EXHIBIT 3

INTELLECTUAL PROPERTY

VALUATION, EXPLOITATION, AND INFRINGEMENT DAMAGES

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CHAPTER 7

VALUATION PRINCIPLES AND TECHNIQUES

Some basic valuation principles must be understood before any attempt is made to address the very specialized challenges of valuing intangible assets and intellectual property. Because these assets are nearly always part of the aggregation of assets that constitute a business enterprise, this chapter addresses the appraisal principles that underlie a business enterprise valuation.

7.1 VALUATION PRINCIPLES

Everyone who must address valuation issues draws on a body of knowledge that has been developed over time, originally in connection with the appraisal of real property. These principles also have been used, in whole or in part, to appraise machinery, gemstones, and works of art, and, as presented here, they are equally appropriate for intangible assets and intellectual property. There has been considerable development and refinement of the means to analyze and utilize the information ingredients, but the basic principles have remained unchanged.

An appraisal is an opinion about the attributes of something. An appraisal can address the attractiveness, style, quality, size, weight, or color of an object. Herein the terms "appraisal" and "valuation" are used interchangeably to mean an opinion of the monetary value of property. An alternative way of defining a valuation is that it describes an assumed (or "virtual") transaction. That is, it is an estimate of the consideration (the agreed-upon price) in a transaction that has not taken place. Therefore, a valuation must describe the property rights presumed to be the focus of the transaction and the terms assumed, in order to make clear the meaning of the consideration estimated. Stated another way, we must completely describe the virtual transaction in order to understand its result.

Because the terms "value" and "property" are used so commonly, it is important to examine their various meanings and to specify their use in this context. This discussion forms a foundation for more detailed analyses in subsequent chapters. In building this foundation, we include some valuation concepts that are not directly applicable to intangible assets and intellectual property. This is necessary in order to eliminate the considerable confusion in valuation terminology and to sort out those valuation concepts that are applicable to a particular property.

(a) PREMISE OF VALUE. Henry Babcock describes value as being "expressible in terms of a single lump sum of money considered as payable or expended at a particular point in time in exchange for property, that is, the right to receive future benefits beginning at that particular timepoint."[1]

Oliver Wendell Holmes recognized that value has many meanings when he said: "A word (value) is not a crystal, transparent and unchanged; it is the skin of a living thought, and may vary greatly in color and content according to the circumstances and the time in which it is used."[2]

Value is not the same as price or cost, although at times they are equivalent. When we speak of "getting a bargain" or "paying dearly" for something, we are verbalizing a perceived difference between price and value, as Oscar Wilde did when he described a cynic as "a man who knows the price of everything and the value of nothing."[3]

Value is the representation of all future benefits of ownership, compressed into a single payment. If property rights are exchanged in an arm's-length transaction between knowledgeable parties, the agreed-upon price is both the market value at that moment and, to the buyer, the "cost." Both buyer and seller have considered the future economic benefits of owning the property rights and have come to an agreement about their present value. As time passes, however, the price (of that transaction) never changes, and the cost to the buyer therefore remains the same. The market value of the rights, however, is subject to continual change as the future benefits increase or decrease with the passage of time. As a result, an opinion of value can be expressed only relative to a given moment or "as of" a specific date.

In addition, the future benefits of ownership cannot be quantified without defining whose ownership is assumed and/or the underlying purpose of the valuation. The distinction of ownership and purpose is essential to the appraisal process. A valuation cannot proceed without a definitive premise of value. One cannot, for example, develop a meaningful answer to the question "What is my car worth?" because additional information is necessary. Value does not exist in the abstract and must be addressed within the context of time, place, potential owners, and potential uses. If my car's value "is in the eye of the beholder," we need to know who the beholder will be. Is it:

An insurance company?

A used car dealer?

A neighbor?

A tax assessor?

An accountant?

The executor of my estate?

A dealer in scrap metal?

Sometimes identifying the recipient of the appraisal will define the value premise, since by custom or law the requirement of certain users has been defined. In other cases, it is necessary to determine how the valuation will be used. Some examples include using the valuation to:

Estimate the cost of replacing property

Determine how much insurance to carry

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1. Henry A. Babcock, FASA. *Appraisal Principles and Procedures* (Washington, DC: American Society of Appraisers), Chapter 6, p. 95.
2. Ibid., *The Appraisal of Real Estate* (1978), p. 21.
3. Oscar Wilde, *Lady Windemere's Fan*, Act III.

Assist in setting a selling price

Set the amount of a charitable donation

Calculate the amount of estate, gift, or income taxes

Determine the amount of a damage claim

Estimate the value of property as collateral in a loan transaction

Estimate the price a property would bring at auction

Each of these combinations of appraisal use and purpose has a specific premise of value that is appropriate.

These same questions and answers can be applied to intellectual property. As an example, if I am a university owner of intellectual property, I would be interested in discovering the best means to exploit it. I would first have to form an opinion of its most promising use and consider that together with alternate means of realization. For example, could I:

- Continue its development and attempt to market it myself?
- Form a joint venture with someone already in the business?
- License it to others?

Other questions include: What is its highest and best use? How do I measure it? Naturally, the highest and best use is that which provides the highest net return. That may vary considerably, depending on how the intellectual property is exploited, when it is exploited, and with whom it is exploited.

A careful definition of value is most important in appraisals of certain types of property. The more that a property is designed, constructed, or suited for a special purpose, the more difference there will be in value measured by different premises. This is especially true of intangible assets and intellectual property, which usually have a very special purpose and which often have their highest value only within the business enterprise of which they are a part.

At the other extreme, if one were called upon to appraise a new $20 bill, the premise of value would be immaterial to the result. It would not matter for whom the appraisal was made, for what purpose, or at what time (assuming the conclusion were to be stated in terms of dollars, and not buying power). This property's complete liquidity negates the value differences that would result from assuming different value premises. Exhibit 14.1 shows a graphic representation of value premise difference as applied to various types of business assets.

In following sections we introduce several definitions of value as well as several types of cost, and indicate for each its most common usage in the valuation process. Examples of valuation concepts applied to physical property are also presented in order to better illustrate the underlying theories.

