred to as the Comparable Uncontrolled Price Method (CUP).

The best comparable royalties are from arm’s length licenses for the same IP in the same, or similar, markets.<sup>6</sup> If the subject IP has not previously been licensed, analysis of licenses for comparable IP can provide guidance.<sup>7</sup>

4. In the US, the Courts recently rejected the use of the 25% rule in calculating a royalty for damages purposes calling the 25% Rule ‘fundamentally flawed’. *Uniloc v. Microsoft*, 632 F.3d 1292 (Fed. Cir. 2011).

5. J.E. Kemmerer & J. Lu, *Profitability and Royalty Rates Across Industries: Some Preliminary Evidence*, 8 J. Acad. Bus. Econ. (2008).

6. See *Rude v. Wescott*, 180 US 152 (1889) (referring to an established royalty rate based on the prior licensor practices). See also *Tektronix, Inc. v. United States*, 552 F.2d 343 (Ct. Cl. 1977) (preferring

The following factors should be taken into account when analysing arm's length royalty rates for comparable IP:

- (1) The similarities and differences between the subject IP and the benchmarked transactions. This covers the nature and application of the IP; its phase of development and commercial success; its strength relative to alternative property, and its expected useful economic life.
- (2) The range of markets covered by the license.
- (3) The comparability of the markets in which the IP was licensed. The earnings potential of a similar asset can vary significantly between jurisdictions due to different economic circumstances and competitive forces.
- (4) The method of calculating the royalty.<sup>8</sup> A headline royalty in a benchmark study might conceal adjustments to the royalty base that differ to the license of the subject IP.
- (5) The impact of the terms and conditions of the comparable licenses. For instance, an exclusive license will typically have a higher royalty than a non-exclusive one; the duration of the license can influence the royalty as can other terms of the agreement which influence the rights and responsibilities of the licensee.
- (6) Special circumstances that may have influenced the benchmarked royalties. For instance, if sales of the product incorporating the IP increase sales of other products, the licensee might agree to a low royalty.

The extent of publicly available royalty rates varies by industry and category of IP, depending on the prevalence of licensing and need for disclosure. In situations where there are a large number of licensing agreements, an analysis can be made of the range of royalties within the industry. The following paragraphs explore the extent to which reliance can be placed on industry norms.

As illustrated in Figure 5, the RoyaltyStat® database shows that the median royalty in many industries is close to 5%<sup>9</sup>.

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an established royalty rate when a pattern of prior licensing practices is evident.); and *T.J. Smith & Co.*, 9 F.3d 979 (Fed. Cir. 1993) (stating that evidence of an established royalty for a patent in suit is one of the strongest measures of a reasonable royalty); *Trell v. Marlee Elecs. Corp.*, 912 F.2d 1443 (Fed. Cir. 1990) (discussing the standards for determining when an established royalty exists).

7. In the US, the Courts have recently emphasized and reiterated that the IP in other license agreements must be 'comparable' in order to rely on such agreements in a damages analysis. See *ResQnet.com v. Lansa*, 594 F.3d 860 (Fed. Cir. 2010).

8. US Courts recently have criticized analyses that are 'little more than a recitation of royalty numbers' requiring instead evidence as to how lump sum payments in other, comparable license agreements for example, were calculated. See *WordTech v. Integrated Network*, 609 F.3d 1308 (Fed. Cir. 2010).

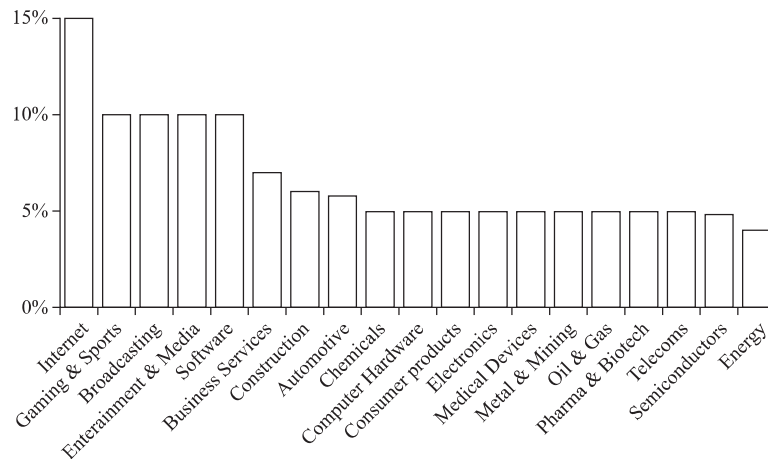
9. Sourced from RoyaltyStat® in September 2014, the referenced industries include 10,487 licence agreements.

