

VALUING KNOWLEDGE ASSETS

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After I got my first degree at that well-known English reform school, Oxford, someone must have whispered to me, "there's gold in them thare balance sheets"..... And so I became a chartered accountant - among other things, not all of which have a bearing on this presentation.

It is a conservative profession, supposedly the second oldest, and since the days of Pythagoras, we have been taught to put on the books only things we can see, touch, or feel - in short, something tangible, which is also a sound way to cover one's derrière. For all those reasons, unless they have been acquired in an M & A transaction, we have traditionally excluded a firm's intangible assets from its Financial Statements. Until recently, intangibles were lumped together with Goodwill. Therefore, to financial analysts, a Balance Sheet shares one characteristic with a bikini: it discloses a lot, but conceals the essentials.

According to the CICA, "Goodwill is commonly considered to be a composite of all the factors which cannot be individually identified and valued and which contribute to or accompany earnings capacity of a company. In a business combination, goodwill is represented by the difference between cost and the acquiring company's interest in the identifiable net assets".

The result is that the shareholders' equity according to accountants (Book Value) differs substantially from the same shareholders' equity established by the stock market (Market Capitalization). Knowledge Assets form a significant portion of the difference.

Accounting for Goodwill

Currently, the CICA Handbook, a Canadian accountant's bible, requires nearly all M & A transactions to be treated as purchases, with goodwill being recorded and then written off over its useful life, not exceeding 40 years. On the other hand, US companies are allowed by the Financial Accounting Standards Board ("FASB") to adopt "pooling-of-interests" accounting for mergers, with no good-will; this puts Canadian firms at a disadvantage.

Some stock markets, for instance NASDAQ, require minimum assets in order to obtain a listing. Usually, goodwill is not accepted as an asset, but for technology issues, Identifiable Intangible Items are allowed, provided they are included at cost and properly amortized over their useful lives, normally up to six years. Examples are: Core Technology, Brand Names, Sales Channels, Customer Base and Distribution Rights,

Valuing Knowledge Assets

If such items are recorded, a company must evaluate them, on an ongoing basis, for potential permanent impairment in value. The usual test is to compare the carrying value of the item to the estimated, undiscounted future net cash flows it will generate; a permanent impairment is immediately written off against earnings.

This paper is being prepared in late December 2000, just after the CICA and FASB jointly announced plans to set uniform accounting rules for goodwill throughout North America; they are anticipated to be effective in the second quarter of 2001. The new rules are assumed to confirm FASB's 1999 position that "pooling" accounting should be eliminated and all transactions treated as purchases. However, the resulting goodwill will not have to be amortized or written off unless there has been a permanent impairment. This is intended to give investors "better information about the economic value of goodwill and the amount and timing of its impact on companies' earnings."

Situation of Bombardier

To show the importance of the difference between Book Value and Market Capitalization, let us look at Bombardier Inc., a major Canadian manufacturer. At January 31, 2000, its consolidated Balance Sheet in millions of dollars was as follows:

Assets	
Cash and Cash Equivalents	1,664.0
Accounts Receivable	570.7
Asset-based Financing Items	7,194.9
Inventories	5,361.5
Fixed Assets	1,898.7
Other Assets	344.3
	<u>17,034.1</u>
Liabilities	
Short-term Borrowings	2,002.7
Accounts Payable and Accrued Liabilities	3,335.2
Advances and Progress Billings in Excess of Related Costs	2,636.8
Long-term Debt	4,795.0
Other Liabilities	652.6
	<u>13,422.3</u>
Shareholders' Equity	<u>3,611.8</u>
	<u>17,034.1</u>

Valuing Knowledge Assets

On that date, nearly a year ago, the Class B subordinated voting common shares (the most actively traded) closed at \$29.50 on the TSE; since then, they have split 2 for 1 and now trade at the equivalent of \$46.00. At the time, there were 688,809,000 Class A and Class B common shares in issue, as well as \$300 million preferred. This meant that the Market Capitalization of all the shares was \$20,619.9 million, compared with the Book Value of \$3,611.8 million.

The difference of \$17 billion (83% of the Market Capitalization) represented unrecorded, mainly Knowledge Assets, such as aircraft designs and approvals, systems, tax benefits, contracts, international connections and reputation, brand names, etc.

