

**WIPO/IP/BJ/96/7**

**ORIGINAL:** English

**DATE:** November 1996



CHINESE PATENT OFFICE



WORLD INTELLECTUAL  
PROPERTY ORGANIZATION

## **WIPO NATIONAL SEMINAR ON THE VALUATION OF INDUSTRIAL PROPERTY ASSETS**

organized by  
the World Intellectual Property Organization (WIPO)  
in cooperation with  
the Chinese Patent Office (CPO)

Beijing, November 26 and 27, 1996

### **THE VALUATION OF INTELLECTUAL PROPERTY**

*Paper presented by Mr. Nick Bertolotti, Partner, Arthur Andersen, London*

Intellectual property can be a highly valuable asset, of increasing importance to today's technology-driven markets. This article explains the methodologies for valuing intellectual property.

### *Introduction*

1. The focus of business is changing rapidly. Success is no longer based on the ownership and use of tangible fixed assets. Many businesses are increasingly deriving their profits from forms of intellectual property, notably in technology-based services and products. These forms include patents, copyright, brands and trade marks, which all play an important part in these developments. Intellectual property gives its owner the right to control the use of technology. It acts as a barrier to market entry, providing its owner or user with a competitive and potentially monopolistic advantage.

2. Historically, intellectual property was often overlooked as a valuable asset by businesses and financial markets. In addition, licensing was in many cases considered a non-core activity, seen as a means of generating marginal income. Little emphasis was placed on the valuation of intellectual property, or on the methodologies by which its value might be assessed.

3. However, in 1992 Arthur Andersen<sup>1</sup> completed a major study into the valuation of intellectual property. The study concluded that:

- the different forms of intellectual property are separable from the underlying business and from each other;
- there was considerable consensus over valuation methodologies for appraising intellectual property; and
- the valuation of intellectual property may be subjective, but no more so than say the valuation of unquoted companies, businesses in emerging markets, or pension funds.
- In this article, we review the situations in which intellectual property valuation is necessary and explain the principal valuation methods.

### *Why value intellectual property?*

4. There are many instances where intellectual property valuation may be required.

### *Exploitation of Intellectual Property*

5. Intellectual property may be exploited in a number of ways: in-house manufacture and sale of a good incorporating patent and trade marks; sale of the intellectual property outright; and licensing. To decide the most appropriate strategy for exploitation, which may include both manufacture and licensing-out, an intellectual property holder needs to assess the risks and rewards involved in each alternative.

---

<sup>1</sup> The Valuation of Intangible Assets, Arthur Andersen / The Economist Intelligence Unit

6. The changing commercial environment has led to a greater interest in licensing. Competitive pressures mean businesses must bring products to market faster than before. These same pressures are reducing the time available to exploit the product before alternative or superior technologies are developed. The consumer electronics market is a case in point. Moreover, the globalisation of markets is placing greater demands on the resources required to distribute the product effectively.

7. Businesses must therefore decide on the best strategy: should they develop their own technology or license-in technology from others, to cut down overall development time? On launching a product, should they license-out the technology or manufacture and sell it themselves in order to maximise returns before the technology is superseded?

8. To determine which of these alternatives to pursue, the holder will need to assess the current and potential value of the intellectual property under each scenario. The holder may also have to assess the value of other companies' intellectual property, including know-how, to decide if to license-in and on what terms.

9. This analysis is pertinent to many industries and particularly the pharmaceutical industry. Small biotech companies may not have the financial resources to develop a drug and put it through clinical trials. Additionally, they are unlikely to possess the distribution and marketing resources to exploit the drug fully. Often, they form alliances or licensing arrangements with major pharmaceutical companies which possess these resources.

#### *Corporate Finance*

10. The rapid growth in the number of high technology firms, principally in the pharmaceutical and electronics industries, has focused attention on the valuation of such businesses. Often a key aspect of the valuation is an assessment of the portfolio of patents held by the firm.