The grouping around 5% of average royalties in a wide range of industries is interesting, but not very informative. Median and average royalty rates have to be treated with caution as they can mask wide ranges within an industry.

It is always necessary to consider whether the strength of the subject IP, or differences within segments of the industry, could result in significant deviations from the average or median.

In most industries, the royalties achieved by blockbuster IP dwarf the median and even the upper-quartile rates in the industry. Without formal benchmarking of the commercial utility of the IP and the strength of legal protection, the licensor risks leaving money on the table. The following example, in the renewable energy industry, illustrates how blinkered use of inter-quartile ranges can lead the analyst astray.

Figure 5 Median Royalty Rates in Selected Industries



Source: RoyaltyStat® database.

Table 1 Royalty Range for a Sample of Renewable Energy Patents

Maximum:	19.5%
Upper Quartile:	5.0%
Average:	4.0%
Median:	3.0%
Lower Quartile:	2.0%
Minimum:	1.0%
Sample Size:	35

The inter-quartile range from 2% to 5% suggests a fairly narrow royalty band, but this disguises the existence of royalties up to 19.5%. A would-be licensor of renewable energy technology would do well to evaluate the strength of the IP prior to accepting a median royalty of 3%.

Segmenting an industry by sub-class can be informative. For instance, in the pharmaceutical industry, patent royalty ranges vary according to the following characteristics:

- (1) Patent type: Pharmaceutical patents can be grouped by those protecting compounds, methods of treatment and manufacturing processes. These segments of the industry have different economic characteristics resulting from the utility step-up and design-around risks. This is reflected in different royalty ranges.
- (2) Stage of development: Royalty rates are influenced by risk and therefore vary in different development phases. (Illustrated below).
- (3) Indication: To demand characteristics in different markets, product profitability and patent royalties varies between, say, cancer treatments and colds and flu medication.
- (4) Territory: To be sustainable, royalty rates have to reflect differences in profitability between geographic markets. Profitability can be influenced by a range of factors, including market size, costs, competitive forces, and the regulatory environments.

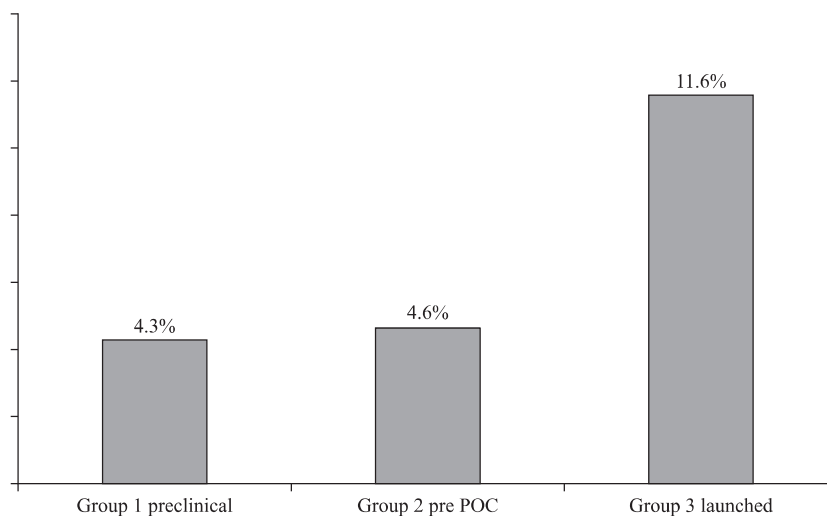
Furthermore, the appropriate royalty for a specific patent family is influenced by the terms of the licence agreement and any unique resources owned by the licensee that will increase its ability to monetize the IP.

