Business Valuation Digest

VOLUME 12, ISSUE 3

To Infinity and Beyond
Examining the Terminal Value Calculation

by Chris Polson, CFA, CBV

The discounted cash flow ('DCF') methodology is a favored valuation methodology, both in theory and in practice. The in-depth analysis and projections that accompany DCF financial models often contribute to a more comprehensive understanding of the risks and opportunities faced by a business and, accordingly, a more supportable value conclusion. However, given this added degree of complexity, errors within a DCF valuation model are not uncommon, even when they are prepared by an experienced financial professional.

The DCF methodology uses future cash flow projections and discounts them to arrive at a present value. A DCF valuation model typically includes two distinct forecast components:

1. an explicit forecast period (often extending over a period of 3 to 7 years), in which the periodic cash flows are discretely forecast; and
2. a terminal value[1] component, in which the value of all cash flows beyond this explicit forecast period are captured.

Common Structure of a DCF Forcast

	Explicit Forecast Period					Terminal Value
	Year 1	Year 2	Year 3	Year 4	Year 5	
Present Value of Cash Flow	10	12	14	16	18	200
% of Total Value	*3.7%*	*4.4%*	*5.2%*	*5.9%*	*6.7%*	*74.1%*

As a practical matter, the terminal value component often accounts for the largest portion of value in a DCF model. It follows that mistakes made within the terminal value calculation often have a greater impact upon the final value conclusion. Accordingly, well founded analysis is important when developing the terminal value's inputs and assumptions. The graphs which follow[2] indicate the terminal value's relative contribution to the total present value of cash flows pursuant to various assumptions about the DCF model.

[1] This term is sometimes also referred to as the "post-forecast", "residual", or "continuing" value.

[2] Both graphs assume an explicit forecast period of 5-years length, with a 12% nominal discount rate, annual inflation of 2%, and no real growth (unless otherwise indicated).

IN THIS ISSUE

The *Business Valuation Digest* is the publication of The Canadian Institute of Chartered Business Valuators. It is published semi-annually and is supplied free of charge to all Members, Subscribers and Registered Students of the Institute.

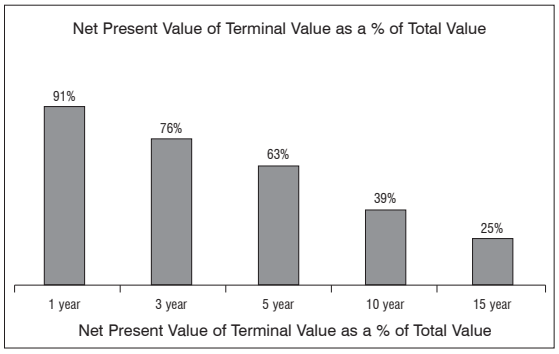
Statements and opinions expressed by the authors and contributors in the articles published in the Digest are their own, and are not endorsed by, nor are they necessarily those of the Institute of the Editorial Advisory Board.

EDITOR:
Farley Cohen
EDITORIAL SUBCOMMITTEE:
Mark L. Berenblut, CA, CBV
Howard Johnson, CA, CBV, CPA
Blair Roblin, CBV, LLB

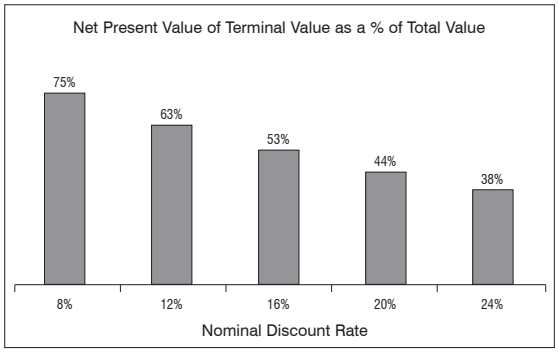
For more information. please contact:
The Canadian Institute of Chartered Business Valuators
277 Wellington St West, 5th Floor
Toronto, Ontario M5V 3H2
Tel: 416-204-3396
Fax: 416-977-8585

THE CANADIAN INSTITUTE OF CHARTERED BUSINESS VALUATORS

In many companies there is little if any emphasis on long-term financial forecasting due to the inherent uncertainty associated with such forecasts and the impracticality of their use for operational planning purposes. In practice, very few financial forecasts exceed 5 years in length, and many tend to be 3 years or less. The absence of a reliable long-term financial forecast will place increased reliance upon the DCF model's terminal value estimate.

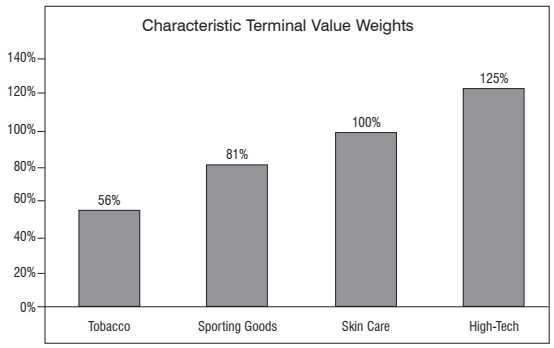


The risk inherent in an enterprise also influences the significance of the terminal value component. As the discount and capitalization rates applied to the cash flow forecast increase, the terminal value's relative contribution to the value conclusion decreases.



This makes intuitive sense, as the evaluation of relatively risky enterprises (e.g. software development startups or pharmaceutical research companies) often tends to place a heavier emphasis on the near-term financial performance of the company.

The unique risk profiles and forecast cash flow patterns of particular industries can also influence a terminal value's significance. Previous studies have determined the characteristic terminal value weights for some industries. For instance, tobacco industry participants tend to have terminal values which account for 56% of the total company value, in the sporting goods industry this figure is 81%, for a typical skin care business it is 100%, and for a high tech company the average is 125%.[3]



In light of these findings, it becomes clear that an accurate assessment of the DCF model's terminal value is of central importance. Small oversights and technical flaws in its calculation can result in a surprisingly material impact on the overall value conclusion. The remainder of this article will attempt to identify and briefly discuss some of the more frequent errors made in the derivation of a terminal value.

Terminal Value Overview

It would clearly be impractical to explicitly forecast a business' prospective cash flows year-by-year in perpetuity. Instead, practitioners usually apply a terminal value calculation which is representative of the value of all discretionary cash flows[4] expected to be generated after the explicit forecast period. In a typical DCF model the terminal value is determined through the use of a continuing value formula[5], in the form of:

$$V_n = \frac{D_{n+1}}{(R - i - g)}$$

[3] Valuation: Measuring and Managing the Value of Companies (4th ed.): Koller, Goedhart, and Wessels (2005, p. 272). The weights were all calculated using a cash flow model horizon eight years into the future.

[4] This article will contemplate discretionary cash flows to the firm (see next section), although alternative approaches exist. Much of the content here will also be relevant when examining the alternative approaches.

[5] A continuing value formula determines the present value of a perpetual cash flow stream.

Where:

V_n = Terminal value, n years from the present

D_{n+1} = Maintainable discretionary cash flow estimate, beginning one year after the explicit forecast period

R = Required nominal rate of return for investors

i = Expected rate of inflation

g = Real growth rate in discretionary cash flow

Pursuant to this formula, a maintainable discretionary cash flow estimate is divided (or "capitalized") by an appropriate capitalization rate. The rates of return used in a DCF analysis (both the discount and capitalization rates) and the discretionary cash flows to which they are applied are interrelated. A capitalization rate is reflective of the risk associated with achieving the maintainable discretionary cash flows projected within the terminal value determination, as well as the inflation and real growth expectations.

Given a maintainable discretionary cash flow that is receivable one year after the end of the explicit forecast period, and the assumption that the rate of real growth remains constant,[6] this formula solves for the present value of an infinite series of future cash flows (as at the end of the explicit forecast period). The value of this term is then further discounted (using the same rates applied within the explicit cash flow forecast) back to the valuation date.

Errors related to the terminal value can be broadly categorized by the three stages of terminal value calculation:

A. The calculation of maintainable discretionary cash flows (D_{n+1});
B. The calculation of the capitalization rate (R- i - g); and
C. Discounting the terminal value to the valuation date ($V_n/(1+R)^n$).

Remarks on terminal value errors have been grouped by the relevant stage (i.e. either A, B, or C above) in the pages that follow.

Maintainable Discretionary Cash Flows

Developing the maintainable discretionary cash flow estimate is one of the most difficult and time-consuming elements in preparing a terminal value estimate. It is also (arguably) the most likely of the three stages examined to contain an inappropriate assumption. In order to be satisfied regarding this estimates' reasonability, the valuation professional must develop a full understanding of the business' operations and marketplace opportunities.

Discretionary cash flows are defined herein as EBITDA (Earnings before Interest, Taxes, Depreciation and Amortization) less cash income taxes, capital investment requirements[7] and any incremental net trade working capital[8] necessary to generate the projected cash flows.

Discretionary Cash Flow Calculation

EBITDA	$150
Less:	
Cash income taxes	(55)
Capital investment requirements, net of tax shield	(35)
Incremental net trade working capital	(10)
Discretionary cash flow	$ 50

This definition of discretionary cash flow has been determined before debt servicing costs and, accordingly, the discounted value of the prospective discretionary cash flows and terminal value (together with certain adjustments to account for items not contained within the projections, such as the present value of existing tax pools) represent the 'enterprise value' of the business. Interest bearing debt and equivalents must then be deducted from enterprise value to arrive at the en bloc equity value of the business.

Some of the most common errors made in the estimation of a maintainable discretionary cash flow component are discussed below:

i) The maintainable EBITDA estimate is not reflective of prospective operating results

Prospective operating results are often derived from historical operating results. However, in

[6] Because the model simplistically assumes a constant growth rate, it is generally applied only once the company has matured to the point where it is anticipates stable (low-to-moderate) growth rates.

[7] Both sustaining and growth expenditures, net of their related CCA tax shields.