#### *Litigation*

11. As technology-based companies and industries grow, so intellectual property litigation is on the increase. This is certainly the case in the US and the UK<sup>2</sup>. The value of a patent must be assessed in determining damages in patent infringement litigation. Often, a royalty is awarded to compensate the patentee for the infringer's unauthorised use of the patent. Similarly, the UK recently saw its first copyright tribunal case result in the award of a royalty for copyright infringement. Legal authority in many jurisdictions requires the assessment of a reasonable royalty, which would otherwise have been payable to the intellectual property holder as licensor.

---

<sup>2</sup> Trends in intellectual property damages awards in the UK and US, Arthur Andersen, April 1996.

*Transfer Pricing*

12. The growth of multi-national enterprises and the globalisation of the world economy has resulted in different parts of the same organisation providing goods, e.g. part-finished products, or services, e.g. management and technical advice, to one another. Where this occurs across borders, the tax authorities may scrutinise the price agreed between the two entities (the transfer price), to ensure that profits are not being manipulated for tax purposes, by charging an artificially low or high transfer price. The relevant tax legislation requires the transfer price to be an arm's length price.

13. Intellectual property is often the subject of transfer pricing arrangements and disputes, primarily because of its high value relative to tangible property and because of the uniqueness of the asset. For example, a pharmaceutical company may hold the patent to a drug in one country and license overseas operations to manufacture and sell the product. Similarly, trade marks and the use of a famous brand name may be licensed between countries.

*Financial Reporting*

14. Financial reporting requirements in many countries do not generally result in the recognition of intangible assets such as patents and trade marks in the financial statements. This position may be about to change. In July of this year, the UK Accounting Standards Board issued a Financial Reporting Exposure Draft ("FRED"), FRED 12, on "goodwill and intangible assets". The FRED is a precursor to a formal accounting standard. In a change from current requirements, FRED 12 proposes the capitalisation of purchased intangible assets (such as patents) and goodwill on the balance sheet. These assets must typically be written off over a period not exceeding 20 years. Importantly, the assets are subject to impairment reviews. To determine if the carrying value shown in the balance sheet is supportable, a valuation must be performed as part of such a review.

*Security for Debt Finance*

15. Intellectual property may be a company's principal asset. Potentially, it can be used as collateral for loans. This may prove attractive to companies, as an alternative to raising more expensive equity finance. However, many companies and financial institutions are reluctant to use intellectual property as security for raising finance, or are not aware that this can be done.

16. One of the principal issues that determines the use of intellectual property as security is whether a value can reliably be assigned to it. A technical assessment of the intellectual property is critical, to determine whether the technology is viable, and has potential for successful commercial exploitation. The lender must be confident that, if the borrower defaults on the loan, the intellectual property can be separated from the rest of the business for sale, or licensing, to recover the debt. For established businesses and technologies, established intellectual property licences may form a suitable basis for security, the royalty streams being used to service the interest costs.

*Purpose of the Valuation*

17. Before valuing intellectual property, the valuer must gain an understanding of the purpose and nature of the valuation, to determine the basis of valuation and appropriate valuation methodologies. The valuer must then identify the premise on which the valuation is to be based. The most common valuation bases are existing use value, market value and liquidation value. These bases and their potential applications are summarised in the Table 1 below.

Valuation basis	Description	Application
Existing use value	Value to the owner under the existing marketing, operational and financial strategies. This ignores unexecuted plans to develop the intellectual property in new areas.	Licence agreements Merger/acquisition Financial reporting Litigation
Market value	Amount that would be paid by a willing, but not anxious, buyer to a willing, but not anxious, seller adequately informed and acting at arm's length in an open market.	Licence agreements Merger/acquisition Transfer pricing
Liquidation value	Assumes that the intangible assets are not operating as part of a going concern and that the assets will be sold in a forced sale situation.	Security for debt finance

Table 1

*Approach to valuation*

18. The value of intellectual property depends on the expected future cash flow to be derived from the use or exploitation of that intellectual property, either immediately (e.g. through sale) or over a period of time (e.g. through ongoing exploitation). The cashflow stems from the volume of the product sold and the margin made on that product. The following diagram depicts a simplified "value equation". The quantity sold and the profit margin give the total profit in the period. This is converted to an overall value by applying a capitalisation factor.