A relationship between stage of development and royalty rates occurs in the pharmaceutical sector. A 2009 study by Renwick and McCarthy analysed the royalties charged in 155 biopharmaceutical licenses, and split these by stage of development, namely preclinical, pre-proof of concept (POC), and launched.

Figure 6 below illustrates average royalties. In comparison, the median royalty of 3.5% for the preclinical group showed a greater difference with the pre-POC group's median of 5.0%. The maximum royalty found for launched IP was 27.5%.

The authors of this study note a clear trend to the use of tiered royalties as predicted sales increased, and conclude that 'this finding supports the use of tiered royalties for larger value deals where there is greater potential for disparity between the sales predicted by the licensor and licensee'.

It is noted that as technology approaches commercialisation, increases in royalty potential can be due to an increasing pool of IP (both patents and confidential information) and reduced risk.

*Figure 6 Impact of Stage of Development of Royalty Rates*

Source: Les Nouvelles June 2009, Review of LES BioPharma Royalty Rate and Deal Terms Survey.

### 3.2.1. Other Royalty Methods

#### 3.2.1.1. Return on R&D Costs

There is often a non-linear relationship between the cost of creating intangible assets and their market value; the gap between cost and value is particularly pronounced for unique IP. As a result, R&D costs cannot be relied upon as a reliable basis for royalty determination. However, there are circumstances where R&D costs provide a relevant reference point for royalty determination:

- (1) In the case of replicable technology, R&D costs are relevant because potential licensees can choose between developing an asset of similar utility or licensing existing technology.
- (2) When the income potential for early stage technology is difficult to gauge, R&D costs can be used to provide a gauge to royalty potential. The royalty should also account for the novelty of the technology and the strength of legal protection.

#### 3.2.1.2. Return on Market Value

Where the market value of IP has been determined, this provides a relevant basis for calculating an appropriate return earned through a royalty. Market



value accounts for factors such as the unique characteristics of the asset, ease of replication, and income potential. The return earned by the owner through a royalty will therefore be largely influenced by the useful economic life of the asset, any unique contribution made by the licensee, and the terms of the license agreement.

### 3.3. ROYALTY CROSS CHECKS

Whatever the primary method of valuation, it is strongly recommended that the output is sense checked by other methods. A process of triangulation can provide strong support for a royalty range in situations where no single method is compelling.

*Table 2 Use of Multiple Methods to Determine a Royalty Range*

(i) Comparable royalties between unrelated parties:	
– upper quartile	8.0%
– median	5.5%
– lower quartile	2.0%
(ii) Excess earnings analysis	5.0%
(iii) 25% rule of thumb	4.5%
(iv) Implied royalty cover	4.5

In the illustrated example four methods have been applied to support a royalty range.

In some instances, different methods will suggest significantly different royalties. This is a strong signal to review the supporting evidence and assumptions.

## 4. VALUATION APPROACHES AND METHODS

An IP valuation should consist of the following steps:

- (1) Confirmation of the purpose and scope of the valuation.
- (2) Definition of the subject asset.
- (3) Identification of the premise (or basis) of value.
- (4) Assessment of the legal, functional and economic characteristics of the subject IP.
- (5) Review of the market, competing technologies and comparable transactions.
- (6) Selection of the appropriate valuation approach.
- (7) Selection of the method of valuation.

- (8) Determination of the valuation assumptions.
- (9) Cross checks of the findings.

#### 4.1. PURPOSE AND SCOPE

The level of detail and rigour required in a valuation ranges between an indicative valuation and a formal valuation opinion. It is important to match deliverables with the purpose of the valuation. A formal, or full-scope, valuation is usually required for the purpose of litigation, financial reporting or transfer pricing. However, an indicative valuation is appropriate in cases where management only needs an estimate of an asset's value in order to make a commercial decision.

Valuation reports must always indicate whether there is a limitation of scope.

#### 4.2. ASSET DEFINITIONS

A clear definition of the subject asset is especially important for intangible assets as terms such as 'technology' and 'brand' are subject to different interpretations. It is necessary to identify the specific rights that are bundled into a generic heading. The extent of rights within the package can have a significant impact on its earnings potential and value.