[8] Defined as the amount by which current assets related to the principal operating activities of the business exceed current liabilities that have arisen from the business' operating activities.

certain circumstances it may be appropriate to adopt EBITDA levels not previously achieved where a potential for cash flow growth (or decline) exists. In particular, historical results may not be indicative of prospective operating cash flows where:

- there have been major changes in the industry, such as substantial consolidation of companies, the entrance of new competitors, or a significant change in consumer behavior;
- there have been significant changes in the business' principal operations, such as the addition or disposition of a major division, substantial changes in management personnel or philosophy, or a considerable capital (capacity) expansion; or
- the business operates in a cyclical industry and historical operating results are reflective of a 'peak' or 'trough' within this operating cycle.

Nevertheless, historic operating results are often an effective source of information from which to develop prospective operating results. When historical results are relied upon to assist in the estimation of prospective maintainable EBITDA, there must be reasonable assurance that historical results are reflective of future maintainable results.

When considering historical performance in the formulation of a maintainable discretionary cash flow, individuals will also sometimes fail to adjust the historic operating results to remove the impact of unusual, non-recurring and non-arm's length transactions. Examples of such adjustments may include instances where:

- owners of privately-held businesses draw compensation and benefits disproportionate to the time and effort they expend in the business. These excessive drawings are a form of return on investment. On the other hand, inappropriately low drawings contribute to a profit overstatement. Economic compensation for services performed must be segregated from return on investment. Accordingly, EBITDA should be adjusted up or down to reflect appropriate owner/management salaries;
- there are non-recurring items within the business' financial statements. This might include expenses relating to the launch of new product lines, capacity expansion, moving expenses, losses caused by labour problems, pension plan service liabilities, and so on. A thorough analysis and understanding of all income and expense items is essential when determining whether or not EBITDA needs to be adjusted;
- a business deals on a non-arm's length basis with other parties. In these cases it often is difficult to ascertain whether costs and revenues equivalent to arm's length costs and revenues are being paid and received. Where non-arm's length transactions are being consummated at non-commercial rates, cash flow (and possibly asset) adjustments may be necessary. These adjustments are particularly important in situations where the business interest on only one side of the non-commercial transaction is being valued. A skewing of the operating income to one organization or the other may result in erroneous value conclusions; and
- the business has cash flows related to its redundant assets. Because the net realizable value of redundant assets is added to the enterprise value of the business, it is assumed the prospective revenue and expense streams associated with these assets will terminate. The revenues and expenses relating to the redundant assets should be removed from historical results.

As absolute accuracy is not a reasonable expectation in this input, maintainable EBITDA is often expressed as a range which encompasses the spectrum of operating cash flow expectations.

ii) Income tax assumptions are not consistent with the prospective taxable income

Income taxes are deducted from EBITDA to determine operating after-tax cash flow. The tax rate utilized in this calculation is normally the effective corporate tax rate on active business income. However, where EBITDA does not approximate taxable income[9] before consideration of capital cost allowance[10] a more detailed

[9] The deductibility of interest payments for tax purposes is ignored at this point in order to present discretionary cash flows which reflect no bias regarding the firm's capital structure.

[10] Or 'CCA', being the term used in the Canadian Income Tax Act for depreciation and amortization allowed for income tax purposes.

income tax calculation may be required. For instance, estimated maintainable EBITDA may include certain items that are not fully deductible for income tax purposes (e.g. meals and entertainment expenses), or where there is a timing difference between an expense for financial accounting purposes and an allowable deduction for income tax purposes (e.g. warranty reserves).

It is also important that the income tax rate applied is appropriate to the business considered when determining terminal value. For example, the Canadian corporate income tax system provides for various situation-specific income tax rates, including tax reduction opportunities such as the 'Small Business Deduction' and the 'Manufacturing and Processing Profits Deduction'.

iii) Capital expenditures are not consistent with the prospective cash flow levels

The sustaining capital expenditure estimate represents the expected annual investment in fixed assets that a business must make to enable it to continue to generate the estimated maintainable EBITDA and projected growth. Estimating the appropriate level of sustaining capital reinvestment requires an understanding of the business' operations combined with thorough analysis of its historic and prospective capital and repair and maintenance spending in relation to its operating capacity. Although this task is an important (and often material) consideration in many valuations, errors will sometimes occur when an inappropriate capital expenditure estimate is adopted.

Determining the appropriate level of future capital reinvestment must be done on a basis that is internally consistent with the estimate of maintainable EBITDA and the capitalization rate. This generally requires the following:

- an analysis of past and prospective repair and maintenance expense. In this regard, note that privately owned businesses (which tend to be influenced by income tax minimization opportunities as opposed to enhancing earnings per share) are prone to expense what a public company (whose managers are driven in part to report enhanced earnings) is prone to capitalize;
- a review of past and prospective fixed asset additions and a segregation of the amounts between maintaining existing practical capacity and expenditures related to real growth in capacity. This process requires some insight where a specific capital expenditure combines elements of both replacement capital and incremental capacity expansion;
- assessing industry trends in terms of capital spending. Where competitors are undertaking aggressive capital expansion programs, the business being valued may have to increase capital spending in order to maintain its market share and generate prospective EBITDA at the levels estimated;
- inquiring about the current condition and technology of the business' operating equipment, and prospective changes to that equipment; and
- discussing any necessary sustaining and growth capital investment with management and, where considered necessary, with industry equipment and related technology experts.

iv) Forecast capital expenditure and working capital requirements are inconsistent with real growth projections

Where the capitalization rate includes an element of real growth (that is, growth in excess of inflation), annual capital expenditures beyond those accrued to maintain existing EBITDA levels are likely required. Therefore, estimated annual capital requirements should reflect an amount for the capital acquisitions necessary to generate the anticipated real growth rate.

Any estimate of incremental capital requirements should also take into account factors such as practical capacity limitations of the existing facilities and equipment, when additional capacity will be required, and what the cost will be. It may also be prudent to review the fixed assets currently held within each CCA class and obtain an estimate of their remaining useful life and replacement cost.

Where the capitalization rate used in the terminal value formula reflects a real (i.e. net of inflation) weighted average cost of capital, an adjustment

for annual net trade working capital normally is not required. This assumes that existing net trade working capital levels will only increase at the annual rate of inflation assumed within the determination of the capitalization rate.

However, where the capitalization rate considers an element of real growth in the post-forecast period some incremental net trade working capital is required to finance that growth. That portion of after-tax operating cash flow required to finance incremental net trade working capital requirements is not discretionary, and should be deducted from the determination of maintainable discretionary cash flow.

Capitalization Rates

A discount rate is used to convert a (finite) series of distinct forecast cash flows to their present value. This rate is applied to the cash flows within the explicit forecast period and the terminal value estimate in a DCF calculation. Conversely, a capitalization rate is used to convert a single, perpetually-recurring cash flow into a point estimate of its present value. The capitalization rate is applied to the maintainable discretionary cash flow estimate in the determination of terminal value. The inverse of the capitalization rate is referred to as the 'multiple'.

The capitalization rate (or rates) adopted should be reflective of a weighted average cost of capital[11] and must also be adjusted to reflect any real and inflationary growth expected above the level of maintainable discretionary cash flow chosen in the terminal value determination.

The capitalization rate formula can be expressed as:

Capitalization Rate =
(Cost of Capital) - (inflation) - (Real Growth)

The derivation of capitalization rates involves a significant degree of subjectivity, but there are a handful of areas which can be identified as sources of recurring errors. The most common problems noted in the derivation of this component are addressed below:

i) Mistakes in the application or calculation of the Cost of Capital

In some cases the cost of capital adopted is inappropriate given the type of maintainable discretionary cash flow being capitalized. For instance, where discretionary cash flows reflect the proceeds to all stakeholders in the firm, terminal values are sometimes mistakenly capitalized using only a cost of equity capital, resulting in a significant understatement of value.

Where maintainable discretionary cash flows have been determined before interest expense (as they have here), the capitalization rate should reflect a weighted average cost of capital ('WACC'). This is a rate of return on the blended capital of the business, including both its equity and debt components.

Mistakes in the calculation of WACC adopted within the terminal value are sometimes seen. One familiar formula for determining this WACC relies upon three independent pieces of information:

- the unlevered return on equity. This is the rate of return required by equity holders assuming no debt in the business. Stated another way, the unlevered return on equity is a function of the business' operating risks not its financial risk;
- the debt to equity ratio. This is the extent to which the capital structure of the business includes interest-bearing debt or other financial leverage.[12] The debt to equity ratio used in calculating WACC should be reflective of a long-term capital structure that is considered appropriate given the circumstances and prospects for both the business and the industry in which it competes. Note that this ratio should be determined using the market value of the equity (rather than its book value) and may differ from the existing debt to equity ratio of the business being valued; and
- the income tax rate. The tax rate used should be the marginal rate at which interest expense is deducted. When properly calculated, the WACC formula accounts for the tax deductibility of interest expense.

In most cases, the marginal income tax rate is readily determined, but the appropriate capital structure and the unlevered rate of return on equity will require careful analysis and judgment.

[11] Where maintainable discretionary cash flows have been determined before interest expense.

[12] Excluding trade payables and similar non-interest bearing trade or 'normal course' debt.

ii) The capitalization rate fails to make an appropriate adjustment for inflation

The maintainable discretionary cash flow estimate set out within the continuing value formula is unavoidably static. Hence, the estimate of ongoing cash flow will necessarily be expressed in real terms (i.e. net of inflation). The WACC component is often determined on a nominal basis for use as a discount rate within the explicit forecast cash flow period. In some instances the individual preparing the DCF model will forget to adjust the WACC calculation to remove the element of inflation, resulting in a potential understatement of the terminal value.

Adjusting the capitalization rate for inflation makes the assumption that a business is able to increase its prices to offset any reduction in currency value. It should be noted that this is not always the case - particularly in very competitive industries.

iii) The real growth assumption is not reflective of an ongoing, sustainable level

As above, the static cash flow estimate adopted will not reflect any future growth above and beyond the inflation rate (i.e. real growth). Where a modest level of continuing real growth can be expected, the capitalization rate should be adjusted accordingly.