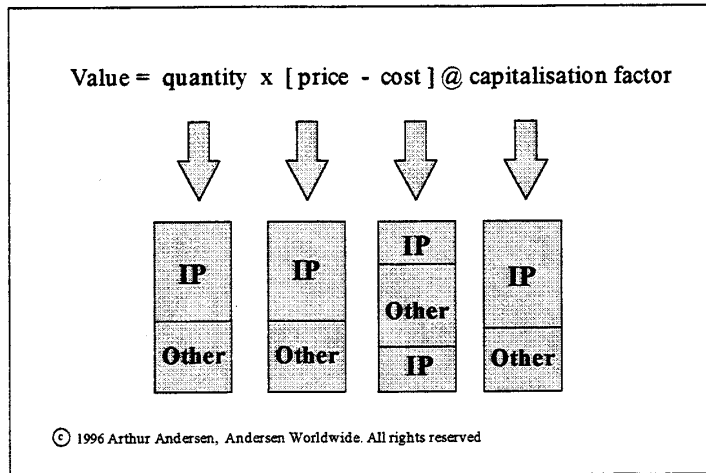


Figure 1: *A schematic for assessing the value of intellectual property*

19. The key to valuing intellectual property is determining the *incremental* value or cost contributed by the intellectual property to each of the components of the overall value, over and above the situation without the particular intellectual property. This incremental contribution will differ markedly depending on the intellectual property under consideration.

20. An added complication is that the incremental value may be contributed by different forms of intellectual property. For example, the value added by a process may arise from a patent but also from know-how. Similarly, a price premium may be created by a combination of a brand name and a patented technology. If this is the case, it will be necessary to estimate the proportion of the value contributed by the patent itself.

21. In assessing the value of intellectual property, it is not possible to be prescriptive and each case must be assessed on its merits. However, the following examples help to illustrate the point.

22. Quantity: A pharmaceutical patent is typically the main driving force in determining the volume of sales. Where there is no viable therapeutic alternative, the patent is the source of all sales. A mechanical patent, on the other hand, may contribute to the volume of sales to a lesser extent, perhaps through enhanced quality of the product.

23. Price: In some cases, a patented or branded product can command a premium price over similar non-patented or unbranded products. This may reflect the technological superiority of the patent/brand, or the exploitation of the monopoly achieved through the grant of the patent.

24. Cost: If the intellectual property generates increased sales volume, the associated economies of scale may result in reduced production costs. Equally, a process patent may contribute to reduced manufacturing costs through reduced wastage or a more energy-efficient production process. In this case, the patent may not assist in generating additional sales or premium prices but is valuable nonetheless. Alternatively, production cost savings arising through patented processes may allow the user to reduce its prices, without affecting profit margins, to boost or protect market share.

25. The use of intellectual property and technology may lead to increased costs, for example, investment in marketing to promote a new technology and establish a market. Further costs, such as registration costs, ongoing research and development, and renewal fees, may also be incurred.

26. Capitalisation factor: The capitalisation factor represents the risk and potential rewards associated with the future cash flows from the product, which is applied to those cash flows. The capitalisation factor converts annual cash flows into an absolute value for the intellectual property. The capitalisation factor may be a multiple, applied to a single year's cash flows or profits (similar to a price earnings multiple used in stockmarket valuations). Alternatively, it can be applied to cash flows for a number of years, the factor declining with each successive year, given that cash flows in the future are riskier and more uncertain, and are valued less highly than more immediate cash flows.

27. Intellectual property is likely to lower the risk attached to the future cash flows, since it offers protection from exploitation by others, thus reducing or delaying competition. However, the degree of protection will depend on the stage of development of the product. For example, to reflect the high risk of early stage technology, a very low capitalisation factor is often used.

#### *Valuation Methodologies*

28. Several methodologies exist for applying the above framework to the valuation of intellectual property. The valuer must choose from the alternative methodologies, based on the conceptual superiority of the methodology and the availability of adequate information, the latter often being a limiting factor. The three main approaches are:

- cost;
- market value; and
- economic bases.

29. The valuer should identify the primary methodology that best satisfies the valuation criteria and where possible should support or cross-check the valuation with other acceptable methodologies.