The term 'technology' can include patents, patent applications, design rights, trade secrets, software and know-how. Similarly, there is no generally accepted definition of the term 'brand'. This is sometimes used in reference to trademarks and associated goodwill, while on other occasions it includes recipes, formulae, design rights and copyright. In extreme cases the term is used to describe a branded business unit, consisting of both tangible and intangible assets.

When interactions between IP rights are intense, they are treated as complementary assets – both for transactional and valuation purposes.

#### 4.3. PREMISE OR BASIS OF VALUATION

The earnings generated by a particular IP right vary depending on the capabilities of the owner. Therefore, it is essential to determine whether an asset is to be valued from the perspective of the current owner (value in-use), a typical purchaser (market value), a specific purchaser (investment value), or an unwilling seller (liquidation value).

The purpose of the valuation will usually determine the appropriate premise of value. In most commercial situations, market value is the appropriate premise. International Valuation Standards define market value as:

The estimated amount for which an asset should exchange on the valuation date between a willing buyer and a willing seller in an arm's-length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently, and without compulsion.<sup>10</sup>

#### 4.4. IP ASSESSMENT: LEGAL, FUNCTIONAL AND ECONOMIC CHARACTERISTICS

A robust valuation of IP is not possible without knowledge of how well it is protected, how it differs from alternative solutions, how it generates earnings and the associated risks. The 'Guidance Note on the Valuation of Intellectual Property Rights', issued by the Royal Institution of Chartered Surveyors stresses the need for an assessment of the legal, functional and economic characteristics of the subject asset, and identifies factors that should be considered.

#### 4.5. REVIEW OF MARKET, COMPETITORS AND COMPARABLE TRANSACTIONS

The earnings capability of IP is influenced by the size, growth and competitive forces in the markets in which it is applied. Hence, these have to be reviewed in the valuation process. Even if the market approach is not being applied, it is informative to review the extent and size of licenses and sales of comparable IP.

#### 4.6. VALUATION APPROACHES

There are three valuation approaches, namely, the cost approach, market (or sales comparison) approach, and the income approach.

*Cost approach:* This approach values the IP on the basis of the estimated cost to create a replacement asset with similar commercial utility. Consideration is given to all costs (expressed in current values) associated with replacing or replicating the IP, less an allowance for any forms of obsolescence that have occurred.

The cost approach is only appropriate for valuing easily replicable assets. The non-linear relationship between the development cost of certain IP and its value must be born in mind. This is reflected in a situation where millions of dollars in R&D are incurred on unsuccessful technology that has negligible value.

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10. International Valuation Standards 2017, IVS 104 Bases of Value.

*Market approach:* This approach establishes value by comparison to recent sales of comparable assets. Information regarding the standalone sales of patents and trademarks are sometimes available; however, IP is more frequently sold as part of a business combination. The unique nature of IP means that even if sales prices for comparable IP are available, adjustments are required for differences in the utility of the asset and for factors such as the relative market conditions at the time of the sale and the remaining economic life.

*Income Approach:* Finance theory holds that the amount that a rational investor will pay for a business or asset is the cash flow that it is expected to generate, discounted by the cost of capital (which takes account of the asset's risk profile).

The income approach is often the most appropriate approach for valuing patents and trademarks. It involves:

- (1) Identifying the current, or expected future, income generated by the IP. For property that is integrated into a business unit, this will involve determining the portion of the earnings that are attributed to the IP. (The next section describes some of the available methods.)
- (2) Deducting associated costs.
- (3) Determining the useful economic life of the IP. This concept differs from the legal duration of a patent. The useful economic life of technology will be a finite period that differs by industry and takes account of the likelihood of technology obsolescence. On the other hand, brands can have an indefinite life unless if are no signs of impairment.
- (4) Forecasting the rate of earnings growth. Growth rates take account of expected economic conditions, industry trends, competitive performance and asset-specific factors.
- (5) Calculating a discount rate. The discount rate is used to determine the current value of each dollar earned in future years. It is a function of: the risk free rate (yield on government bonds), the market risk premium (extra risk applying to the share market), and specific risks attached to the industry and subject IP. For IP that has not yet been commercialized, it is also necessary to consider development risk. This is illustrated later in this section.
- (6) Discounting the forecast IP earnings back to a present value.