However, in order to do this the explicit forecast period must be long enough such that the business reaches a 'stable state' of operations by the end of the period. The steady state concept anticipates that certain key financial attributes of the company hold in perpetuity. This is necessary because any continuing-value formula relies upon a handful of important assumptions in order to be effective. These assumptions include:

- the company earns constant margins, maintains a constant capital turnover, and, therefore, earns a constant return on existing invested capital;
- the company grows at a constant rate and invests the same proportion of its gross cash flow in its business each year; and
- the company earns a constant return on all new investments.

These can be difficult assumptions, particularly for firms anticipating significant near-term growth (e.g. start-up software) and firms within cyclical industries (e.g. pulp and paper). If any of these assumptions are found to be unreasonable, the terminal value estimate may result in an unrealistic forecast of the company's performance after the explicit cash flow forecast horizon.

Where near-term growth is expected to be high, with subsequently sustainable growth being maintained at modest (or non-existent) levels, it is generally preferable to extend the explicit forecast approach in contrast to adopting a capitalization of discretionary cash flow methodology which uses a 'blended' capitalization rate comprised of a high short term real growth component and a low (or non-existent) long term real growth component.

iv) Capitalization rates are derived from poor comparable data

Public equity markets and capital transactions will sometimes provide a relative measure of corporate value by expressing price as a multiple of some financial metric, such as EBITDA or EBIT. These indications of value can sometimes be dissected using principles similar to those introduced herein in order to determine their underlying assumptions.

In some cases financial professionals will rely upon the data derived from public equity markets or transactions involving allegedly comparable businesses to provide an implied capitalization rate. This can be a hazardous approach as there are rarely two perfectly comparable organizations and sources of publicly-available information are often incomplete and clouded by peripheral factors (e.g. strategic purchaser premiums and minority interest discounts).

Determining the NPV of the Terminal Value Estimate

Capitalizing an estimate of maintainable discretionary cash flow will produce the terminal value, which is representative of the value (as at the end of the explicit forecast period) of all post-forecast discretionary cash flows. The terminal value must then be adjusted to reflect its present value by discounting it at the same rate applied to the explicit cash flow forecast.

There are two common mistakes seen when discounting the terminal value to present value:

i) Failure to adjust for the inherent discounting effect of the continuing value formula

The present value of the terminal value estimate should be determined using a discount factor identical to the one applied to the last year of the explicit forecast period. This is because the

capitalization rate inherently assumes a perpetual stream of discretionary cash flows beginning one year forward. That is, the act of capitalizing a cash flow effectively discounts that cash flow by one additional year. For example, if the explicit cash flow forecast is five years in length, followed an estimate of the maintainable discretionary cash flow (for the sixth year and thereafter), it would be appropriate to discount the resulting terminal value estimate by 5 years (assuming end-of-year cash flows).

ii) Failure to consider the intra-period timing of the prospective cash flows

The timing of a business' cash flows within each discrete forecast period needs to be considered when developing the discount factor, although in practice this is not always done.

There are two common methods for reflecting cash flow timing:

End-of-year payments – This method is applied when cash flows are received as a single payment at the end of a year. The terminal value estimate, along with the explicitly forecast cash flows, are discounted by a whole number which is representative of the distance (in years) from the valuation date. Alternatively, a payment that is due at the beginning of Year t may be treated as a payment due at the end of Year t-1. For example, payments due at the beginning of Year 2 and Year 3 will be treated as if they are due at the end of Year 1 and Year 2.

$$NPV = \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{0.5}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{1.5}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{2.5}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{2.5}}$$

Mid-year payments – This method is applied when cash flows are received as a single payment mid-year or when payments occur at regular intervals throughout the year. The terminal value estimate, along with the explicitly forecast cash flows, are discounted by a number which is representative of the average distance from the valuation date (where t = 0.5, t+1 = 1.5, and so on). Where cash flows are received unevenly over the course of a year (and this pattern of distribution can be reasonably estimated) a more elaborate weighting process may be necessary.

$$NPV = \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{1}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{2}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{3}} + \frac{\text{Explicit Cash Flow}}{(1 + \text{Discount Rate})^{3}}$$

Conclusions

The preparation of a reasonable terminal value estimate is among the most challenging tasks within any DCF model. A cursory analysis of the business' operations or a technical mistake can result in a materially adverse impact on the value conclusion. Those who regularly rely upon or prepare valuations in the course of their profession would do well to familiarize themselves with the issues raised within this article.

It is my hope that this article will achieve two things. In the first instance I hope to increase the level of professional vigilance applied in the preparation and application of the terminal value component by drawing attention to its significance within a DCF valuation, and its inherent challenges. The onus is squarely on the professional to determine the fundamental reasonability of each assumption made within this calculation. This is no small task, and indeed should require in-depth analysis of both the business and the industry in which it operates.

Secondly, I have attempted to make this material accessible to the end users of an estimate of value, whether they be financially savvy individuals or otherwise. A better understanding of the various considerations which underlie a calculation of economic value will ultimately lead to more insightful contributions during the valuation process and an improved ability to assess the quality of the final product. An

informed and knowledgeable client can only serve to improve the quality and efficiency of the valuation process.

Chris Polson, CFA, CBV, is an Associate with Veracap Corporate Finance Limited in Toronto. Chris' scope of experience includes providing valuation and related advisory services for buy/sell and related party transactions, fairness opinions, shareholder disputes, and employee stock ownership/option plans across a wide variety of industries. (cpolson@veracap.com)

This article is meant to encourage general best practices only and is not intended as a substitute for professional advice. Specific situations or circumstances may warrant alternative approaches.

Estimating the Remaining Useful Life of Intellectual Property

By David Bogus

Inherent in the typical economic analysis and/or valuation of an intellectual property is an estimation of the subject property remaining useful life. This discussion explains how the estimation of a remaining useful life is considered in each of the generally accepted intellectual property valuation approaches. This discussion further describes (1) the various methods that are commonly used to estimate the intellectual property remaining useful life and (2) the various factors that typically affect the intellectual property remaining useful life.

Introduction

Virtually any assignment involving an economic analysis of intellectual property (IP) involves the estimation of the expected remaining useful life (RUL) of the subject IP. This statement is true regardless of which IP valuation approach—cost, income or market—is used by the analyst. For IP, and for most other intangible assets, the RUL can generally be defined as the period from (1) the subject IP valuation date to (2) the subject IP date of retirement from service. Typically, this RUL estimate equates to the remaining period over which the subject IP may be profitably utilized.

Given the importance of RUL measures to any IP economic or valuation analysis, this discussion will explore:

1. RUL determination by IP valuation approach,
2. relevant life measures that should be considered when determining an RUL,
3. data commonly used in the RUL estimation,
4. definitions of some common terms used in an RUL analysis, and
5. examples of both qualitative and quantitative IP RUL analysis.

RUL Determination—By Valuation Approach

The application of any of the three generally accepted intellectual property valuation approaches—the cost approach, the income approach, and the market approach—typically requires the estimation of the IP RUL. The outcome of the RUL estimation generally influences the value indication concluded by each valuation approach.

Cost Approach

In the cost approach to IP valuation, depreciation, or obsolescence, is a key component of the valuation process. While a number of qualitative factors may be considered in an estimation of obsolescence, a life analysis—and an RUL estimation—can assist the analyst in quantifying the subject IP obsolescence measures.

One measure of IP obsolescence (or value depreciation), involves the determination of the ratio of (1) the effective age of an IP asset to (2) the total expected life of the IP asset. Once this ratio is determined, an analyst can calculate the mathematical complement to this ratio in order to estimate the expectancy life factor. The expectancy life factor can then be multiplied by the IP estimated cost new in order to estimate the subject IP value.[1]

An example of this expectancy life factor calculation is presented below:

$$\textit{Expectancy Life Factor (f)} = 1 - x$$

$$\textit{Value of Intellectual Property} = f \times \textit{Cost New}$$

With all other factors being equal, a lower expectancy life factor (resulting in a longer RUL) typically leads to a higher value indication.

Income Approach

An income approach IP valuation will typically involve performing either:

1. a yield capitalization method, which calculates the present value of a nonconstant stream of projected economic income over a discrete time period, or
2. a direct capitalization method, which consists of calculating the present value of a constant or constantly changing stream of projected economic income over a discrete time period.

In either case, the discrete time period over which the economic income is projected is influenced by the estimated RUL. All else being equal, the longer the estimated RUL (which in turn results in a longer discrete time period over which the economic income will be projected) the higher the IP value. Naturally, it follows that the shorter the estimated RUL, the greater the impact any variation in this estimated RUL will have on the overall IP value.

Market Approach

When applying the market approach, the RUL estimation serves as a basis for both selecting and adjusting market transactions involving IP similar to the subject IP. A large variance in the estimated RUL between the subject IP and the guideline IP transactions, may be a cause to reject the market data as invalid for comparison purposes.

In certain instances, the magnitude of this RUL variance may result in the analyst completely rejecting the market approach. In the case of a smaller difference in the RUL between the subject IP and the guideline IP transactions, a valuation adjustment may be warranted in order to improve the comparability of the IP.

From an economic analysis perspective, no two properties from the same IP category are entirely alike. Therefore, similar IP will not always have a similar RUL. Instead, careful analysis and judgment are required in order to have a sound basis for the application of market-derived data involving IP transactions.

As indicated above, the determination of RUL is a necessary component of virtually any IP economic analysis assignment. The following discussion focuses on the determinants that are relevant when estimating the IP RUL.

Relevant Life Measures That Are Considered When Determining an RUL

There are several different life measures that are typically analyzed when performing an IP RUL analysis. The following discussion summarizes (1) the more common IP life measures and (2) the bases for determining the influence of these measures on the respective RUL estimates.