(b) PROPERTY DEFINITION. One might imagine that the task of defining a property to be appraised would not loom large, compared to the other requirements of the process. Most readers may think of property definition as being the same as a physical description. To be sure, that is part of it. In order to express an opinion about the value of a plot of land, one must determine its boundaries and area. We must also know something about its physical character—whether it is flat, hilly, dry or wet, and so forth. To appraise

a machine, we must have a description of what it does; how old it is; its make, model, and serial number; its condition; and the like. This sort of information is just the first level of information that we need, but it is not trivial.

The asset we are really appraising is the right to use the property, not its physical embodiment. We therefore must define not only the physical nature of the property but also the rights that will be the basis of the future economic benefits. There is obviously a great difference in value between the full right of ownership to a machine and the right to use the machine for three years in the manufacture of a specific product.

We will be discussing these factors in greater detail when we present the subject of intellectual property exploitation. At this point we simply wish to caution the reader that a premise of value and a description of the property are two very essential ingredients in a valuation.

Just as an expert skier recognizes many different types of snow conditions, and just as an expert sailor can detect a myriad of wind and water conditions (because their skills permit them to make seemingly minute adjustments for factors that go unnoticed to the uninitiated), an expert appraiser must recognize the nuances of property and its ownership.

(c) MARKET VALUE. This measure of value is the most commonly used and is also, unfortunately, the most misunderstood. The terms "fair market value," "fair value," "true value," and "exchange value" are also found in appraisal literature, the law, and court cases.

In fairness, the appraisal profession must take some of the blame for this confusion, for not having been quicker to reach internal agreement and for not working more effectively to educate the public. Putting that aside for the moment, we will proceed with yet another attempt to clarify this concept.

(i) Market Value—Conditions of Exchange. There are two recognized definitions of market value. First, market value embodies the concept of an exchange of property. Further, it defines the conditions of that exchange. There are, therefore, different types of market value, as those conditions change. All, however, proceed from five basic concepts:

1. Market value is the amount at which a property would exchange . . .

   Two persons are coming together for the purpose of exchanging property for money (since an appraisal is made in terms of money).

2. . . . between a willing buyer and a willing seller . . .

   These two persons want to make the exchange.

3. . . . neither being under compulsion . . .

   Neither of the parties is being forced, by the other or by circumstances, to make the transaction.

4. . . . each having full knowledge of all relevant facts . . .

   Both parties are aware of what is included in the sale, the condition of the property, its history and possible use, and liabilities against it.

5. . . . and with equity to both.

   The exchange will be fair to both parties, and neither will gain advantage in negotiation or in the terms of the sale.

This is the definition of market value in its purest form. Appraisers will, at times, introduce minor modifications, such as the words "might exchange" rather than "would exchange." This is because no one knows the precise amount. Defining the amount is the purpose of the appraisal. Another common modification is the substitution of "reasonable knowledge" for "full knowledge," presumably because no one ever has absolutely full knowledge of anything. With the possibility of these minor changes, that is the essence of market value.

The Appraisal of Real Estate presents an interesting graphic representation (Exhibit 7.1) of the buyer-seller relationship as it concerns the concept of market value. It is readily applied to intellectual property and is described as follows:

> Curve YS [in Exhibit 7.1] represents the subjective value estimates at various times for a parcel of real estate as assigned to it by the owner of the fee or owner of the right to use the property. The curve OB represents the subjective value estimates at various times, as assigned to the property by a prospective buyer who is assumed to be a typical buyer in the market. . . . The curves YS and OB intersect at I where the value estimates of the owner and the prospective buyer coincide. At this point neither the buyer nor the seller would gain from a transfer at the expense of the other. . . . Between IB and IS (the shaded area) a market exists; here the real estate appraiser's activity centers. . . . This is an area of negotiation. . . . and within which market value is found. . . . an opinion of market value can be certified to at some point in this area, say at point D where a sale can be made; or if the opinion allows additional waiting time, Point T could be reached.[4]

(ii) Market Value—Economic Criteria. A second definition of fair market value is quite important and provides a most useful guide in the valuation process itself. By this standard, *market value is equal to the present value of the future economic benefits of ownership.*

We will, in subsequent chapters, provide an explanation of the methods to estimate present value and therefore directly estimate market value.

The definition of market value often is amplified to accommodate different types of property or different exchange conditions.

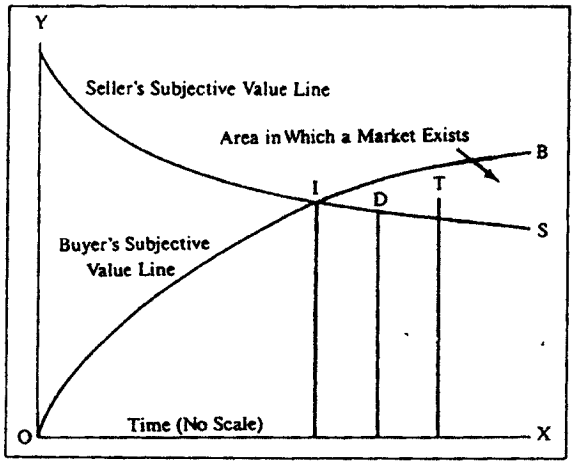

EXHIBIT 7.1 BUYER-SELLER SUBJECT VALUE CONCEPT

Source: Redrawn from Thurston H. Ross, *Some Economic Aspects of Urban Land Valuation* (Los Angeles: University of Southern California Press, 1933).

4. Ibid., *The Appraisal of Real Estate*, pp. 28–29.

(iii) Property. Certain kinds of property, such as the $20 bill, need no amplification of the market value definition because they are a single-purpose property whose use is clear.

Land is always appraised at market value, and often the pure definition is used because it is customary to assume that knowledgeable parties know the permitted uses of the subject land and the use that will yield the highest economic return. Under this assumption, the appraiser forms an opinion of the "highest and best use" of the property and bases the analysis on that, irrespective of how it is being used at the time. No knowledgeable buyer would purchase waterfront property in Atlantic City, New Jersey, for the purpose of farming, and the appraiser of such land does not have to define market value in such a way as to avoid a potential misunderstanding. The appraiser's statement of the opinion of highest and best use removes any doubt regarding the basis of the conclusion.