- Cost-based methodologies

30. There are two main cost-based methodologies which can be applied to valuing intellectual property: historical cost and replacement cost. Both approaches seek to aggregate the costs incurred in developing the intellectual property. Historical cost measures the actual cost incurred in creating the intellectual property, whereas replacement cost quantifies the estimated cost of replacing the intellectual property or creating an equivalent asset.

31. An example of a cost-based methodology is found in UK medical and pharmaceutical licence of right cases. In these cases, a so-called Section 41 approach is applied to setting a royalty rate. This approach derives from Section 41 of the Patents Act 1949, now repealed. Three elements are taken into account in setting royalties:

- an allowance for the patentee's research and development costs;
- an allowance for promotional costs; and
- an appropriate uplift, often taken as 20% on the above two components.

32. Since the approach aims to provide a return on the research and development costs originally incurred in developing the patent, it can lead to extremely high royalty rates being set. For example, in the decision on *Smith Kline and French Laboratories Ltd's (Cimetidine) Patent*<sup>3</sup>, application of the Section 41 approach yielded a royalty of 42%.

33. While historical cost-based approaches may satisfy the criteria of objectivity, consistency and reliability, their use has a fundamental drawback. The value equation described in Figure 1 indicates that it is anticipated future economic benefits which determine value. There is no direct correlation between expenditure on an asset and its subsequent value. For example, a patented drug developed at huge cost may never reach market because it unexpectedly fails to obtain regulatory approval. There are many cases where a company has spent considerable sums developing and marketing a product, only to see limited success in the market place. An example would be the Betamax video system which was superseded by the VHS system. The success of the VHS system lay in licensing-out of the technology, so that it became the industry standard.

34. There are also practical difficulties involved in applying historical cost-based approaches such as:

- differentiating between expenditure which maintains the value of the intellectual property, as opposed to investment expenditure which enhances its value;
- deciding how many years of research and development to take into account;
- isolating the research and development expenditure which is specifically related to the intellectual property; this could be difficult at research facilities pursuing a number of development programmes;

---

<sup>3</sup> [1990] RPC 203 (CA)

- the lack of relevant information on costs for older intellectual property; and
- the need for adjustment to historical cost to reflect current prices.

35. The replacement cost approach overcomes the problem of translating a historical cost into a current cost, as it is based on current day prices. It does, however, introduce an additional practical obstacle in estimating the costs of recreating the intellectual property, which is highly subjective.

36. Cost, therefore, is a poor surrogate for estimating value to the intellectual property holder. Cost-based methodologies do not estimate the future benefits associated with the intellectual property. However, they may need to be considered in certain cases, for example where it is very difficult to identify separately those earnings or cash flows arising from the use of the intellectual property, or where the intellectual property was created over a very short period of time, incurring costs which are readily identifiable. An analysis of replacement cost may be relevant to a potential licensee in determining what royalty to pay, the maximum royalty being the cost of obtaining an alternative right or asset. This may be the cost of creating an equivalent technology.

37. In practice, research and development costs are often taken into account in assessing licensing policy and terms, although in combination with a number of other factors.

38. The Section 41 approach provides a further example of the practical application of a cost-based approach. However, this approach is only applicable in compulsory licences and is not generally used in commercial agreements.

#### *Market-based Methodologies*

39. There are two main market-based methodologies which can be applied to the valuation of intellectual property: comparable market value and comparable royalty rate.

40. Under the comparable market value methodology, the value of the intellectual property is determined by reference to the prices obtained for comparable intellectual property in recent transactions. The methodology is attractive, being both credible and objective. Although the number of transactions which deal solely with the sale of intellectual property (as opposed to the entire business) is increasing, activity in the market for intellectual property sales is, however, still limited. Information is scarce. The most common source of comparable transactions to use in intellectual property valuations is therefore licence agreements.

41. Under the comparable royalty rate methodology, the value of the intellectual property is determined by reference to royalty rates which have been agreed for comparable intellectual property. This exercise can be incorporated into an economic valuation approach, and as such is discussed in the following section.