Analytical Life

Analytical life measurements rely on historical asset placement and retirement data either (1) of the subject IP or (2) of selected guideline IP. These historical placement/retirement data are analyzed in order to develop a set of survivor/mortality patterns. These survivor/mortality data can be analyzed to estimate the following for the subject IP: (1) total life, (2) RUL, and (3) expected future retirements of the IP.

This quantitative RUL analysis often incorporates curve fitting procedures. The curve fitting procedures are used to determine the attrition rate associated with the economic income derived from the subject IP.

Contractual Life

A contractual life analysis results in a definite life estimate based on the terms of commercial contracts governing items such as the use, exploitation, and transfer of IP between parties. This estimate of the RUL would be based on the documentation involving the contractual commitments governing the subject IP, including: (1) stated contract renewal terms and (2) the history of contract renewal.

Economic Life

An economic life estimate uses a quantitative analysis to determine the ability of the subject IP to justify its continued use through the generation of significant economic income. Often, the economic life of IP can be affected by market factors that are beyond the control and influence of the subject IP owner/operator.

For example, changes in consumer behavior or preferences can reduce the expected economic benefit of a patent-protected product to a de minimus level, thereby decreasing the economic life of the IP.

Functional Life

The length of time over which the subject IP is intended to perform its intended function is referred to as its functional life. While still a quantitative analysis, the IP functional life measure may be superseded by other life measures—such as economic life.

When the subject IP can no longer perform the function for which it was intended, the IP has reached the end of its functional life.

Judicial Life

For valuation purposes, judicial life relates to the term of economic damages as awarded by a judge or similar entity. For example, a judicial finder of fact:

1. may determine both the beginning and ending date of an infringement action during which time economic damages were suffered by the affected party or
2. may determine a time period over which remuneration must be made.

Physical Life

As suggested by its name, physical life is perhaps the most tangible of the available IP life measurements. Physical life simply refers to the time it is expected to take for an asset to be physically depleted. Therefore, this life measurement is typically the least relevant RUL measure when performing an IP economic analysis or valuation

Statutory Life

Statutory (or legal) life is a definite life estimate derived from the term of the subject IP's legal registration, as determined by statute.

For example, IP such as patents and copyrights typically have a specific legally defined period lasting from date of granting or a specified expiration date/event. In either case, the life of the IP, from a statutory perspective, is fixed and is not subject to change outside of legislative action.

Technological Life

Technological life is another qualitative life measurement influenced by technological advancement. Newer technologies often result in less expensive, more effective products that serve to eliminate demand for the legacy IP. Such advancements can make the IP technologically obsolete prior to the end of its functional or statutory life.

For those IP assets covered by a definite life analysis technique, calculation of the RUL is relatively straightforward. However, for those IP assets requiring either a qualitative or quantitative approach, more complex RUL measures are required.

Data Commonly Considered in the RUL Estimation

Depending on the type of IP, a variety of age/life data may be utilized in the RUL analysis. A discussion of some of the more commonly used age/life data is presented below.

Age/Life Data Summary

Some of the data used in an RUL estimation are used qualitatively, as background information to assist in making life estimates based on professional judgment. However, when quantitative data—such as placement and retirement data—are available, these age/life can be used in a quantitative actuarial-type analysis. Quantitative analysis can also be performed using such data as historical or projected revenue, unit sales volume, and so forth.

IP Contracts

Any commercial contracts may be useful in an RUL estimation. Such commercial contracts include:

1. use, development, or exploitation contracts,
2. inbound and outbound license agreements, and
3. intercompany or other transfer price agreements.

Information regarding historical contractual renewals would also be relevant to the IP RUL analysis.

Owner/Operator Financial Statements

Both historical and projected financial statements can be used in a variety of ways in an IP economic analysis. For example, an income approach valuation analysis may rely on either historical or projected financial statements. Alternatively, the historical revenue related to the subject IP may be useful in estimating the IP RUL.

Judicial Decisions/Court Orders

In litigation, judicial decisions or court orders regarding the terms of historical damages are relevant. The judge may also rule on the time period of any future damages. These judicial

orders are particularly relevant in cases where the litigation has been bifurcated into: (1) a liability phase, and (2) a damages phase.

In the liability phase, the judge may rule on relevant time periods that could affect the analyses prepared for the damages phase of the litigation. For example, a judge may order that the infringing party may have to pay: (1) for any historical damages suffered by the IP owner, and (2) a fair royalty rate for the future use of the IP.

Operational Documents

Typical operational documents gathered by the analyst include inventories or lists of identification numbers, dates, and descriptions of items such as: engineering drawings, mylars, schematics, blueprints, product/process flowcharts, manuals, lines of computer software source code, memos, procedures, policies, packaging materials, or contracts.

Relevant document dates may include creation dates, revision dates, and cancellation/retirement dates.

Registration Documents

IP registration documents include (1) patent application and issuance documents, (2) trademark application, registration, and renewal documents, and (3) copyright application and certificate of registration documents.

In addition to the subject IP registration documents, the analyst may review registration documents related to similar active and/or cancelled/abandoned IP. The analysis of registration documents provides dates that verify the subject IP age as well as the subject IP existence.

Technology Data

Relevant technology data includes information about prior related technologies and competitive technologies. Technology information may be found in patents, patent applications, marketing materials, technical journals, or conference proceedings.

Start dates and stop dates of prior generations of technology may be useful in estimating the IP RUL. In addition, qualitative life cycle or technology replacement data may be relevant to the RUL estimation.

Definitions of Common Terms

In order to gain a proper understanding of the methods and conclusions drawn from an RUL estimation, it is necessary to define some of the terms commonly used in an RUL analysis. To do so, it may be helpful to think of the terms in the context of a human actuarial study.

Let's consider the actuarial data that concludes that an average life expectancy for human males is 80 years. In other words, a human male born today can expect to have a life span of 80 years. However, that does not mean that a human male that is currently 78 years old has a remaining life of only two years. Such an individual would have already survived such factors as: (1) infant mortality and (2) teenage death that resulted in the above 80 year life calculation. Having survived to date, the 78 year old male has a higher probability of achieving an age beyond 80 than a newborn.

For our purposes, let's assume that actuarial data suggests that such a 78 year old male would have an estimated remaining life of seven years. With this background, we can consider that this type of gradual "mortality" or "decay" will be factored into an IP economic analysis using an RUL analysis.

Keeping the above actuarial analogy in mind, we can now begin to define and identify some of the key terms used in an IP RUL analysis.

Age

The analyst in an IP economic analysis needs to be specific when using this term, as the answer to the age question can differ for various reasons. Therefore, it is important to:

1. select the best definition of age, given the facts and circumstances of the assignment,
2. document how age is to be defined, and
3. consistently use the same definition of age throughout the IP analysis.

Average Life

Average life refers to the expected average life span for a new IP unit. Using the above-described actuarial analogy, the average life of a human male would be 80 years.

Total Life

Total life refers to the age at which the last member of a group of IP units is expected to retire/expire. Returning to the above actuarial example, total life for a group of human males is clearly a finite number.

The total life for a group of IP assets may be more difficult to estimate, as there may be no natural upper limit to the total life of an IP.

Probable Life

The probable life for a particular vintage of surviving IP units is the average expected life of those surviving units. For example, the probable life of a 78 year old human male may be 85 years. This 85 year estimate represents an average of the expected lives of members in the group. Of a group of 78 year old males, a certain number are expected to survive to age 79, a certain number are expected to survive to age 80, and so on.

Average RUL

The average RUL for a particular age group of surviving IP units is equal to the probable life for that group of units less their average age. This measure represents the time the IP group, or a specific unit of the IP group, is expected to survive after the analysis date.

Returning to the actuarial example, the average RUL for a group of 78 year old human males is seven years. This conclusion is true even though the average life of a human male is only 80 years.

Survivor Curve

A survivor curve represents the relationship between (1) age of a population and (2) percent surviving for a population. A survivor curve for a group of IP assets can be determined using placement and retirement data. The survivor curve starts with 100 percent surviving at age zero, with the percent surviving decreasing over time.

Probable Life Curve

A probable life curve represents the relationship between (1) age (or percent surviving) and (2) probable life. The probable life of an IP asset when its age is zero (at which time the percent surviving is 100 percent), is equal to its average age.[2]

Given this background information, we can now embark on describing the common procedures of both qualitative and quantitative IP RUL analyses.

Qualitative Life Analysis

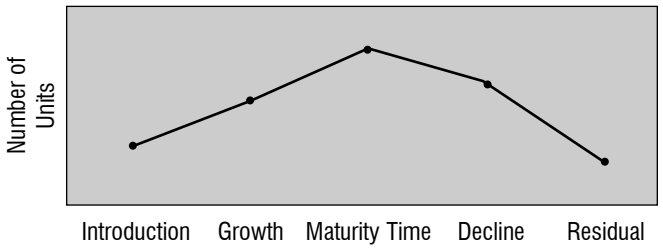
Given the nature of the IP marketplace and the relative speed with which technological advancements can occur, a qualitative life analysis of IP assets typically involves life cycle analysis procedures. This type of analysis allows an examination of technological trends and futures, resulting in a logically derived estimate of when technological changes may take place in the subject IP market.

Life cycle analysis takes into consideration that a new product goes through five stages of development, as outlined below:

- Introduction — At this stage, the emphasis is on building and developing both product awareness and market acceptance.
- Growth — In the growth stage, a product gains market acceptance and increased market share.
- Maturity — Strong growth in demand slows due to increased competition.
- Decline — Superior economic and/or functional alternatives arrive in the market in the form of substitute products.
- Residual — Small quantities of product remain in the market primarily for maintenance and replacement purposes.

Graphically, a typical product life cycle is depicted in Table 1, with the y axis representing a unit measure (such as revenue) and the x axis serving as a measure of time (such as months or years).

When estimating IP RUL, it is not necessary to measure actual chronological age. Rather, it is important to identify the stage of the product life cycle that the IP currently inhabits. By determining where the analysis date fits along the product life cycle curve, it is possible to estimate the subject IP RUL.