The concept of "highest and best use" will be discussed again as it relates to intangible assets and intellectual property. Reasonable potential uses of property must be considered in any valuation. If the highest and best use of property is as a part of the business enterprise to which it has been dedicated, that should be so stated as part of the valuation. One common way of doing this is to add the phrase: ". . . and assuming that the property will continue in its present use (or in continued operation)."

(iv) Exchange Conditions. There are times when a valuation should recognize that there are unwilling buyers and/or sellers, or that there is an element of compulsion present, or that property being used for one purpose by the seller is purchased by the buyer for another purpose. These conditions introduce further modifications to the definition.

For example, if a 12-meter yacht that had never won a race was offered for sale, this might result in an exchange under various circumstances, probably all of which could be defined as some form of liquidation. By this we mean that the present owner wishes to convert the property into money because the property is no longer useful in its present role (winning) or capable of earning an adequate return as an investment. The term "liquidation" also connotes some form of compulsion on the part of the owner (seller), perhaps because the financial return on the property has not met expectations or because there are other, better opportunities for investment. The speed with which the seller hopes to achieve liquidity is a key value factor.

(v) Orderly Liquidation. Orderly liquidation is a situation in which there is a "reasonable" time in which to accomplish the sale. What is reasonable can vary considerably, depending on the type of property. The 12-meter yacht is very special, is probably high priced (even under these circumstances), and has an appeal to a very small market. It might take 6 months to a year to advertise, engage brokers, and locate someone in the world with enough interest, money, and able-bodied relatives and friends (for crew) to strike a deal. Another buyer might purchase with the intent of an alternate use, such as a floating restaurant or school training vessel. The exchange price would certainly be lower than for continued use, because the buyer would consider the renovation costs or the cost of a more ordinary boat that could provide the same service.

A steel mill or petrochemical plant might require several years of worldwide marketing efforts and substantial conversion costs to achieve the same objective.

If intellectual property were placed on the market, it could easily require a year or more to locate a buyer whose particular business circumstances would result in a reasonable exchange price. Chapter 14 will provide a more detailed discussion of liquidation value, as it pertains to intellectual property.

(vi) Forced Liquidation. Forced liquidation implies the same transaction carried out more quickly, even at some sacrifice in selling price. Often this means selling to an intermediary, such as a real estate developer or other dealer, who buys with the intent of "repackaging" the property and reselling it at a profit. The exchange price would be further reduced by the dealer's anticipated holding costs and return on investment.

(vii) Auction. An auction is likely to result in the lowest exchange price because there is no particular effort to contact the best possible buyer prospects and because there is an objective to dispose of the property *now.* Auctions of machinery and equipment, store fixtures, and so on, are usually on an as-is, where-is basis. Therefore, the buyer also considers (in the price to be paid) the cost to remove and transport the property.

Intangible assets and intellectual property are rarely exchanged separately from the business enterprise of which they are a part and rarely under conditions of forced sale. This is because as stand-alone property they tend to have little value, although this is not always true. This is discussed later in our description of special valuation situations.

(viii) Conclusion. Market value has a number of permutations. In its purest form, it represents an exchange between knowledgeable persons who are not coerced in any way. It also can refer to situations in which one of the parties is under pressure to complete the transaction or in which the time available for its completion is limited. The market value of business property is inextricably linked to its earning capability.

(d) COST OF REPRODUCTION. Cost of reproduction is the cost that would be incurred as of the appraisal date to construct a replica of the subject property. This would be represented, for example, by the work effort that would be necessary to reproduce a software system that had all of the modifications, patches, no longer used portions of code, and obsolete command language that are contained in the original.

Cost of reproduction is useful as a starting point to develop other measures of value. It is also useful to measure a partial loss for insurance purposes, since it is assumed that the damaged property will be restored in keeping with the whole.

(e) COST OF REPLACEMENT. Cost of replacement is the cost, as of the appraisal date, that would be incurred to obtain a property with equivalent utility to the subject. For computer software, it would be a system written in the newest, most efficient language for current hardware configurations. It also would suit the most current usage. It would have the same utility as the old system but would likely accomplish its required tasks in a quite different manner. Cost of replacement is used:

In budgeting for property replacement or additions

As a starting point in determining other measures of value

To determine insurance coverage or to measure insurable losses

In the insurance industry, the term "replacement cost" is not the same as cost of replacement described here; rather it is cost of reproduction, as previously defined.

(f) COST OF REPRODUCTION/REPLACEMENT LESS DEPRECIATION. Cost of reproduction/replacement less depreciation refers to a type of value calculated by reducing either cost of reproduction or cost of replacement by an amount to reflect the loss in value due to physical deterioration and, in some cases, obsolescence. The analyst uses this measure of value as a value conclusion when the appraisal is for insurance purposes and as an intermediate figure in the determination of other forms of value.

This measure of value is in common use in the insurance industry and is often referred to as "actual cash value." In the insurance context, depreciation is almost always limited to that arising from physical deterioration. Property that might generally be considered obsolete could be very useful in some businesses or for specific purposes and require replacement in kind. There have been, however, circumstances in which obsolescence has been recognized for insurance purposes, such as the case of an abandoned school building destroyed by fire.

The term "sound value" is also used, most often in an insurance context, as a synonym for actual cash value.

(g) **ORIGINAL COST.** Original cost is the amount recorded at some previous time for the purchase, construction, or creation of an asset. It is typically the amount recorded on the books of an enterprise and may be a combination of materials, labor, overhead, taxes, interest, and other costs. It represents the costs incurred by a specific party, at a particular time, and in accordance with particular conditions. It is related to value only by coincidence, since the costs, even at the time they were incurred, may have been unusually high or low.