*Economic-based Valuation Methodologies*

42. The economic-based valuation methodologies are conceptually superior to the other approaches since they address the issue of the contribution of the intellectual property to each of the components of value, as illustrated in Figure 1. The economic valuation of an intellectual property has two distinct components:

- the identification, separation and quantification of the cash flows attributable to the intellectual property; and
- the capitalisation of these cash flows.

43. Two main methodologies can be used to value intellectual property on an economic value basis. These are the net cash flow method and the royalty method.

44. Net cash flow method. Cash flow is used since it is a true economic measure of value which, unlike accounting profits, is not subject to the distortions introduced by different accounting treatments. Annual cash flows are projected for a number of years, up to the expiry of the intellectual property (or expected technical obsolescence, if sooner).

45. If the intellectual property is not the primary basis for the sale of the product, it is necessary to assess separately the proportion of the total cash flow attributable to the intellectual property in question. For example, the value generated by a patented process may depend in part on the skills and experience of the work force that apply the process.

46. Capitalisation factor: The cash flows identified as relating to the intellectual property are best capitalised using the discounted cash flow method. This involves restating cash flows arising in future periods in present day terms, by discounting these flows at a discount rate commensurate with the risk attaching to these projected cash flows. There is, inevitably, subjectivity in determining the discount rate. The value of the intellectual property may be highly sensitive to changes in this parameter, particularly for pharmaceutical patents where it may be many years before commercial exploitation of an approved drug ensues.

47. The discount rate used to discount each forecast period's cash flow should reflect the business and financial risk of investing in the intellectual property. Aspects to consider include:

- the degree of leadership of the intellectual property in its market. For example, is it a breakthrough product or a "me-too" product?;
- the stability of the cash flows arising from the intellectual property in previous years;
- the remaining intellectual property life;
- pricing and regulatory issues; and
- the cost of developing competing products.

48. These factors combined will provide a risk profile for the asset, and from this the associated discount factor can be calculated.

49. The risk profile for a product can vary greatly. A study by Hambrecht & Quist<sup>4</sup> advocates very high discount rates for drugs in preclinical trials, falling to 7.5% for a mature drug. Thus the projected value of a patent may increase considerably as a pharmaceutical product reaches the market.

50. Royalty rate method: The royalty method values intellectual property by capitalising the estimated annual post-tax royalty payable for the use of the intellectual property under a (hypothetical) licensing arrangement. Costs associated with maintaining the licensing arrangements are deducted from the royalty stream.

51. The royalty base in this methodology is usually the turnover attributable to the intellectual property. The turnover must therefore be isolated using the same principles as for the net cash flow method, described above.

The royalty rate may be assessed using three main approaches:

- precedent;
- a standard rate as adjusted for the particular circumstances of the licence; and
- the allocation of economic benefits deriving from the licensee's use of the intellectual property.

52. The use of precedent involves examining previous licences established by the licensor for the intellectual property. This is a good guide to the appropriate royalty rate, being a market value for the intellectual property. The UK Courts and Patent Office, in litigation and compulsory licensing situations<sup>5</sup>, favour this approach, as do courts and tribunals in other jurisdictions. Royalty rates established in previous licences are generally the strongest evidence of a royalty provided that the previous licences are similar to the licence under consideration.

For example, terms of licences should be similar as regards:

- exclusivity;
- the technology and industry;
- the duration of licence;
- the further rights attaching, e.g. know-how, technical support, use of trade marks;

---

<sup>4</sup> Smith, D. Larry (1994), 'Valuation of Life Sciences Companies - An Empirical and Scientific Approach', Hambrecht & Quist Monograph, January 4.

<sup>5</sup> Smith Kline & French Laboratories Ltd's (Cimetidine) Patents [1990] RPC 203 (CA)

- the territories covered; and
- any reciprocal arrangements, e.g. cross-licensing.

53. If an apparently comparable transaction is identified, all of the necessary market and financial information concerning the intellectual property may not be publicly available. For example, certain, but not all, terms of a licensing agreement may be disclosed. A royalty rate may be disclosed, but without mention of an associated upfront lump sum payment or an understanding that the licence was exclusive or non-exclusive.