Quantitative Life Analysis

Retirement Rate

In many cases, retirement data related to a group of IP assets are limited. Often, data can be provided that can quantify (1) the number of IP assets on hand at the beginning of the last three years and (2) how many IP assets were discarded during those three years. However, the age of the discarded/retired IP assets may not be known.

In that case, measuring the ratio of the number of retired assets to the number of IP assets at the beginning of the year can assist in developing an IP retirement rate. To estimate future turnover and

average life, annual turnover rates may be assigned different weights, depending on (1) interviews with the IP owner/operator or (2) the experience/judgment of the analyst.

A simplified example of this RUL measure based on a retirement rate analysis is summarized in Table 2.

Table 2
Retirement Rate Analysis and RUL Based on a Retirement Rate Analysis

	Year 1	Year 2	Year 3
Number of IP Active at Beginning of Year	240	280	320
Number of IP Retired During the Year	55	72	83
IP Retirement Rate	22.90%	25.70%	25.90%
Average Retirement Rate, Rounded			25%
Estimated RUL = 1/Retirement Rate			4 years

Expected Decay or Depreciation

The obsolescence, or value depreciation, for an IP asset or a collection of IP assets is the expected loss in IP number or utility over time. This could mean an expected decrease in IP royalty revenue, a decreased unit/dollar sales volume, or the expected of certain IP over time. Ideally, the estimation of future decay for a group of IP assets considers the age of each individual IP.

The historical decay of a group of IP assets is illustrated in Table 3. In this example, the number of active IP units at the beginning of year x is 260. The number of IP units at the beginning of a year is equal to:

number of IP units at the beginning of the previous year – the IP unit retirements during the year + the number of new IP units added during the year.

In Table 3, the average RUL is calculated using both mid-year and end-of-year retirement assumptions. For ease of demonstration, it is assumed there are no IP additions during the time period examined.

When retirement data are available (specifically the start dates for all active IP and the start and stop dates for all retired IP for the last several years), it is possible to estimate RUL using more comprehensive techniques—including the calculation of an actual survivor curve. This actual survivor curve may be matched to the standard survivor curves, such as Iowa-type curves and Weibull-type curves, in order to find the best fitting curve type and average age.

The decay of the group of IP assets can then be estimated as a composite of the decay of each age group over time, given (1) the survivor curve type and (2) the average life.

Table 3: Survivor Decay Rate and IP RUL Based on a Constant Retirement Rate Analysis

			Decay/Depreciation		Mid-Year Calculation		End-of-Year Calculation	
Year	Number of IP Survivors Beginning of Year	Retirement Rate	IP Retirements During Year	IP Survivors at End of Year	IP Age at Retirement	Number IP Retiring Times Age	IP Age of Retirement	Number IP Retiring Times Age
X	260	25%	65	195	0.5	32.5	1	65
X+1	227	25%	57	170	1.5	85.5	2	114
X+2	170	25%	43	127	2.5	107.5	3	129
X+3	127	25%	32	95	3.5	112	4	128
X+4	95	25%	24	71	4.5	108	5	120
X+5	71	25%	18	53	5.5	99	6	108
X+6	53	25%	13	40	6.5	84.5	7	91
X+7	40	25%	10	30	7.5	75	8	80
X+8	30	25%	8	22	8.5	68	9	72
X+9	22	25%	6	16	9.5	57	10	60
X+10	16	25%	4	12	10.5	42	11	44
X+11	12	25%	3	9	11.5	34.5	12	36
X+12	9	25%	2	7	12.5	25	13	26
X+13	7	25%	2	5	13.5	27	14	28
X+14	5	25%	1	4	14.5	14.5	15	15
X+15	4	25%	1	3	15.5	15.5	16	16
X+16	3	25%	1	2	16.5	16.5	17	17
X+17	2	25%	0	2	17.5	0	18	0
X+18	2	25%	1	1	18.5	18.5	19	19
X+19	1	25%	0	1	19.5	0	20	0
X+20	1	25%	0	1	20.5	0	21	0
X+21	1	25%	0	1	21.5	0	22	0
X+22	1	25%	1	0	22.5	22.5	23	23
Total number of IP units retiring times age						1045		1191
Divided by number of IP units						260		260
Estimated average IP RUL (years)						4		4.6

Iowa-Type Curves

Iowa-type curves are the 22 survivor curves described in *Statistical Analysis of Industrial Property Retirements*.[3] That textbook provides the mathematical equations, as well as the percent surviving and probably life tables, for each of these curves. In addition, various methods to analyze retirement data are described.

The Iowa-type curves include seven symmetrical curves (called S0-S6), five right-modal curves (called R1-R5), six left-modal curves (called L0-L5), and four origin-modal curves (called O1-O4).

In a typical RUL analysis using Iowa-type curves, the observed survivor curve (based upon observed asset placements and retirements) is compared to each Iowa-type curve over a reasonable range of average lives. Ideally, a least-squares curve-fitting program is used to selects the Iowa-curve that best fits the actual survivor curve.

Once the best fitting Iowa-curve is selected, the analyst can determine:

1. the average life of the IP asset or IP asset group,
2. how to predict the percent surviving past the time period for which actual IP survivor data exists, and
3. how to calculate the probable life of any IP age group.

Weibull Curves

Weibull curves are a family of curves developed by Waloddi Weibull. They are defined by the parameters of shape and scale. When the shape parameter is equal to one, the resulting Weibull curve is an exponential curve. When the shape parameter is equal to two, the resulting Weibull curve is a Rayleigh curve.

The equation for a Weibull survivor function is:

$$\%\ Surviving = exp(-(Age/Scale)Shape)$$

It is noteworthy that the shape exponent is to be applied before the negative sign.

Once this Weibull survivor function equation is algebraically transformed into a linear form, a regression analysis can be performed using actual IP survivor data.

The linear form of the Weibull survivor function equation is:

$$ln(ln(1/s) = B\ ln(t) + c$$

where:

s = percent surviving at time t
B = the shape parameter
t = time, or age
c = the y intercept such that exp(c) = (1/a)B, where a = the scale parameter

The shape parameter is equal to the x-coefficient or slope. The scale parameter is calculated by

solving the exp(c) = (1/a)B equation for a (where c is the y intercept from the regression analysis):

$$a = exp(c)(-1/B)$$

Once the shape and scale parameters are determined, the percent surviving values for the Weibull curve can be calculated. These values can be used to predict the percent surviving after the time period for which actual survivor data are available for the IP group. The average life can be computed as: (1) the scale multiplied by (2) the gamma function of (1 + 1/shape).

One practical problem with the use of Weibull curves in IP RUL analysis is that the curves often "flatten out." That is, the percent surviving indicated by the Weibull curve may not reach zero percent in any meaningful time frame. This may result in unusually long IP RUL estimates (as calculated using the area under the curve to the right of age divided by the percent surviving) as the age of the IP increases.[4]

Summary and Conclusion

An RUL estimation is an integral component of any IP economic analysis/valuation assignment. Both qualitative and quantitative analytical methods may be used, depending on the availability of relevant data. The use of qualitative measures requires the application of professional judgment based on the analysis variables. In addition, an RUL estimation based on technology forecasting and life cycle analysis may also be considered when practical.

Notes:

[1] Robert F. Reilly and Robert P. Schweihs, Valuing Intangible Assets (New York: McGraw-Hill, 1999).

[2] Pamela J. Garland, "Estimating Intellectual Property Remaining Useful Life," Willamette Management Associates Insights, Special Issue 2004.

[3] Robley Winfrey, Statistical Analyses of Industrial Property Retirements (Ames, IA: Engineering Research Institute, Iowa State University, 1953, Revised April 1967 by Harold A. Cowles), p.179.

[4] Robert F. Reilly and Robert P. Schweihs, The Handbook of Business Valuation and Intellectual Property Analysis (New York: McGraw-Hill, 2004).

David Bogus is a manager in the Washington, D.C., office of Willamette Management Associates. David can be reached at (703) 235-4616 or drbogus@willamette.com.

This article originally appeared in the Summer 2006 issue of Willamette Management Associates Insights. It is reprinted here with permission of Willamette Management Associates, www.willamette.com.

Do Tax Courts Understand Valuations?

By Sean Cavanagh, CA, CBV

Recent court cases have demonstrated the Tax Court of Canada (TTC) and the Federal Court of Appeal (FCA) understand and can apply complex valuation principles. They have reiterated what the valuation expert's qualifications should be and the expert's role in assisting the court. The analysis of software and art donation cases in light of the fair market value (FMV) definition provides direction on what is important to the court. This, in turn, should allow experts to prepare their reports with a view to providing the greatest possible assistance.

Expert

The TTC addressed the expert's qualifications in *Morley v. The Queen*, a software tax shelter case. Here, the taxpayer paid for the software with cash and issued a promissory note for the balance. He provided a software valuation to support the FMV as the sum of the cash and note. The Minister did not attribute value to the note and thus presumed the value of the software to be the cash paid. He reassessed, limiting the Class 12 CCA deduction to the cash portion only and declining the note portion. The taxpayer appealed.

The Minister successfully discredited the taxpayer's expert because he did not have a professional designation from the *Canadian Institute of Chartered Accountants (CICA), Canadian Institute of Chartered Business Valuators (CICBV)*, or the CFA Institute. The court did not state which of the three would provide certification; however, the CICBV and CFA Institute provide recognized valuation designations. Therefore, we will refer to the CICBV for guidance.

Fair Market Value

The FMV definition valuators use is different from what the court uses in its decisions. It is advisable for the expert to address this difference directly and explicitly to make his report more useful. The traditional definition as presented by the CICBV is:

> *The highest price, expressed in terms of cash equivalents, at which property would change hands between a hypothetical willing and able buyer and a hypothetical willing and able seller, acting at arms length in an open and unrestricted market, when neither is under compulsion to buy or sell and when both have reasonable knowledge of the relevant facts*

Recent court decisions have referred to the *Henderson v. Minister of National Revenue* definition of FMV:

> *The highest price an asset might reasonably be expected to bring in if sold by the owner in the normal method applicable to the asset in question in the ordinary course of business in a market not exposed to any undue stresses and composed of willing buyers and sellers dealing at arm's length and under no compulsion to buy or sell.*

The common elements of these two definitions are:

1. Highest price,
2. Willing participants,
3. Arm's length, and
4. No compulsion.

The differences are:

1. CICBV refers to the market as open and unrestricted while the court refers to the *disposition in the normal method applicable without undue stress on the disposition*, and
2. The CICBV has the additional criterion that each party must be *reasonably informed* and

the value must be *expressed in cash or equivalents*.