In the valuation of intangible assets and intellectual property, one must be particularly cautious in using any accounting or tax-based "value," even original cost. The reasons for this caution were fully explored in Chapter 5. It is useful here to understand that original cost is useful as:

A rough guide to the cost of reproduction at an earlier time

Part of the balance sheet of a business enterprise

A starting point in the development of reproduction cost by the use of price trends

(h) **BOOK COST.** Book cost is also referred to as "book value" or "net book value," and it refers to original cost reduced by accounting depreciation as carried on the books of a business. In order to distinguish between "accounting depreciation" and "appraisal depreciation," we will use the term "capital recovery" to refer to depreciation for accounting purposes.

Capital recovery is an allocation of cost. When an asset is purchased and expected to be useful in a business for several years, it would distort the financial statements to reflect that expenditure entirely in the period of initial purchase. The cost is therefore spread over the time when the asset will be used so there will be an appropriate matching of cost and the benefits that ought to result from the property:

$$\frac{\text{Original Cost}}{\text{Useful life}} = \frac{\$1{,}000{,}000}{40 \text{ years}} = \$25{,}000 \text{ per year}$$

Using this example, the net book value of this asset is reduced by $25,000 per year until, in the 40th year, it is zero. The cost of intangible assets and intellectual property is rarely shown on financial statements because the cost to create them is usually expensed in the year incurred.

Although many businesspeople think book cost is equivalent to some form of value, it is not. Property accounting practices vary widely. In some cases, property disposed of is not removed (retired) from the books, and in others, property that is fully depreciated is written off and disappears from the accounting records. Capital recovery practices also vary widely, and so methods and lives are not consistent from company to company.

Although most managers would prefer not to admit it, capital recovery rates are sometimes changed to "manage" earnings per share. Therefore it is unlikely that "accounting" depreciation matches the decline in value over time. Even if the original cost starting point was representative of value at some previous moment, depreciated original cost is not likely to equal current value.

Net book value does have relevance to the appraiser in the valuation of utility property under traditional regulation, in that earnings permitted by a regulatory commission are a function of book cost.

Book cost is, except for the regulated environment, useful only as a very rough benchmark suitable for "order of magnitude" comparisons. We occasionally use a permutation of book value as a surrogate for market value, but the caveats above should be borne in mind.

(i) **TAX BASIS.** Tax basis is similar to book value as described above except that the calculation of capital recovery is in accordance with tax requirements. Capital recovery usually is calculated by some form of accelerated method, and the life is the result of some legislation rather than a value based on actual service life.

Tax depreciation methods and lives have been changed so often and so significantly over the years that tax basis is of no use as a measure of any form of value.

7.2 VALUATION METHODS

There are three accepted valuation methodologies that utilize the cost, market, and income techniques. One can find other methods named and described in articles and texts, but analysis will reveal that these are really forms of the basic three. In many instances, "new" valuation methods are based on alternative techniques for analyzing or obtaining ingredient inputs to the core methods named above.

(a) **COST APPROACH.** The cost approach seeks to measure the future benefits of ownership by quantifying the amount of money that would be required to replace the future service capability of the subject property. This was defined above as cost of replacement. The assumption underlying this approach is that the price of new property is commensurate with the present economic value of the service that the property can provide during its life. The marketplace is the test of this equation. If, for example, the price of a new machine were set at a level far above the present value of the future economic benefits of owning the machine, then none would be sold. If the opposite were true, then demand would outstrip supply, and presumably the price would rise. The price of a new machine, absent some market aberration, is therefore equal to its market value.

(i) **Depreciation.** One is rarely called upon to render an opinion of value on new property, however, and therefore the use of the cost approach nearly always brings with it the complexity of quantifying the reduction from (new) value due to the action of depreciation. Appraisal depreciation is the result of physical deterioration, functional obsolescence, and economic obsolescence. The proper reflection of all three is essential to estimating market value by the cost approach. These factors are discussed in detail in Chapter 8.

(b) **MARKET APPROACH.** The market approach is the most direct and the most easily understood appraisal technique. It measures the present value of future benefits by obtaining a consensus of what others in the marketplace have judged it to be. There are two primary requisites: an active, public market and an exchange of comparable properties contemporaneous to the valuation date.

In essence, we are seeking a population of transactions from which we can select those that best match the description of the virtual transaction we are constructing.

The residential real estate market is a good example of a market where these conditions are usually present. There is generally some activity in this market in a given area, and selling, asking, and exchange prices are public. Of course not all residential properties are similar, but given enough activity, reasonable comparisons can be made. Where these optimal market conditions do not exist, using this approach involves more judgment, and it may become a less reliable measure of value. As we will discuss in Chapter 9, this technique is not often used for the valuation of intangible assets and intellectual property, largely because of the absence of the conditions noted below.

(i) Active Market. The ideal situation is to have a number of property exchanges to use in this analysis. One sale does not make a market. There are, for example, publicly traded common stocks in which only a few shares are traded in a year. Their exchange price has much less validity as a measure of their value than, for instance, that of General Motors stock, in which thousands of shares are traded each day, though all the other requisites except activity are present.

(ii) Public Market. To be useful, the exchange consideration must be known or discoverable. The prices of common stock in the primary exchanges are precisely known. For other types of property, it becomes more and more difficult to discover the exchange price. Even with real estate, the published price may be misleading due to financing arrangements between buyer and seller that are not made public. Transactions between businesses, such as the sale of a plant, product line, or subsidiary, may be very difficult or impossible to evaluate because competitive pressure motivates the participants to keep the details confidential.

(iii) Adjustments for Comparability. The best of all worlds for a real estate appraiser is to find, for a subject property, an arm's-length sale of an exact replica property, across the street, the day before the appraisal. Unfortunately, this does not happen with enough regularity to eliminate the need to make adjustments when the "comparable sales" are not exactly comparable. Real estate appraisers continually grapple with the problem of quantifying differences in property, so that the location, amenities, zoning, size, shape, and topography of comparable sales can be equated to the subject's and thus provide an indication of value. Analysts using this approach for other types of property have the same challenge, but comparability tends to be more obvious—one either has it or not—and there are fewer nuances.