Earnings multiples can be used as a proxy for future cash flow and risk, however, the discounted cash flow method is theoretically more robust as it requires key value drivers to be discretely analysed.

The income approach is reliant on the ability to make reasonable estimates of future earnings. As discussed later in the chapter, this can complicate its

application to the valuation of technology which will not be commercialized for some years.

There are a number of income-based valuation methods.

#### 4.7. INCOME-BASED VALUATION METHODS

The income-based valuation methods are closely linked to the methods of royalty determination, which have already been discussed.

*Relief from Royalty:* This is a commercially orientated method that is based on the assumption that if the subject IP was not owned, it would have to be licensed from a third party, and a royalty paid. The value of the IP is represented by the present value of the net notional royalty stream that ownership relieves the business from paying. Deductions are made for costs associated with ownership of the IP and tax. The capital value of the asset is calculated using either a discounted cash flow or multiple to arrive at the current value of the forecast notional royalty stream. Determination of the notional royalty rate will use one of the methods discussed in section 3 of this chapter.

*Profit Split:* This is similar to the profit split method of royalty determination. Rather than expressing the subject IP's profit contribution as a percentage of sales, the dollar amount is forecast into the future and discounted back to a present value. The profit contribution of the subject IP can be determined through quantitative research or qualitative weightings of value drivers.

*Residual Earnings:* This method values the IP as the present value of the future residual cash flow after deducting returns for all other assets required to operate the business. The first step is to make a charge to operating profit for net tangible assets and routine intangibles. Thereafter, charges are made for identifiable intangible assets that have already been valued. As long as it has been established that the subject IP is the only remaining asset, the residual earnings are attributed to it. The rate used to calculate the charge made for each asset category takes account of the company's cost of capital and the asset's risk profile.

*Incremental cash flow method:* The incremental cash flow method identifies the cash flow generated by the subject IP through comparison with a business that is comparable in all other respects, but does not have similar IP. The evaluation of incremental cash flows considers increased revenues and reduced costs. Although conceptually sound, this method is difficult to apply in practice.

### **4.7.1. Applying the Income Approach to Early Stage IP**

For technology that will not be commercialized for several years, there is uncertainty regarding the likelihood, extent and timing of future earnings. In some instances, the technology under development will have to be integrated with other resources in order to generate earnings, and at an early stage it is difficult to evaluate its relative importance within an income generating unit.

In these situations, a probability weighted valuation can be appropriate. The following illustration is based on pharmaceutical or biotech IP that is in the early stage of development. At each phase of clinical trials and regulatory approval, there is a limited probability of success (see Figure 7). The cumulative effect of the probability of success is only 15%, and the product incorporating the IP will not reach the market for seven years. The development risk and time to market significantly reduce the present value of the IP. In addition to development risk, a valuation of the IP should also consider market risk once the product has been commercialized.

Even if the estimation of probabilities and future earnings make the income approach impractical, a probability tree helps make appropriate assumptions for a transactional or cost-based royalty calculation.

### **4.8. VALUATION ASSUMPTIONS**

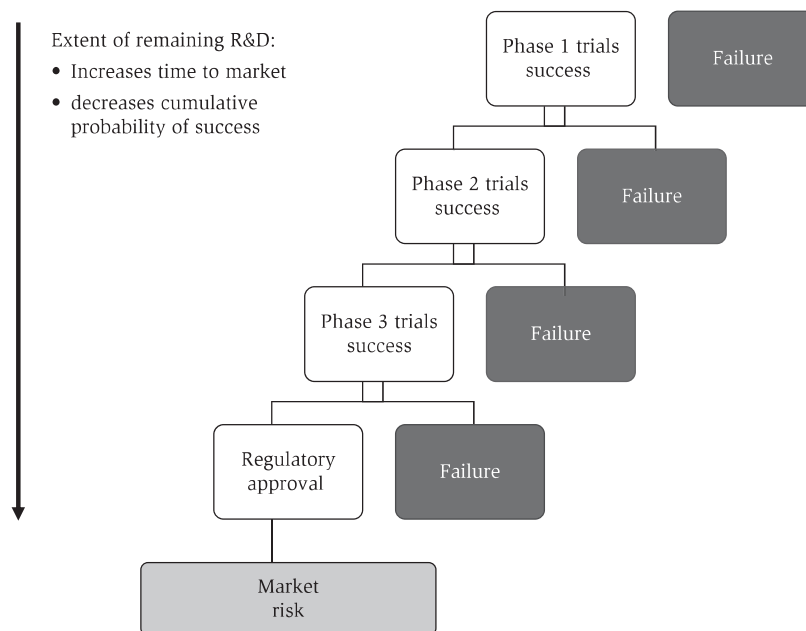
The rigour of an IP valuation is heavily dependent on the quality of the assumptions. A formal valuation report will include a significant amount of analysis to support each assumption, and clearly state all data sources. Less rigour is required for an indicative valuation.