Reviewing the art donation cases of *Malette v. The Queen, Klotz v. The Queen* and *Nash v. The Queen*, will highlight this divergence in FMV.

These cases work because the appellant purchases art at a low price, gets it appraised for a higher price then donates to a charity for a tax receipt at the higher price. They all have this basic element in a variety of contexts. The amount of cash actually paid by the appellant is a fraction of the donation receipt, thus yielding a respectable after tax return.

The question arises, why is there a change of value from the time of purchase to the time of donation? In many cases, this was a few days; in others, it was months. The justification for either a high value or low value brings forth good valuation issues that make the donation cases instructive to valuators.

These cases also show how another valuation principle, blockage, is determinative to value in a manner that may vary from other valuation models traditionally used for notional valuations.

Blockage

The CICBV defines blockage discount as "an amount or percentage deducted from the current market price of a publicly traded stock to reflect the decrease in the per share value of a block of stock that is of a size that could not be sold in a reasonable period of time given normal trading volume." Blockage can be applied to other property; for our purposes here, art will be adapted to the definition.

The Supreme Court decision in *Untermeyer Estate v. A-G. British Columbia*, quoted in *Nash* is interesting for illustrative purposes. In this case, publicly traded shares were deemed to be disposed of at the date of death and taxes were to be paid based on the gain which is a function of the share's cost and their FMV at the time of disposal or deemed disposal. The taxpayer wanted a low price and argued blockage on the shares. The Crown stated blockage did not apply on a deemed disposal:

> *"Where the market price has been consistent and not spasmodic or ephemeral, that price should determine the "fair market value"; no deduction should be made on the assumption that all the deceased's shares would be placed on the market at once, thus depressing the market value, as no prudent stockholder would pursue that course."*

Both parties agreed that the "open and unrestricted" market public stock exchange could not absorb all the shares if disposed of in one day based on historic daily trading volumes. The taxpayer argued FMV on a deemed disposition has to address liquidity issues if all shares were sold on the date of death; he wanted a discount to lower the FMV and hence the taxes due. The Crown stated an orderly disposal would be pursued in the "normal course of business" at a rate the market could absorb.

The Supreme Court favoured the logic behind the orderly disposal versus an immediate sale. The court picked a $2 value that reflected the market value of the preceding year rather than the then-current closing price of $2.20. It appeared the $2 price was arrived at from the lowest price in the preceding 12 months as a conservative estimate of value that appreciated the taxpayer's argument.

In *Malette v. The Queen*, the TTC agreed with *Untermeyer* but was overturned at the FCA. At the FCA, no reference was made to the Supreme Court decision; only to accepted valuation theory:

> *"The need to apply such a discount is a function of supply and demand. When, for any reason, a large number of personal property items come on the market at the same time, a depressive effect on the value of the individual items can occur due to the fact that the number of items offered for sale exceeds the number of willing buyers."*

This rationale seems to depart from *Untermeyer's* assumption of an orderly disposition. The difference is, in *Untermeyer* the shares were not disposed of; in *Malette* the property was disposed of/donated.

The FCA in *Malette* seemed to focus not on a blockage discount as previously defined, but a marketability discount. Marketability is the ability to quickly convert property to cash at minimal cost. The discussion focused on how long the orderly liquidation would take (the Minister's valuator in the case estimated 400 years to sell all of the pieces based on sales history), rather than the effect of a block disposal.

Blockage and marketability discounts both reflect supply and demand issues; the former relates to blocks of identical property disposed of at one

time, while the latter appears to consider singular or differential properties disposed of over time. The former is considered when a formal market, a public stock exchange, exists; the latter where no formal market exists.

Digging further, when there is no ready market and thus a marketability discount may apply, there is still a further discount that relates to the type of property and the speed at which that property can be liquidated. This is known as a liquidity discount. A classic car may be harder to sell than a classic comic book by virtue of the price and, hence, the number of possible purchasers.

Not all valuators agree on the definition and application of various discounts; these concepts are complex. For the courts to determine and grasp how to apply them demonstrates a sophistication warranting an appropriate level of report detail.

Market? Which Market?

Typically, discounts are applied on a value that is derived from public markets. The CICBV FMV definition is the notional "open and unrestricted" market but *Henderson* follows an "ordinary course of business" market and one can imagine how an ordinary market may be different from the notional concept of open and unrestricted, i.e. price v. FMV?

This leads to the *Klotz* case, where a promoter gathered multitudes of art prints for around $50 a piece, then sold them for $300 to taxpayers who donated them to an American university. The taxpayers then received a $1,000 charitable tax credit. There was no capital gain as art is personal use property (PUP) with a deemed adjusted cost base of $1,000.

Klotz contended that the highest price resulted from an orderly (*Untermeyer*) retail sale of each individual print; no blockage. Other prints of comparable artists sold for over $1,000; thus FMV was established in this market.

In *Malette* (a case heard just prior to *Klotz*), the taxpayer donated the art at five times his cost price three months after his purchase. Both the appellant and Minister at the Tax Court level agreed to an FMV at eight times the cost. The retail market seemed to be OK here; however, the Minister wanted a discount. The FCA disregarded the valuations, as the Income Tax Act says the Cultural Review Board has to provide the valuation. This determined FMV materially exceeded the taxpayer's cost for the art. There was no reference to FMV or purchase price.

Bowman ACJ, who gave the *Klotz* TTC decision (which the FCA subsequently supported) before the Federal Court of Appeal ruled on *Malette*, seemed to be cognizant of the blockage discount "will o' the wisp" and steered clear of it completely by stating the most contemporaneous purchase price is the value preference. What was he to do? The SCC said orderly disposal; a colleague agreed but the FCA had not ruled. He was in a tight spot. Bowman said *Malette* was not instructive for *Klotz* while dabbing perspiration from his forehead.

Bowman sidestepped the blockage/orderly disposal question by saying the issue was how much the disposal of 250 prints, not one print, at one time. *Klotz* bought 250 prints and disposed of the same number; therefore, the ordinary business market was the wholesale market not the individual "retail" print market. This was not a departure from *Untermeyer*, as Bowman looked at the liquidity values of the wholesale market.

The senior justice in the TTC now established that appropriate market, not just any market, should be used, and therefore valuation assumptions deriving the highest price will be constrained by ordinary business conditions when the valuator is viewing the open and unrestricted market.

Comparables

Knowing the obvious difference in the retail/wholesale market, the court also was instructive on comparables. They have to make sense. Valuators use other transactions to get a reference point to value and then adjust the comparable transaction for economic differences. The court now understands comparables, thus necessitating greater analysis.

For the art cases, which can be used as a basis of analysis for any other industry, the court differentiated the retail/wholesale market, the type of art, the jurisdiction (New York v. Florida), the artist's target market, sales history, past and current appeal, the age of inventory, the numbers in the series, etc. These are specific requirements to present to the court and the expert's reports in these cases were avoided because they did not.

Value Change

Klotz purchased the prints for $300 and donated them for $1,000 after a few days. The courts asked the smart question: "Why did the FMV

increase so fast after purchase?" There was no discussion as to why the price changed. This issue had to be addressed and good arguments had to be made to legitimize the report. This was not done and this formed the FCA's, main argument against the expert in *Nash*.

For example, one could argue the artists/galleries were in need of cash and thus were under compulsion to sell art at any price. Thus, the $300 purchase price did not represent FMV, as it abrogated an element of its definition: there must be no compulsion to act. The courts acknowledged the fact that good deals could be had in the art market and seemed to be willing to hear these arguments.

The period between purchase and sale/donation is determinative in the court's acceptance of value change without any discussion as to the reason for value change. The principle the court adhered to was that cost leads value the shorter the time span. This is normally true, but a single incident in a short time span can still have significant impact on value. Again, the court demonstrated a commonsense application of valuation principles that the report writers did not address.

Normal Business Transaction

The courts will focus on the motivation for the transaction. The Minister presented these cases as tax motivated; a case where prints were purchased from the financial planner the taxpayer didn't see; nor did the taxpayer know where the prints were purchased or donated. The $1,000 FMV just happened to equal the personal use property (PUP) deemed ACB; Bowman did not consider the possibility of coincidence.

This is an obvious case, but an instructive one. The assumptions the report relies on are more persuasive if they make common business sense in the ordinary market in which the business operates. This may translate into less reliance on complex theoretical valuation models than on real time commercial reality.

Highest Price

Additional guidance can be found in *Maréchal c. La Reine*, an art donation case that found comparables above the taxpayer's cost. Bowman's decision noted:

> *"Where the Board or this Court has the obligation of determining the FMV of a property and is faced with several different figures it does not fulfill that obligation by picking the highest. It is not bound by any valuation and is not obliged to pick any one. Its obligation is to do the best it can to arrive at a* ***true value****, difficult as this may be. This may involve rejecting all valuations, or taking material from some or all of them and arriving at a conclusion that differs from all of the valuations. It is not a mechanical process. It is one that requires weighing all of the material before it and applying its best judgment to arrive at a correct result."*

The point to consider here is that neither the highest price derived nor the cost was necessarily determinative of FMV; Bowman picked a value on a principled basis above the cost price, but it was not the highest comparable presented to him. Bowman's basis of value was premised on:

1. The artist's pre-eminence and reputation, hence their potential marketability,
2. The assurance that the comparables (artist and work) made sense and that no value was solely riding on reputation, and
3. Actual sales and auction records of the artist and his work, including market demand.