(iv) Adjustments for Time. Sometimes it is necessary to utilize sale information that is not contemporaneous with the appraisal. In this case, the appraiser must adjust for price changes over time. This may necessitate a separate study of changes in property value in the subject area during a recent period of time so as to develop some specialized indices to use in the adjustment process.

(v) Summary. With this background, the reader can gain a picture of the strengths and weaknesses of the market approach. Where there is a good base of information about the sales of properties that are similar to the subject, the market approach can be the strongest indicator of value. As the number of comparable sales or the information about them

dwindles, or when the lack of comparability makes adjustment speculative, then this approach ceases to be useful. The market approach is then most effective for:

- Real estate
- Machinery and equipment in general use
- Vehicles
- General-purpose computer software
- Computer hardware
- Liquor licenses
- Franchises

The market approach is very often useful in the valuation of capital stock, other types of securities, or an entire business enterprise.

The market approach is typically least effective for:

- Special-purpose machinery and equipment
- Most intangible assets and intellectual property
- Properties highly restricted by zoning, environmental restrictions, or other forms of regulation

The market approach takes the analyst right to the bottom line of market value. The assumption is that other buyers of comparable property were willing, had knowledge of all relevant facts, and struck a deal that was fair and, therefore, their transactions represented market value at that time and for that property. It is assumed that the market measures and adjusts for all forms of appraisal depreciation: physical, functional, and economic.

(c) **INCOME APPROACH.** The income approach focuses on a consideration of the income-producing capability of the property. This book is about the valuation of business property whose raison d'être is to provide a return on and return of the investment required to create it. As when buying common stock, our puzzle is to estimate the price a virtual buyer would be willing to pay for the anticipated returns from the property.

So the underlying theory is that the value of property can be measured by the present value of the net economic benefit (cash receipts less cash outlays) to be received over its life. This concept was nicely described by Campbell and Taylor:

> It has often been stated, but bears repeating, that assets (whether bricks and mortar, land, equipment or corporate shares) are only worth in the open market what they can earn, and the true measure of worth is the assets' earnings when related to the risk inherent in the business situation.[5]

(i) **Present Value Concept.** Some background is provided here for the reader who may not be familiar with the concept of the "time value of money"—that a dollar to be received in the future is worth less today than a dollar to be received immediately. To assist to explain this concept, we provide the following example:

> Let us make the pleasant assumption that, as a result of some clever basement tinkering, we have designed a putter that unerringly propels a golf ball into the hole. . . . we have carefully guarded our design and have been awarded a patent. Let us further assume that our decision is to

5. Ian R. Campbell and John D. Taylor, "Valuation of Elusive Intangibles," *Canadian Chartered Accountant* (May 1972), p. 41.

exploit this intellectual property by selling it. We have approached the golf equipment companies, and two of them have made offers. Zing Golf Corporation has offered a cash payment of $550,000. Cougar Club Company has offered $300,000 cash and $300,000 a year from now.

The choice would be clear if the two offers were an immediate payment of cash. The proposed delay in Cougar's second payment complicates the decision. The additional fifty thousand dollars is certainly attractive, but we must consider all the uncertainties surrounding the second offer. Will Cougar Co. still be in business a year from now? Will it have the money to make the payment? What if the putter design does not turn out to be the answer to every duffer's prayer, and Cougar is unhappy with the deal? What if the design turns out to be very expensive to manufacture, and the market won't accept the high price? We must find a way to put the two offers on the same basis so they can be compared.

What is the essential difference between the offers of Cougar and Zing? This example presents the concept of the time value of money as measured by its "present value." The present value of a cash offer is obvious, and the comparison of two different cash offers can be made without difficulty. When we introduce the element of time, the complication begins. What is the present value of $300,000 to be received in one year? And what do we need to know about the situation in order to calculate it? The first consideration we must address is how confident we feel that the payment will be made, in full and on time. If we feel really confident about the buyer's integrity and ability to pay, our reasoning could be as follows:

1. If I had the $300,000 today instead of in one year, I could put it in my money market fund and earn 2%. At that rate, the $300,000 would be worth $306,055 (compounded monthly). This calculation uses the basic formula that we learned in early mathematics schooling, $I = Prt$ (Interest equals Principal multiplied by Rate multiplied by Time). To calculate the future amount directly, the formula is transformed to:

$$\text{Amount} = P(1 + rt)$$

2. Looking at the other side of the coin, we ask ourselves, how much would I have to put into my money market fund today in order to have $300,000 in one year? The answer is $294,118. This calculation uses another permutation of the basic interest formula:

$$\text{Present Value} = \text{Future Value} / (1 + rt)$$

3. Therefore, the present value of the right to receive 300,000 in one year is $294,118 at an interest rate of 2%.

If I feel that Cougar Club Company is as financially reliable as the holder of my money market fund, then my analysis is complete. If, on the other hand, I am not so confident about receiving the $300,000 payment on time (or at all!), I would want a greater return for accepting that additional risk. The interest rate in the calculation is the measure of my perceived risk. The present value of $300,000 to be received in one year at an interest rate of 15% is $260,870. At a rate of 25%, it is only $240,000. A comparison of the prospective sales is shown in Exhibit 7.2.

Armed with this calculation we can see that, depending on the level of confidence we have in Cougar honoring its commitment to pay the remaining $300,000 in a year, their offer could either be better or worse than that of Zing. What do we require in order to make these calculations? We need to know the amount of the delayed payment, when it is to be made, and how much risk is associated with receiving it.

(ii) Amount of Income. In the example above, the amount of the payments to be received is clear ($300,000 now, $300,000 in one year). In the real world, the "amount" portion of the equation can be much more obscure, and can comprise payments to be received, as well as expenses to be borne.

ZING'S OFFER		$550,000		$550,000		$ 550,000
COUGAR'S OFFER						
Cash upfront		$300,000		$300,000		$ 300,000
Cash in 1 year	@2%	294,118	@15%	260,870	@25%	240,000
Total		$594,118		$560,870		$ 540,000
Cougar advantage		$ 44,118		$ 10,870		$(10,000)

EXHIBIT 7.2 PRESENT VALUE COMPARISON

(iii) **When the Income Is to Be Received.** Sometimes the "when" of receipts or obligations is clear (as when they are to be made according to a prearranged schedule), but more often it is dependent on other events. . . . The "when" is a very important element in a present value calculation. The present value of the $300,000 payment to be received at different times in the future can vary as shown in Exhibit 7.3.