54. The circumstances in which a previous licence was settled can be significant to the royalty rate agreed in that licence. For example, a licence that is the result of willing negotiations may be very different from a court-imposed royalty, or one established in the context of licence of right proceedings. Rates agreed between two willing parties can also vary according to the circumstances of the agreement, such as the wider commercial context where one party is willing to enter into a licence principally to establish a relationship with the other party.

55. Where a previous licence is not directly comparable, it may be possible to make suitable adjustments to assess the royalty in the current case. Often there are no comparables, perhaps as the licensor has no history of licensing. In this case, industry norms or going rates may be used. An oft-quoted figure is a 5% royalty for mechanical patents. This approach must be treated with caution, as the use of averages can mask a wide variation in rates for technology within that industry. In particular, such rates provide little guidance to the value of the licence under consideration. They may, however, be used as cross-check of other methods as a starting point.

56. The second approach is a derivative of the precedent approach is to take an industry standard rate, and adjust it up or down for the specific circumstances of the licence. This involves considering factors such as the terms of the licence, the availability of alternatives and substitutes, and the ability to make ancillary sales. Ancillary sales are sales of non-patented/unbranded goods or services sold with the patented/branded item. An example would be games cartridges sold with a console containing a patented component.

57. This approach is subject to the same drawbacks as the precedent approach, but again may provide a benchmark or support for royalties estimated by other means.

58. The third approach to determining royalty rates is assessment of the economic value of the intellectual property to the licensee (known as the available profits approach). This is the best approach conceptually. Sophisticated analyses can be performed to assess the incremental cash flows arising. As well as projecting turnover and profit margins which are examined in the more rudimentary approaches, under the economic approach the parties must consider the additional capital expenditure, working capital and marketing support each will contribute to the exploitation of the intellectual property. As such, a better analysis of the risks borne by the licensee and licensor is possible. This should be reflected in the royalty rate. If the licensee bears a high proportion of the risk, perhaps by taking a licence for a new market, this will be reflected in a lowering royalty rate than would otherwise be the case.

59. Cash flow projections are compared, for the situation with and without the licence, to determine the incremental cash flows arising from the licence. These cash flows may be

discounted back, using a suitable discount rate, to a net present value. This is the anticipated capital value of the licence, to be allocated between the parties. This value (or the incremental cash flows themselves) are usually split in the ratio 25:75 or 33:67 between the licensor and the licensee. These ratios are supported in licensing literature. The split of profit is adjusted for the circumstances of the licence. For example, if the licensor has a presence in the market in which it is licensing, the allocation tends to be nearer to 50:50. This is to compensate the licensor for potential lost sales or price competition resulting from the licensee's entry into the market.

60. Once the allocation is determined, the figure may be paid as a lump sum payment. Alternatively, it may be expressed as a percentage of turnover to be paid on future sales. The appropriate percentage royalty rate is derived by finding the rate that yields a royalty stream over time, which is equivalent when discounted to present day terms to the lump sum previously allocated to the licensor as a royalty.

61. The drawback with the economic method is that it requires reliable and detailed projections of the licensee's cash flows. Consequently, such an approach is typically only used by experienced licensors and licensees or in certain industries where suitable information is available, such as pharmaceuticals and engineering.

#### *Summary*

62. In summary, the conceptually superior method to use for valuing intellectual property is the capitalisation of net cash flows or royalties attributable to the intellectual property using the discounted cash flow method. Market based approaches are attractive providing that information on genuinely comparable market transactions is available. Historical cost-aggregation methods are rarely acceptable as there is no direct correlation between expenditure on an asset and its value.

63. Intellectual property valuations are rarely a straightforward exercise. There are great many issues to be considered, each of which can have a significant impact on the value. Consequently, intellectual property valuations should be well planned to ensure all relevant factors are carefully considered and that the appropriate methodology is selected and correctly applied.

---

*Note: The authors of this paper, Nick Bertolotti and Mark Bezan, are respectively a partner and senior manager in Arthur Andersen's Intellectual Property group, London. The authors would like to thank Tina Whitehouse, a consultant with the Intellectual Property group, for assistance in preparing the article.*

[End of document]