Classifying Assets

Traditionally, accountants have classified assets by their liquidity:

- Current: Receivables, inventory and other items expected to be turned into cash within twelve months.
- Capital: Property, plant and equipment, which contribute to operations for more than a year, and whose costs are recorded by charges to income over their useful lives.
- Deferred: Costs incurred during one period that create benefits in the future.
- Intangible: A catchall of the costs of purchased items, mainly Goodwill, that contribute to future profits and are amortized over their economic lives.

After careful consideration, my firm, Corporate Valuation Services Limited ("CVS"), prefers to look at assets differently, according to their characteristics. We use four categories, the first two covering tangibles:

Financial

- Cash
- Investments
- Receivables
- Loans & Advances
- Prepaids & Deferred Costs

Physical

- Inventories
- Real Estate
- Operating Equipment
- Computer Hardware
- Purchased Software

Valuing Knowledge Assets

Legal

- Operating Leases (Capital Lease treated as Physical)
- Licences & Permits (TV/Radio, Aircraft, etc.)
- Patents (Monopolies for a Period)
- Trademarks (Brands & Products - Market Share)
- Copyrights (Created Software, Websites, Designs, Drawings, etc.)

Intellectual

- Delivery Channels (Distributors, Wholesalers, Retailers, Customer Base)
- Knowhow (Core Technology, Process Improvements, New Products, R & D, Trade Secrets, Planned Innovations)
- Systems (Planning, Accounting, Production, Supply Chain, Environmental, Quality Control)
- Workforce (Culture, Management, Sales, Administration, Production, Support, Engineering, R & D)
- Alliances & Opportunities

In our view, these groupings should be broad, and could, for example, include in inventories residual costs of a TV series that would be recovered out of syndication revenues.

Knowledge Assets include Patents, Trademarks and Copyrights, which are legal assets (table above), as well as all Intellectual Assets; their essential characteristics are that they can be codified, owned and transferred. For example, while an individual cannot be a Knowledge Asset, in certain industries, such as investment banking, where groups of employees move between firms, a "team" may be.

Other descriptions are sometimes used:

- Human Capital, the collection of education, skills and experience of all the employees, for our term "Workforce".
- Structural Capital, the processes, documentation and organization which support Human Capital, for our term "Systems".
- Intellectual Property, for Patents, Trademarks, Copyrights, Knowhow and Trade Secrets, which all have legal protection.

Value Drivers

Over the longer term, every business aims to increase its value. Public companies aim to do so by supplying information to analysts and shareholders, sometimes with a spin. Surprisingly, managements often ignore the importance of their firm's Knowledge Assets. As demonstrated above, the Book Value of the shares only represents one portion of their Market Capitalization.

Valuing Knowledge Assets

Arthur Levitt, Chairman of the (US) Securities & Exchange Commission (SEC), in a speech to The Economic Club of New York in October 1999, showed that regulators are well aware of the problem.

"We have long had a good idea of how to value manufacturing inventory or assess what a factory is worth. But today, the value of R & D invested in a software program, or the value of a user base of an Internet shopping site is a lot harder to quantify. As intangible assets continue to grow in both size and scope, more and more people are questioning whether the true value -- and the drivers of that value -- is being reflected in a timely manner in publicly available disclosure."

As the ratio of Market Capitalization to Book Value increases, the relationship between recent financial performance and the current stock price diminishes. Today, for many companies the amounts invested in Knowledge Assets, which by accounting convention are usually expensed, exceed those made in tangible (financial and physical) assets.

As a result, ROI (Return On Investment), a standard performance measure, is no longer very useful, as both, the return and the investment components, now deviate from historical norms.

In contrast, most financial analysts use both financial and non-financial performance measures in assessing a firm's position; some studies attribute up to 35% of institutional investors' decision making processes to non-financial factors.

The following ten non-financial measures of Management and Corporate performance are frequently applied by financial analysts.

Management	Corporate
Experience	Market Position
Credibility	Ability to Attract Talent
Appropriateness of Strategy	Innovations
Execution of Strategy	Research Leadership
Basis of Executive Compensation	Quality of Major Processes

Forbes Magazine Survey

In 1996, Forbes undertook a survey of managers concerning the performance measurement systems they use and the relationships with their corporate strategies. The alignment between systems and strategy were: good for 19% of the respondents; fair for 36%; and poor for 45%.