As illustrated in Exhibit 7.3, the relative effect of "when" is also greatly altered by the rate of interest assumed. At high interest rates, the deterioration in value is accelerated as receipt is delayed. The present value concept is applicable to any pattern of cash flow as well. At a rate of 15% compounded monthly, both of the following payment schemes have a present value of $300,000:

12 monthly payments of $27,077

$100,000 in cash plus 12 monthly payments of $18,052

(iv) **Risk of Achieving the Income.** A difficult ingredient is the quantification of risk, as measured by the rate of interest, or discount rate. We will use the term "discount rate" henceforth, because expressing the receipt of future benefits in current terms is a process of discounting. There are a number of methods used to estimate an appropriate discount rate and many of these are discussed in Appendix A. The essence of these, however, is a consensus of returns required by investors on investments of different types in the marketplace.

As an example, investors in U.S. government securities typically accept rates of return at the lowest end of the range of possible investment returns, currently around 4%. At the other end of the range, investors in the common stock of a start-up, high-technology enterprise may require a rate of return of 30%, 40%, or 50%.

Discount Rate	1 Year	2 Years	5 Years	10 Years
2%	$294,118	$288,462	$272,727	$250,000
15%	$260,870	$230,769	$171,429	$120,000
25%	$240,000	$200,000	$133,333	$85,714

EXHIBIT 7.3 EFFECT OF TIME AND RATE ON PRESENT VALUE

(v) **Discounted Cash Flow Example.** A calculation of the present value of future income is often referred to as a discounted cash flow (DCF) model. That is, one "discounts" the amount of future income to reflect its loss in value due to the delay in receiving it. The classic illustration of this technique is the purchase of a security, such as a share of common stock. Assume the following:

1. Today's market price of one share of the stock is $45.00.
2. The company currently pays a quarterly dividend of $.56 per share.
3. Earnings of the company are currently $3.75 per share, and are expected to grow at 8% annually.
4. We expect to hold the stock for 3 years.

Under these conditions, we could expect that the dividends paid by the company will grow at 8% per year and, if no market aberrations are expected, the price of the stock will also grow at that rate. If we purchase a share of this stock, the transaction will produce a series of positive and negative cash flows. First, there will be a negative cash flow when we reduce our savings and pay out the $45.00. Then, there will be a series of positive quarterly cash flows starting at $.56 and growing. Finally, when we sell the share of stock in 3 years, there will be a positive cash flow of $56.69 ($45.00 grown at an 8% annual compound rate for 3 years).

If all this were to go according to plan, what rate of return would we have achieved on this investment? To calculate this, we need to calculate the summation of the present values of the negative and positive cash flows, using different discount rates until they net to zero. Some refer to this as a calculation of the internal rate of return (IRR). This is a trial-and-error process best left to a computer or financial calculator. The result of this is the rate of return we would achieve if we entered into this transaction and if the dividends and future stock price were as expected. In this example, the discount rate is 12.37%. As an investor, we must decide whether that rate of return is appropriate relative to what we perceive as the risk of the investment. If it is, we purchase the stock. If it is higher than we require, we purchase it eagerly. If lower, we wait for the price to come down or look for an alternative investment.

If we apply these principles to the valuation of intangible assets or intellectual property, we can observe that the three essential ingredients of the income approach are:

1. The economic benefit that can be reasonably expected from the exploitation of the property
2. The pattern by which that economic benefit will be received
3. An assumption as to the risk associated with realizing the amount of economic benefit in the expected pattern.

These elements can be related to one another by means of a simple formula, $V = I/r$, where:

V = Present value of the economic benefit attributable to the property

I = Economic benefit derived from employment of the property, representing the net of cash inflows and outflows

r = Capitalization rate reflecting all the business, economic, and regulatory conditions affecting the risk associated with employing the property and achieving the prospective earnings

For example, if an income of $100 will be received in perpetuity, and the appropriate rate of capitalization is 10%, then the value of that income is:

$$\frac{\$100}{.10} = \$1000$$

This is obviously the simplest of examples and one that never occurs in real life. Property ownership is rarely expected to produce income perpetually. Therefore, the calculation is always more complex, and the determination of an appropriate capitalization rate is more complex as well. Because business property is owned for the express purpose of earning a return on investment, the income approach is the strongest indicator of value for this type of property.

A number of methods can assist analysts in estimating the amount of income that can be realized from the ownership of an asset and an appropriate discount rate (risk factor). These are discussed at length in Chapter 10 and in Appendix A. As to the expected duration of income, one may be again relying on a consideration of the three forms of depreciation. That is, the assets that are the source of the income may be subject to a decline in both value and earning power. The income that they are capable of producing may decline proportionately, and this decline would become part of the calculation by the income approach.

The income approach is best suited for the appraisal of the following:

- Contracts
- Licenses and royalty agreements
- Patents, trademarks, and copyrights
- Franchises
- Securities
- Business enterprises

The income approach indicates fair market value directly and without intermediate calculations involving the three forms of appraisal depreciation.

(d) **CORRELATION.** Valuation practice suggests that all three methods be employed when possible and appropriate. At the very least they should each be considered. Circumstances are often such that one or more of the methods is obviously inappropriate and should not be pursued, but it is not unlikely that an appraiser will have to reconcile two or three indications of value. Even more indications of value may be present if multiple assumptions were employed in the use of one method or another. This process is often referred to as "correlation."

In this process, the appraiser considers such factors as:

- The appropriateness of the method used
- The quantity and quality of information available as input to each method
- The extent to which judgment or alternative assumptions were employed
- The sensitivity of the value indication to various inputs and their relative reliability
- Whether the results of a single method should be relied upon or whether some weighting of results is appropriate

7.3 SUMMARY

The cost, market, and income approaches are the tools of valuation. Virtually any type of property can be valued using them. In the next chapters we discuss these three methods in more depth and illustrate the analysis tools that are available to develop the inputs that are necessary for their employment. The analyst should consider using all three for every property because a comparison of their values may confirm the conclusions or highlight inconsistencies that should be investigated.