The expert was reminded that his function was to assist the court in meeting its obligation, and not to provide an answer. The highest value has to be principled and relevant — the value of a credible report.

Summary

The art donation cases clearly demonstrate the court's sophistication on certain complex valuation issues. This means experts must be professionally qualified. The standard for reporting is increasing, with courts rejecting superficial or unsubstantiated work. To assist a court the report must consist of valuation models reflecting analysis that meets the existing business conditions at the valuation date. Probable may replace hypothetical; FMV converges with price in deriving ***true value***.

Cases Cited:

[1] Morley v. The Queen, [2004] 3 C.T.C. 2153; (2004), 58 D.T.C. 2604.

[2] Henderson v. Minister of National Revenue, 1973 Carswell Nat 189, [1973] C.T.C. 636, 73 D.T.C. 5471.

[3] Malette v. The Queen, [2004] 1 C.T.C. 2125; (2003), 57 D.T.C. 1078.

[4] Klotz v. The Queen, [2004] 2 C.T.C. 2892; (2004), 58 D.T.C. 2236

[5] Nash v. The Queen, (2004), 58 D.T.C. 3391

[6] Untermeyer Estate v. A-G. British Columbia,[1929] S.C.R. 84.

[7] Canada v. Malette, [2004] 4 C.T.C. 24; (2004), 58 D.T.C. 6415.

[8] Maréchal c. La Reine, 2004 TCC 464 (CanLII) Date: 20040817.

Sean Cavanagh, CA, CBV is a principle at FS Capital in Toronto, a financial advisory firm assisting in value growth modeling, litigation and valuation.

Summary of the Factors Courts Have Considered Important When Determining a Reasonable Royalty Rate in Patent Infringement Litigation

By Anna Kamenova

Two seminal cases in the patent infringement area are Georgia-Pacific Corp. v. US Plywood Corp. and Honeywell v. Minolta. Both of these cases highlight the factors the respective courts considered relevant in estimating a reasonable royalty rate in the determination of economic damages. This discussion (1) summarizes these various reasonable royalty rate factors and (2) explains how these factors affect the reasonable royalty rate selection.

Introduction

The determination of the patentholder's lost profits due to a patent infringement depends on the facts and circumstances of each individual case. In this discussion, we will review the use of the reasonable royalty rate factors described in two federal court cases:

1. *Georgia-Pacific Corp. v. U.S. Plywood Corp.* (318 F. Supp. 116 (S.D.N.Y. 1970)) (the "Georgia-Pacific case") and
2. *Honeywell v. Minolta* (Civil Nos. 87-4847, 88-1624 (N.D.N.J. 1992)) (the "*Honeywell* case").

In these two cases, the courts concluded those factors that are important in determining a reasonable royalty rate for the estimation of damages related to patent infringement.

These reasonable royalty rate factors are closely followed by valuation analysts in providing economic damages analyses, particularly in the area of intellectual property infringement litigation.

Patent Infringement Damages

Damages adequate to compensate for patent infringement are awarded under the U.S. Patent Act, Title 35 of the U.S. Code Section 284:

Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.

When the damages are not found by a jury, the court shall assess them. In either event the court may increase the damages up to three times the amount found or assessed.

The court may receive expert testimony as an aid to the determination of damages or of what royalty would be reasonable under the circumstances.

The specifics of this concept can be troublesome to some intellectual property analysts. This is because:

1. the patent statute contains no further guidelines and
2. the case law is not entirely consistent in this area.

A fundamental problem that immediately arises is the existence, in reality, of two different definitions of the term "reasonable royalty."

Reasonable Royalty Rate

The first definition of the term "reasonable royalty" is the actual licensing rate to which the patent owner and a licensee would have negotiated and agreed entirely apart from any litigation or damages question. As stated by the Federal Circuit, this negotiated reasonable royalty is "merely the floor below which damages shall not fall."

The second definition of the term "reasonable royalty" is the amount of damages adequate to compensate the patent owner, when the later cannot prove actual damages because no royalty has been set.

In the vast majority of patent litigation damages cases today, this meaning of "reasonable royalty" has rarely been the "floor" represented by a negotiated royalty.[1]

Reasonable royalty damages have historically been much higher than—and bear very little relationship to—any royalty that the parties would have ever agreed upon. Reasonable royalty damages can even exceed what could be obtained by a lost profits analysis.

What the courts generally attempt to award is "damages adequate to compensate" the patent owner for the economic effects of the patent infringement.[2]

In both cases, there is a multiplicity of interpreting factors bearing on the amount of reasonable royalty. However, there is no formula by which:

1. these factors can be rated precisely in the order of their relative importance or

2. by which their economic significance can be automatically translated into their monetary equivalent.

The courts—in the *Georgia-Pacific* case and in the *Honeywell* case—provided jury instructions including all relevant factors that had to be addressed in order to determine the damages award in relation to the patent infringement.

The *Georgia-Pacific* Reasonable Royalty Rate Factors

The factors for estimating a reasonable royalty rate considered in the *Georgia-Pacific* case are as follows:

1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.
2. The rates paid by the licensee for the use of other patents comparable to the patent in suit.
3. The nature and scope of the license, as exclusive or non-exclusive; or as restricted or non-restricted in terms of territory or with respect to whom the manufactured product may be sold.
4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention of by granting licenses under special conditions designed to preserve that monopoly.
5. The commercial relationship between the licensor and licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.
6. The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or convoyed sales.
7. The duration of the patent and the term of the license.
8. The established profitability of the product made under the patent; its commercial success, and its current popularity.
9. The utility and advantages of patent property over the old modes or devices, if any, that have been used for working out similar results.
10. The nature of the patented invention; the character of commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.
11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.
12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable business to allow for the use of the invention or analogous inventions.
13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.
14. The opinion testimony of qualified experts.
15. The amount that a licensor (such as the patentee) and a licensee(such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement; that is, the amount which a prudent licensee—who desired, as a business proposition, to obtain a license to manufacture and sell a particular article embodying the patented invention—would have been willing to pay as a royalty and yet be able to make a reasonable profit and which the amount would have been accepted by a prudent patentee who was willing to grant a license.[3]

The *Honeywell* Reasonable Royalty Rate Factors

The *Honeywell* case adopted virtually verbatim 11 of the 15 *Georgia-Pacific* case factors.

The *Honeywell* case omits the first two *Georgia-Pacific* case factors relating to established royalties and other "comparables." Three additional factors were added by the court in the *Honeywell* case, specifically:

1. the extent to which the infringement prevented Honeywell from using or selling the invention;
2. the relative bargaining positions of Honeywell and Minolta;
3. the market to be tapped.[4]

Other Judicial Precedent

In previous cases,5 the Supreme Court said that, where a patentee could not prove lost profits, infringer's profits, or an established royalty, the patentee could show the value by providing what would have been a reasonable royalty.

That reasonable royalty rate should consider the nature of the invention, its utility and advantages, and the extent of the use involved. The parties could rely upon the traditional array of facts probative of a reasonable royalty.

But in the *Georgia-Pacific* case, a heavy reliance is placed upon a later formulation called "the willing buyer willing seller" rule. This rule is more a statement of approach than a tool of analysis.

This approach defines the estimated royalty rate not only:

1. as the amount a willing licensee would have paid but also as
2. the amount a willing licensor would have accepted if negotiated at the time the infringement began.

In a litigation context, both parties would present different scenarios and give different weight to relevant factors in a hypothetical negotiation of a royalty rate for the subject patent. The majority of the hypothesized facts—such as anticipated profit rates, probable volume of sales, normal economic motivations, and prevailing business outlook—should be premised on the direct and circumstantial record evidence.

The hypothetical situations to which the reasonable royalty factors are applicable should be supported by direct or circumstantial evidence in order for the court to accept their validity.

Analysis of the *Georgia-Pacfic* Reasonable Royalty Factors

Factors 1 and 2

Often in estimating a reasonable royalty rate, the analyst cannot rely on factors 1 and 2. This is because either:

1. the patentee has not previously licensed the patent or
2. the patent in the instant case differs significantly from any other licensed patents by the infringer.

Factor 3

The geographic or sublicense limitations of an actual or hypothetically negotiated licensing agreement would typically warrant a selection of a lower royalty rate.

Factor 4

The policy of a hypothetical licensor to maintain patent monopoly on sales would justify the selection of a higher royalty rate to compensate the licensor for the impaired market position. The reluctance of the patentee to grant licenses would indicate a higher royalty rate selection in hypothetical licensing negotiations.

Factor 5

The commercial relationship between the licensor and licensee if they are same-territory competitors would require a higher royalty rate that

1. the licensee would pay in order to enter the licensor's market and earn profits and
2. would motivate the licensor to forgo profits from decreased sales.

In cases where the two parties operate in different territories and/or different lines of business, the royalty rate would typically be lower. This is due to additional efforts that the licensor and licensee need to make in order to compete for new customers.

Factor 6

In a determination of the royalty base for the use of patents, anticipated and actual sales of items that are not part of the subject product may be considered. To determine whether such sales are relevant to the royalty rate, it may be considered if the infringer used or anticipated using its

infringing product lines to promote the sale of other noninfringing product lines.

Factor 7

The duration of the infringed patent, and hence term of the hypothetical license, is a factor that is possibly deceptive. A long remaining term does not necessarily point to a higher royalty rate, and vice versa. As with most concepts relating to licensing, it should be examined in the specific context of each case.

If many years remain on the infringed patent, and if it happens to be in a scientific discipline being rapidly advanced such that the patent is likely to become obsolete long before its expiration, then a relatively modest royalty rate could be logical. In addition, a long remaining patent term could help create a larger overall royalty base, which could decrease the applicable royalty rate.

If an infringer is actively marketing products covered by a patent scheduled to expire in a year or two, such an infringer might be willing to pay a very high royalty rate for a short duration to avoid a hiatus from the market.