Valuing Knowledge Assets

The survey also considered nine potential value drivers, which the managers were asked to rank, on a scale of 1 (low) to 5 (high), by both importance and adequacy of measurement:

Driver	Importance	Adequacy
Alliances	3.7	2.4
Brands	3.8	2.2
Customers	4.1	2.8
Employees	4.1	2.9
Environment	2.9	2.5
Financial	3.8	3.6
Innovation	3.9	3.1
Quality	3.0	2.5
Suppliers	4.0	3.0
Technology	3.7	2.8

Established Value Drivers

Investors now place greater emphasis on non-financial measures than do managements, whose views were presented by the Forbes survey. The views of investors were established in 1997 by the Ernst & Young Center for Business Innovation. Their rankings of various Value Drivers for durable and non-durable manufacturers, as well as e-Commerce companies, are set out in the following table together with those from Forbes.

	Ernst & Young			Forbes	
	Durable	Non-Durable	e-Commerce	Performance	Measurement
Alliances	4H	6H	1H	8	9
Brands	7M	7M	4H	5	10
Customers	9L	9L	3H	1	5
Employees	2H	3H	n.a.	2	4
Environment	6H	5H	n.a.	10	8
Financial	n.a.	n.a.	n.a.	6	1
Innovation	1H	1H	2H	4	2
Management	3H	2H	5M	n.a.	n.a.
Quality	5H	4H	n.a.	9	7
Suppliers	n.a.	n.a.	n.a.	3	3
Technology	8L	8L	6L	7	6

The Ernst & Young rankings for durables are very similar to non-durables, but totally different from those for e-Commerce and from Forbes. The discrepancies seem to reflect a significant dichotomy between the views of managements and those of investors.

Valuing Knowledge Assets

The Ernst & Young study covered large enterprises and used the following indicators to establish the Value Drivers:

- Alliances: Number of Alliances and Joint Ventures, Number of Alliance Partners (Security Data Corp.)
- Brands: Advertising Expenditures (Compustat), Financial World Brand Values
- Customers: American Customer Satisfaction Index
- Employees: Kinder, Lydenberg, Domini ("KLD") Diversity Score, KLD Employee Relations Score, Fortune Magazine Employee Talent Score, Fortune Best Places to Work, Computer World Best Places to Work
- Environment: KLD Environment Score, KLD Community Service, Fortune Social Score;
- Innovation: Number of Patents (US Government), Research and Development Expenditures, Fortune Innovation Score, Patent Importance
- Management: CEO Reputation Score (Burson-Marsteller), Fortune Management Quality Score, Industry Week Best Managed Companies, Worth 50 Best CEOs Mention
- Quality: ISO 9000 Certification, Fortune Product/Service Quality Score
- Technology: Information Week: 500 Best Technology Users' Ranking

Identifying Knowledge Assets

Companies often fail to take advantage of their Knowledge Assets, simply because they have never identified them and are not aware of their possibilities. Various sources have listed more than 90 types of Legal and Intellectual Assets a company may own. Every firm will have some, such as: brand/product names, literary works (technical documentation), user rights, proprietary software, etc.

Traditionally, assets have been considered either tangible (financial & physical) or intangible (legal & intellectual). For an intangible asset to be an Identifiable Intangible Item from a valuation perspective, it should be:

- Specifically identifiable with a recognizable description
- Legally transferable between private sector owners
- Supported by evidence of its existence, such as a contract, license, registration, computer diskette etc.
- Created or come into existence at an identifiable time, or as the result of an identifiable event
- Destroyed, or its existence terminated, at an identifiable time, or as the result of an identifiable event
- Able to generate some measurable economic benefit to its owner; this may be increased income or lower costs
- Enhancing the value of another asset with which it is associated

Valuing Knowledge Assets

Examples of Identifiable Intangible Items are:

- Patents - product or process
- Brands - consumer goods, trademarks, corporate names
- Publishing Rights - magazines, books, newspapers, film or music, sometimes even mastheads
- Other Intellectual Property - copyrights, technology, knowhow
- Licenses - television & radio, franchises, distribution rights
- Computer Software - developed in-house

Things that exist and contribute to the economic success of a business, but do not meet these specific attributes, are not Identifiable Intangible Items. Some, such as high market share, good profitability, a generally positive reputation and market potential, merely describe conditions that contribute to the existence and value of such, but, of themselves, do not qualify.