CHAPTER 8

COST APPROACH

The cost approach seeks to measure the future benefits of ownership by quantifying the amount of money that would be required to replace the future service capability of the subject intellectual property. The assumption underlying this approach is that the cost to purchase or develop new property is commensurate with the economic value of the service that the property can provide during its life. The cost approach does not directly consider the amount of economic benefits that can be achieved or the time period over which they might continue. This approach is often employed together with the assumption that economic benefits indeed exist and are of sufficient amount and duration to justify the developmental expenditures. Using a cost approach to develop an indication of market value, however, requires a consideration of economic obsolescence, and in this instance the appraiser must decide to what extent future economic benefits will support an investment at the indicated value.

First, we will discuss the general concepts of the cost approach as they typically apply to the valuation of fixed assets. This includes production equipment, office furnishings, truck fleets, and many of the tangible items that are used in a business enterprise. Then application of the cost approach for intangible assets will be discussed.

8.1 GENERAL COST APPROACH PRINCIPLES

If the price of a new computer-controlled machine tool were set at a level exceeding the present value of the future economic benefits of owning the machine, none would be sold. Likewise, if there were limited future benefits associated with intellectual property ownership, the property would not be desirable. If the opposite is true and the price of the machine were set at a level lower than the present value of the future economics benefits, demand would be strong. Either the seller will get wise to the situation or competitors will enter the market and force a better match between price and future economic benefit. As a general rule, then, the price of a new tangible asset is accepted as being equal to the future economic benefit of ownership.

Unlike tangible property, intellectual property and intangible assets are not manufactured and offered for sale in the marketplace. We therefore do not have market prices to guide us to a starting point in the employment of a cost approach. We therefore must start with estimates of the cost to create, and, as we will point out, there can be a great disparity between the cost of creating intellectual property and its value. The basic cost/benefit theory is applicable nonetheless.

Most often we are concerned with determining the value of existing property. whether it is a machine or intellectual property. When we first identify the costs needed to create a property. the aggregate amount does not reflect the negative effects on the utility of the property that have accumulated as the property has aged. This involves the concept of depreciation and the associated diminution in value.

CHAPTER 9

MARKET APPROACH

The market approach provides an indication of value by observing what others have agreed upon as a fair price in arm's-length, open-market transactions involving property similar to the subject. That is, the virtual transaction is compared with actual transactions judged to be comparable. Like the cost approach, the market approach is based on the principle of substitution that instructs us that a prudent buyer would not pay more for property than it would cost to purchase a comparable substitute. To employ this approach, one looks for transactions that:

- Involve property similar to the subject
- Are part of an active, public market, and for which the price and terms are known
- Are contemporaneous with the virtual transaction
- Are between parties dealing at arm's length

Since one never discovers an actual transaction that perfectly matches the virtual one, a valuer is always faced with decisions concerning the reasonableness of the comparability and whether some adjustment to the elements of the actual transaction are warranted in order to enhance the similarity.

9.1 MARKET TRANSACTIONS OF INTELLECTUAL PROPERTY INDICATE VALUE

The exchange of intellectual property in the marketplace typically is completed as part of the exchange of an entire company or division. Rarely do we see a specific patent or trademark exchanged as stand-alone property.[1] Usually the exchange includes the portion of the enterprise with which the intellectual property is associated. The price paid often includes an amount for working capital, fixed assets, the assembled workforce, and various types of intangible assets and intellectual property. Even when specific intellectual properties are exchanged separately, the price is rarely disclosed.

1. This is even more true for trademarks than for technology. When trademark rights are transferred (assigned), they must be accompanied by "the goodwill of the business." This requirement ensures that the new owner has the capability to produce products or services bearing the mark that are indistinguishable from those of the previous owner, so that consumers will not be deceived or confused. This has been interpreted to mean that the trademark assignment should be accompanied by tangible assets, formulas, customer lists, and whatever other assets are necessary to ensure the new owner's capability. If the mark is separated from its goodwill it can be lost. See 15 U.S.C. § 1060.

CHAPTER 10

INCOME APPROACH—QUANTIFYING THE ECONOMIC BENEFIT

10.1 MARKET VALUE EQUALS THE PRESENT VALUE OF THE FUTURE ECONOMIC BENEFITS OF OWNERSHIP

From Chapter 7 the reader will recall that the focus of this book is the estimation of market value. Chapters 8 and 9 discussed how to develop indications of market value by the cost and market approaches. This important chapter presents the income approach to estimating market value, which has been defined as "the present value of the future economic benefits of ownership." This definition itself indicates the direction of this discussion. The reader will recall the discussion of investment principles in Chapter 2 and the present value calculations that are the core of that subject. A calculation of the present value of future economic benefits therefore requires us to develop three primary inputs:

- The economic benefit that can reasonably be expected from the exploitation of the property
- The pattern by which that economic benefit will be received
- An assumption as to the risk associated with realizing the estimated amount of economic benefit in the expected pattern.

If we have these three pieces of information, we can calculate present value. If this information comes from an analysis of the real marketplace, that present value equals market value. The arithmetic (calculating present value) is straightforward; the analysis necessary to develop the inputs (amount of benefit, pattern of income, and risk factors) can be extremely complex. The remaining sections of this chapter explore analysis techniques.

10.2 QUANTIFYING THE ECONOMIC BENEFIT

Estimating the economic benefits that can flow from the exploitation of intangible assets and/or intellectual property is one of the most difficult challenges in the application of the income approach.

In the discussions that follow, we often use the term "earnings" to represent the quantification of the economic benefit. It is therefore appropriate to preface the examples with our thoughts about the use of earnings as this measurement.