Factor 8

The level of patent significance in the created product popularity, profitability, and achieved commercial success would lead to the selection of a higher reasonable royalty rate. If the patent in suit has no substantial bearing on the product desirability, this factor would be considered irrelevant.

In the *Georgia-Pacific* case, the product made under the patent had a substantial market share during the last nine years prior to infringement. The patentee had no reason to believe that the demand for the product would decline significantly in the foreseeable future. This factor was heavily weighted in the *Honeywell* case, as well.

Factors 9 and 10

The infringer in the *Georgia-Pacific* case argued that the relevant product was only a type within a whole class of products experiencing substantial competition—during the time the infringement began. The infringer argued that, therefore, the selection of a minimal royalty rate is justified.

Despite the allegedly fierce competition between the subject product and other generally similar products, the Georgia-Pacific company deliberately decided to duplicate the product notwithstanding the caveat of the Georgia-Pacific legal counsel that an expensive infringement suit was inevitable.

The Georgia-Pacific company willful infringement of the subject patent is an admission by conduct that it regarded the product as occupying a uniquely favorable position in the market.

In order to determine the competitive position for a given patent, an analysis of current market technologies—their popularity, life cycle, and customer preferences—is needed to assess the patent exclusivity. A determination to what extent various similar products are competitive with each other can be made by comparing:

1. their respective price ranges and
2. the respective markets that had been developed for them.

Typically, a price stability of the subject product would support a theory of stable competitive position and sufficient product differentiation to sustain other product offerings on the market.

The competitiveness of the subject product and the infringing product is analyzed in conjunction with the degree to which they are competitive to each other and to other products.

In the *Georgia-Pacific* case, the patentee product and the infringing product were competitive to each other to a greater degree than they were competitive with other similar products. This fact provided further support for selecting a high royalty rate.

The competitive situation analysis must address the market conditions as of the time the infringement commenced and hence the time when the reasonable royalty would have been negotiated.

For the patent owner, often the absence of acceptable noninfringing substitutes is the hardest factor to prove. A careful analysis of this factor—sometimes described as whether there is a commercially viable noninfringing alternative to a patented invention—is considered crucial in most situations when determining the appropriate measure of damages.

This issue is directly related to the breadth of the patent being litigated. If the breadth of the patent is insignificant—in that easily available noninfringing alternatives exist—then damages "adequate" to compensate for its infringement should be correspondingly modest.

Factor 11

The extent to which the infringer has made use of the subject invention is directly relevant to the size of the royalty base (against which the royalty rate is multiplied to arrive at the total royalty figure). And, the extent to which the infringer has made use of the subject invention is also pertinent to the question whether noninfringing substitutes were readily available.

Evidence as to the value of such use to the infringer could directly influence the royalty rate which could logically be negotiated.

Factor 12

Instead of Georgia-Pacific factor 12 relating to standard industry profits, the Honeywell judge substituted:

What the parties reasonably anticipated would be their profits or losses as a result of entering into a license agreement.6

Under this formula, the lawyer and the damages expert witness could take into account relevant industry practices. However, the lawyer and the damages expert would also have the added flexibility to consider any other pertinent business circumstances in making the analysis.

Factor 13

Reasonable royalties may be based on the sales of entire product systems, even though the infringed patents cover only parts of those systems. The products manufactured using the infringed patent (the "patented item") are typically sold in conjunction with products that are not claimed in the patents-in-suit.

This occurs when the subject patented item is a key component in a larger apparatus. It also occurs when the sales of other related products are expected as a result of the sales of the patented product (also known as convoyed sales).

When the patented element is the basis for the consumer demand, an entire market value is applied to determine the royalty base—the base against which the royalty is measured. It is, in effect, what is included in computing royalty damages.

Under the entire market value rule, it is not the fiscal joinder or separation of the items that determines whether they are included in the royalty base. Rather, the financial and marketing dependence on the patented item under standard marketing procedures for the product determine whether they are included in the royalty base.

Factor 14

Often, the expertise sought in determining damages for infringement cases is that resulting from experience in actual licensing transactions. Experts furnish opinions as to what would be a royalty that the patentee and infringer would logically have been expected to negotiate at the point in time just prior to the commencement of the actual infringement.

Within the context of 35 U.S.C. Section 284, this expert opinion should furnish the court with a floor or lower limit of damages to be awarded. If such opinion is accepted, the court can take various factors into account to increase the base figure to the quantum of damages that the infringer should be required to pay to the patentee. Indeed, the statute contemplates that the court can go even further.

Its discretionary powers allow the court the option to:

- award up to treble damages, particularly if infringement is found to be willful;
- award prejudgment interest; and
- require the infringer to pay the patentee's attorney's fees.

When acting as an expert, an analyst should adopt the following attitudes and procedures:[7]

- An expert should thoroughly establish independence. This extends well beyond the absence of conflict of interest from past or present involvement.

  The expert should elicit from the retaining party a commitment of absolute candor. Any information that could reasonably be relevant to the expert in constructing an opinion, positive or negative, should be made available.
- Questions about preservation of confidentiality should promptly be settled. Frequently, the expert will be required to sign a court-enforced restraining order on the use of commercially sensitive material which is produced by either party to the litigation, via discovery or otherwise.

  In addition, the expert should offer to the retaining party to execute the same

confidentiality procedures such party requires of its own employees or consultants. Thus, the expert will not be inhibited in performing a background study.

- A general, preliminary opinion by the expert to the retaining party may reasonably be expected. This indicates the basic direction of the expert's thinking, as well as the methodologies contemplated to be employed.

  If this is unacceptable to the retaining party, the expert should be released and paid for past services. If the plan is acceptable, a relatively detailed plan of action should be mutually agreed upon.
- An expert should require the same degree of familiarity with the technology involved in the litigation as the expert would need if charged to negotiate a license of the patent at the time of the hypothetical negotiation.

  This usually involves a visit to actual laboratories and production facilities, similar to those where the infringing products were made or processes performed.
- In addition to requesting access from the retaining party to all potentially relevant documentation in their possession, an expert should be free (within practicable limits) to perform individual investigations to elicit or confirm important facts.
- When formulating an opinion, an expert should be as explicit as possible about the information directly relied on, as well as other circumstances taken into account, in reaching his or her conclusions.

Factor 15

In restating factor 15, the court in the Honeywell case affirmed that it intended to cover unexpected facts that actually occurred subsequent to the hypothetical negotiation, stating to the jury:

The amount that Honeywell and Minolta would have agreed upon, if both had been reasonable and had voluntarily tried to reach an agreement, starting at the time the infringement began. In making this determination, you may take into account the events and facts that occurred thereafter, and that could not have been known to or predicted by the hypothesized negotiators."[8]

While the district court in the *Georgia-Pacific* case spelled out all of the foregoing criteria for fixing reasonable royalties in the context of Section 284, it should be noted that this decision was partially reversed on appeal to the Second Circuit.[9]

Indeed, the Second Circuit did not appear to take into account all of the nuances that could exist in a hypothetical negotiation. Instead, the Second Circuit employed a methodology that has since come to be known as the "analytical approach."

According to this "analytical approach," the analyst starts with the net sales of the infringing articles by the infringer and then deducts the infringer's:

- direct or variable costs in producing the article,
- fixed costs, including allocated overhead to produce the article, and
- "normal" profits to the infringer on similar products.

The remainder is given to the patentee, and is described as "reasonable royalties." The reason given by the Second Circuit in modifying the lower court decision was that it failed to leave the infringer, *Georgia-Pacific* "a reasonable profit on its sale of striated plywood," the infringed product. The analytical approach is designed to do just that.

Summary and Conclusion

The methodology for assessing and computing damages in patent infringement cases is a choice within the sound discretion of the district court. The choice and the means of application of a particular methodology will not be disturbed by the Court of Appeals for the Federal Circuit (CAFC). This is true unless an abuse of discretion is found, something which has historically occurred only in a small minority of cases.

The *Georgia-Pacific* case pertinent factors have stood the test of time in that they continue to be cited regularly. An updated version of these factors was utilized in the 1992 charge to the jury by Judge Alfred Wolin, in the *Honeywell* case. This case was subsequently settled by a substantial payment by the defendant, Minolta, to Honeywell, the patentee.

The quality of the economic reasoning in reasonable royalty cases has been improving steadily in the years since the *Georgia-Pacific* case and the *Honeywell* case.

Notes:

[1] John Skenyon, Christopher Marchese, John Land, Patent Damages Law and Practice (Egan, MN: Thomson/West, 1999, supplemented 2005), pp. 3:3–4.

[2] Ibid.

[3] Georgia-Pacific Corp. v. US Plywood Corp., 318 F. Supp. 1116 (S.D.N.Y. 1970).

[4] Transcript of Court's Charge, Honeywell v. Minolta, Civil Nos. 87-4847, 88-1624 (N.D. N.J. 1992), p. 78.

[5] Dowagiac Mfg. Co. v. Minnesota MolinePlow Co., 235 U.S. 641, 35 S.Ct. 221, 59 L.Ed. 398 (1951) and United States Frumentum Co. v. Lauhoff, 216 F. 610 (6th Cir. 1914).

[6] Georgia-Pacific Corp. v. US Plywood Corp., 318 F. Supp. 1116 (S.D.N.Y. 1970).

[7] Robert Goldscheider, "The Employment of Licensing Expertise in the Arena of Intellectual Property Litigation," The Journal of Law and Technology, 1996.

[8] Transcript of Court's Charge, Honeywell v. Minolta, Civil Nos. 87-4847, 88-1624 (N.D. N.J. 1992), p. 76.

[9] Georgia-Pacific Corp. v. U.S. Plywood-Champion Papers, Inc., 446 F.2d 295, 170 U.S.P.Q. (BNA) 369 (2d Cir. 1971).

Anna Kamenova is a senior associate in the Chicago office. Anna can be reached at (773) 399-4312 or avkamenova@willamette.com.

This article originally appeared in the Summer 2006 issue of Willamette Management Associates Insights. It is reprinted here with the permission of Willamette Management Associates, www.willamette.com.