Valuation Procedures for Knowledge Assets

All of the generally accepted valuation methodologies can be applied to Knowledge Assets: Capitalized Earnings, Comparables, Discounted Cash Flows, Rules-of-Thumb, Original Cost, Replacement Cost and Reproduction Cost. Each method has its strengths and weaknesses; it is advisable to use more than one, as appropriate for the Asset being valued, or the particular situation.

No standard or formula exist for the valuation of Knowledge Assets, but the courts, valuers and tax authorities tend to concentrate on factors, such as:

- The significance of the Asset to the firm's products or processes
- The sales revenues, income or cost savings the firm expects from using the Asset
- The Asset's economic life
- The competitive alternatives to its use

The valuation process usually begins by analyzing the industry and the market in which the Asset will be used. Market size and prevailing economic conditions help establish how much impact the Asset may have on the market position of the firm, how long it will take to achieve that situation, and the period of the competitive advantage.

Other factors to be considered are the distribution networks and supply chains in which the firm participates, its manufacturing capacity, management structure and financial status as well as the products' position in their life cycles.

The various methods, and when it is appropriate to use them, are best understood within the traditional valuation conceptual framework of three approaches: cost, which represents the effort

Valuing Knowledge Assets

to create or recreate the asset; income, reflecting the future economic benefits; and market, based on transactions in comparable assets.

The following descriptions of the three traditional approaches as applied to Knowledge Assets is based in part on work by my former associates in the Financial Valuation Group, Jim Rigby, MBA, CPA/BV, ASA, and Michael Mard, CPA, ASA, Los Angeles.

The Cost Approach

Types of Costs

Three types of costs may be chosen under this approach: original, reproduction and replacement. Original cost is the total of the amounts expended to create the Knowledge Asset. Reproduction cost contemplates the construction of an exact replica of the Asset, while replacement cost recreates the functionality or utility of the Knowledge Asset, but in a form or appearance that may be quite different from that of the Item being valued.

Functionality, an engineering concept, means the ability of a Knowledge Asset to perform the task for which it was designed (effectiveness). Utility, an economic concept, has to do with the ability of another asset to provide an equivalent amount of satisfaction as the original Asset (efficiency).

All three methods adopt a comprehensive and all-inclusive definition of cost, not only hard (materials) and soft (engineering, design, labour and overhead) costs, but also the creator's profit, and sometimes an entrepreneurial incentive to motivate the development process. This approach also covers cost avoidance due to ownership of the Asset, eliminating historical or prospective costs.

Underlying Economic Principles

The Cost Approach is based on the following seven concepts:

- Substitution - The maximum amount a prudent buyer will pay for a Knowledge Asset is the cost to construct or develop an Asset of equal functionality and utility, allowing for time-to-market.
- Supply & Demand - Shifts in supply or demand can cause costs to increase or decrease, and changes in the need for, and the supply of, different Knowledge Assets.
- Externalities - External factors may cause a newly created Knowledge Asset to be worth more than its original cost.
- Functional Deterioration - The inability of a Knowledge Asset to continue to perform the function, or offer the utility for which it was originally designed.
- Technological Obsolescence - The result of improvements in design, engineering, or technology leading to a replacement being more productive than the Asset; this is often considered a specific form of Functional Deterioration.

Valuing Knowledge Assets

- Physical Decline - A reduction in the functionality or utility of the Knowledge Asset due to age, leading to higher maintenance costs.
- Economic Depreciation - A reduction in the value of the Asset due to changes in the external situation rather than from its current use or condition, and thereby beyond the control of the owner; generally considered incurable.

Application of Approach

For the original cost of a Knowledge Asset, the actual historical amounts expended to create or develop it are identified, quantified and then "trended" to the Valuation Date by an appropriate factor, such as the Producer Price Index.