The key assumptions of a discounted cash flow valuation are the current earnings of the subject IP, forecast growth, discount rate, and the useful economic life of the asset.

When the sales comparison approach is used, it is necessary to evaluate the extent of the similarities and differences of the comparable transactions as compared to the subject IP. The reasons for any adjustments should be articulated and the supporting analysis disclosed together with the data sources.

Key assumptions in cost-based valuations include any decisions as to whether components of historic R&D are relevant to the replacement of the asset, inflationary adjustments, and obsolescence provisions.

Figure 7 Development Risk of Early Stage Technology



#### 4.9. VALUATION SENSE CHECKS

As with royalty determination, IP valuations benefit from the use of more than one method and from commercial sense checks. For instance, if the income approach has been used, the implied earnings multiple should be considered for reasonableness. The cost of replicating the IP, or producing an asset of similar utility, should always be considered as it represents the ceiling to the valuation.

It is advisable to carry out sensitivity analysis to determine the value impact of changes in key valuation assumptions, and to disclose the impact of these in the report.

#### 4.10. CONTENTS OF A VALUATION REPORT

A formal valuation report should contain the following information:

- (1) The scope of the valuation and any limitations or restrictions to its scope.
- (2) The purpose for which the valuation report has been prepared.

- (3) A clear description of the asset being valued.
- (4) An assessment of the legal, functional and economic characteristics of the subject IP.
- (5) The date at which the value has been determined, and the date on which the report has been issued.
- (6) The basis, approach and method of valuation.
- (7) A conclusion of value.
- (8) Sufficient details of the valuation and underlying assumptions to allow a reader to understand how the conclusion was reached.
- (9) The name, qualifications and experience of the valuer.

## 5. VALUE-BASED IP MANAGEMENT

We live in an age of intellectual capital – tangible assets represent a diminishing portion of the value of listed companies. The crown jewels of many companies are the IP rights associated with technology, brands and artistic content. Yet in many companies decisions regarding IP assets have been based on little more than intuition.

Understanding the current and potential value of technology and brands enables organizations to develop value maximizing strategies, set appropriate budgets and track the return on IP investment.

Executive teams of sophisticated IP owners are increasingly using IP analytics and valuation to answer the questions regarding risk management and strategy development.

*Managing intangible value at risk:*

- (1) What is the dollar value of technology and brand assets, and how big a contribution does each make to enterprise value?
- (2) What early warning measures are used to protect competitive advantage by tracking the commercial strength of technology and brands?
- (3) Are the organization's most valuable intangible assets supported by adequate legal protection?
- (4) What are the reasons for any changes in IP value in the last financial period?

*Developing strategies that maximize business value:*

- (5) How does the organization identify and quantify opportunities to leverage corporate value through IP?
- (6) Is IP value maximized in licences?
- (7) How much IP value is forecast to be added by the strategic plan?



- (8) How has the level of R&D and marketing investment been determined, and what is the expected return on investment?

## 6. CONCLUSION

Decisions regarding the value of IP, and associated royalty rates, have far reaching commercial consequences. As a result these assets are no longer the exclusive domain of IP practitioners: boards, investors, deal makers and tax authorities are increasingly influenced by their perceptions of the value of IP. It is the responsibility of IP owners to develop IP tracking systems that allow them to effectively manage the value of these assets and, when appropriate, to communicate the value to other stakeholders.