The mere existence of profit is not enough to justify company investments in intellectual property. Before creating, buying, or licensing intellectual property, a company must determine its contribution to the overall earnings of the enterprise in which it will be used. Earnings derived from operations must be of an amount, on a consistent basis, to

(i) **Valuation Using "Relief from Royalty."** Valuation using "relief from royalty" is a common methodology based on the concept that if a company owns intellectual property it does not have to "rent" the asset and therefore is "relieved" from paying a royalty. The amount of that phantom payment is used as a surrogate for income attributable to the intellectual property, and a calculation of the after-tax present value can proceed.

The royalty used in this type of calculation is often taken from the "market" or from rules of thumb in the relevant industry, although there is nothing to prevent judgment being exercised if the subject property is sufficiently different from the available data. Often the relief-from-royalty calculation is made by capitalizing the income stream in perpetuity as follows:

$$\frac{\text{Year 1 After-Tax Income}}{\text{Capitalization Rate}} - \frac{\$112{,}050}{.10} = \$11{,}205$$

A relief-from-royalty calculation also could be made using a discounted cash flow model, if the economic benefit of the property will be realized only for a finite period of time.

We have previously cautioned users of this technique that the relief-from-royalty income stream may represent only a portion of the economic benefit attributable to the asset being appraised. That is, one must be attentive to the license terms that give rise to a royalty rate taken from the "market." If those license terms transfer only a portion of the full rights of ownership (i.e., the licensor retains the right to exploit the intellectual property itself or to license to others), then the payment for those limited rights (royalty) may not be an adequate surrogate for the full economic benefits of ownership.

In an example from the world of real estate, assume that a building owner occupies one-half of the structure and rents the other part. A capitalization of the rental income obviously would not be an appropriate indication of value for the entire building. To be sure, the rental income from that tenant might be a very good indication of market rental rates, but it would not be adequate for valuation purposes if the objective is to appraise the entire building.

This limitation of the method recently received judicial notice in a decision of the U.S. 2nd Circuit Court of Appeals in the matter of a U.S. Tax Court decision relating to Nestle Holdings, Inc. Experts for both the taxpayer and the IRS utilized the relief-from-royalty method in the valuation of trademarks. The 2nd Circuit, however, was not persuaded that the resulting values were appropriate, commenting:

> In our view, the relief-from-royalty method necessarily undervalues trademarks. . . . Royalty models are generally employed to estimate an infringer's profit from its misuse of a patent or trademark. . . . However, use of a royalty model in the case of a sale is not appropriate because it is the fair market value of a trademark, not the cost of its use, that is at issue. A relief-from-royalty model fails to capture the value of all of the rights of ownership, such as the power to determine when and where a mark may be used, or moving a mark into or out of product lines. It does not even capture the economic benefit in excess of royalty payments that a licensee generally derives from using a mark. Ownership of a mark is more valuable than a license because ownership carries with it the power and incentive both to put the mark to its most valued use and to increase its value. A licensee cannot put the mark to uses beyond the temporal or other limitations of a license and has no reason to take steps to increase the value of a mark where the increased value will be realized by the owner. The Commissioner's view, therefore, fundamentally misunderstands the nature of trademarks and the reasons why the law provides for exclusive rights of ownership in a mark. Given the shortcomings of the relief-from-royalty methodology, the Tax Court erred when it adopted the Commissioner's trademark valuations. The Tax Court is instructed to examine alternate methods of determining the fair market value of the trademarks in question.[1]

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1. U.S. 2nd Circuit Court of Appeals. *Nestle Holdings, Inc. v. Commissioner of Internal Revenue*. Docket Nos. 96-4158, 96-4192, decided July 31, 1998.

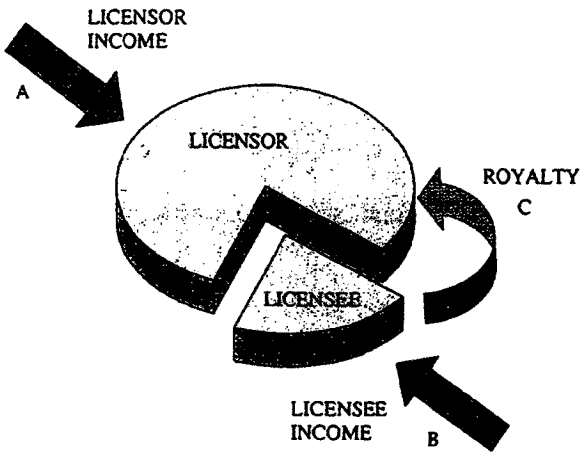

EXHIBIT 10.6 LICENSING INCOME STREAMS

It is helpful, in the understanding of property rights and the role of the royalty, to examine the basic aspects of the licensing process. In a license, the owner of intellectual property rents some of the total bundle of rights to another (the licensee). The licensee pays for those rights by means of a royalty. If we add the *value* of the licensor's rights to those of the licensee, we would capture all of the intellectual property value.

If we use an income approach to value intellectual property and wish to use a market royalty rate as a surrogate for the income attributable to the asset, we must capitalize both the income realized from the licensor's (owner's) exploitation of the mark and the income attributable to the property from the licensee's exploitation. This latter is not necessarily the amount of royalty being paid by the licensee. The essential point is that we need to consider all of the potential income streams that may be associated with licensed intellectual property and understand which streams belong to whom (see Exhibit 10.6).

The value of *all of the rights* in the intellectual property would be obtained by capitalizing the income streams *A* and *B*. What is the income *C* that is the royalty payment? It is a portion of income *B*, and a capitalization of it would be representative of the value of the *license contract* to the licensor. If our task were to value the *licensor's rights* in the intellectual property, we would capitalize income streams *A* and *C*. If we were to value the *licensee's rights* in the intellectual property, we would capitalize income stream *B* less the royalty expense *C*. It is apparent that there is some overlap here, and one must carefully define the asset to be valued and also carefully define the income associated with that asset before proceeding.

For those mathematically inclined, the relationships can be expressed as follows:

$$V_t = Vo + Vl$$

Where: V_t equals the total value of all trademark rights

V_o equals the value of the owner's trademark rights

V_l equals the value of the licensee's trademark rights

$$V_o = \frac{I_o + Ir}{C} \qquad Vl = \frac{Il - Er}{C} \qquad Ir = Er$$

Where: I_o equals owner's income attributable to the trademark