Reproduction cost is the total spent to develop an exact duplicate of the Asset, using the same design, layout, standards, materials and quality as the original.

Replacement cost is the total amount required to create, under present conditions, an item having equal functionality and utility to that of the Asset. However, the replacement would use modern methods, be developed according to current standards, state-of-the-art design and layout, and of the highest possible quality. Accordingly, the replacement, although it performs the same task as the Asset, may be better. The valuator must adjust for this factor in his estimates of Functional Deterioration, Technological Obsolescence, Physical Decline and Economic Depreciation.

Replacement cost typically establishes the maximum amount a prudent investor will pay for an Asset. If the item is less useful than an ideal replacement, its value must be adjusted. In addition, as the replacement cost is for a new item, the value of the Asset must be reduced for: Functional Deterioration, Technological Obsolescence and Economic Depreciation. In estimating such amounts, the Asset's actual age and its expected remaining useful life must be taken into consideration.

An Asset's deficiencies are considered curable when the projected future economic benefits of enhancing or modifying it exceed the current cost of the material, labour and time required. For valuation purposes, they are regarded incurable when such costs exceed the benefits.

Valuing Knowledge Assets

Fair Market Value is obtained from Replacement Cost - New, by the formula shown below, together with illustrative amounts:

Replacement Cost – New	10,000
Less: Economic Depreciation	2,000
Incurable Functional Deterioration	1,500
Technological Obsolescence	<u>500</u>
Equals Fair Market Value	<u>6,000</u>

The Income Approach

As shown earlier for Bombardier, ownership of Knowledge Assets is one of the most important contributions to the Market Capitalization of a firm. This is due to such Assets' ability to:

- Increase income in a quantifiable fashion
- Reduce costs by identifiable amounts
- Avoid paying others to obtain the same functionalities and utilities

Methods Employed

The income approach is based on the concept that the value of an asset or business represents the future economic benefits available to its owners. The various methods used to determine this can be grouped into two categories: capitalization of current, and discounting of future benefits.

In the capitalization methods, the valuator estimates the selected measure of the economic benefits for one period, usually the year ending at the Valuation Date, and then divides that figure by an appropriate Capitalization Rate. This may be in perpetuity or for a specified period, depending upon the valuator's expectations of the duration of the benefits.

In the discounting methods, the valuator projects, for several periods, the appropriate extent of the benefits, which are then converted into a present value by discounting at the investor's required rate of return. The value of any tax shields, and, if the benefits will continue after the projected periods, a Terminal Value are then added.

The measure of the economic benefits chosen depends on the purpose and valuation methods selected. The periods for which they should be projected, and whether or not a Terminal Value is appropriate at its conclusion, depends upon the valuator's expectation of the duration of the benefits.

Valuing Knowledge Assets

Some Measures of Economic Benefits in Valuing Knowledge Assets:

- Gross Revenues
- Net Operating Revenues
- EBITRAD (Earnings Before Interest, Taxes, R&D, Amortization & Depreciation)
- EBITDA (Earnings before Interest, Taxes, Depreciation & Amortization)
- Net Operating Profit (Before Interest, Taxes and Investment Income)
- Pre-tax Profit
- Net Income
- Operating Cash Flow (Net Operating Profit plus Depreciation & Amortization)
- Net Cash Flow (Net Income plus Depreciation & Amortization)
- Free Cash Flow (Net Cash Flow less mandatory debt repayments and maintenance capex)
- Incremental Income (Increase in revenues related to the Asset less direct costs)
- Cost Savings (Reduction in otherwise required investment or operating expenditures)

As many different measures of economic benefits may be used in the income approach, an essential element in its application is to ensure that the Discount or Capitalization Rate selected is consistent with the measure of the benefits chosen. Either directly capitalizing or discounting the expected future economic benefits gives an indication of the value of the Asset.

Determining Appropriate Capitalization or Discount Rates

Valuation theory and practice have established that the appropriate rate of return for valuing an investment is the related cost of capital. Depending on the measure of economic benefits adopted, this figure may include both debt and equity elements, thus reflecting how the Asset has been financed. In general, Knowledge Assets are supported only by Equity.

For an equity investment, the rate of return required by an investor has four components:

- 1) The general level of medium-term risk-free interest rates for a particular currency.
- 2) An equity premium that takes into account the financial risks relating not only to traded shares in a particular country, but also the size of the firm.
- 3) Specific increments to reflect business risks.
- 4) A deduction to allow for the expected earnings growth of the firm.

Two methods are normally used to develop a rate from those components: the Capital Asset Pricing Model ("CAPM"), and the Build-up method. One of the cornerstones of modern finance, the CAPM concept relates to the returns on investments in securities. It assumes the appropriate risk premium on an asset will be determined by its contribution to the risk of investors' overall portfolios. CAPM divides the risks of a particular security into specific (Alpha) and diversifiable (Beta).

Valuing Knowledge Assets

Under CAPM, an investor's required rate of return on marketable equity is the sum of: the Alpha for the stock, plus the risk-free rate, plus the product of the Beta of the stock times the equity premium (the market's expected rate of return minus the risk-free rate).

The Build-up method establishes an amount for each of the four components separately. Various techniques are used to establish the increments for the business risks of private companies or their assets; CVS applies a range of one to ten to each specific risk, with the increments rising from 0% to 4.5%, in 0.5% steps.

The specific business risk factors considered in valuing Knowledge Assets should include, but not be limited to:

- Industry (ease of entry, technology in use)
- Nature of the Asset (with or without legal protection, purchased or created)
- Diversification (product lines, types of customers)
- Management (available skills/experience)
- Capitalization (debt/equity ratio leverage, cash flow coverage)
- Dependence (customer/supplier)
- Environmental Impact (legal framework, regulations, permits)
- Geographic Locations (concentration, distance from markets)
- Profit Margins (levels, variability, operational gearing from fixed and variable costs)
- Regulatory Situation (federal/provincial requirements, union contracts)

Based on these factors, the appropriate Capitalization or Discount Rate for a Knowledge Asset will vary greatly. An established item of Intellectual Property, such as a widely licensed patent, may use an industry rate, while an intellectual asset such as knowhow in an emerging technology, with potentially high obsolescence, may require a venture capital return.

Establishing the Capitalization or Discount Rate for a Knowledge Asset is normally a two-step process. First, the valuator develops the appropriate rate for the entire business, which reflects its unique risks. This is then adjusted to represent the situation of the specific Asset and the measure of economic benefits selected, by identifying and quantifying the relative risks.

The Capitalization Rate, used in the direct capitalization method, is determined by subtracting from the Discount Rate the projected average annual compound growth rate of the benefit stream. The Capitalization Rate of a business may be viewed as the weighted average of a series of Capitalization Rates applicable to its various assets. The reciprocal of the Capitalization Rate is the Price/Earnings Ratio multiple.

Valuing Knowledge Assets

Illustrative Example

A major characteristic of legal and intellectual assets recognized by both US and Canadian GAAP is that they can be separately identified. The valuator must determine which Identifiable Intangible Items exist in a business and their estimated useful lives based on an analysis of the firm and discussions with management.

Let us look at a manufacturer whose shares were acquired for \$10.7 million, with a further \$2.3 million of liabilities assumed. The Net Income was \$907,000 for a Price/Earnings Ratio was 11.8X, giving an effective overall Pre-tax Capitalization Rate of 15.4% ($100/11.8$) / (1-45% tax rate). The Assets involved, the expected rates of return and the Weighted Average Return on Assets (WARA) were:

CALCULATION OF WARA

ASSET	Fair Value \$'000	Indicated Rate %	Achieved Return \$'000
<i>Financial</i>			
Cash - net	800	5.0	40
Receivables	2,800	7.0	196
Prepays etc.	100	8.0	8
	<u>3,700</u>	<u>6.6</u>	<u>244</u>
<i>Physical</i>			
Inventories	1,950	9.0	176
Machinery & Equipment	450	10.0	45
	<u>2,400</u>	<u>9.2</u>	<u>221</u>
<i>Legal</i>			
Lease	300	9.0	27
Brand Names (Trademarks)	1,100	12.5	138
Core Technology (Patent)	1,200	15.0	180
Software (Copyright)	500	18.0	90
	<u>3,100</u>	<u>14.0</u>	<u>435</u>
<i>Intangible</i>			
Sales Channels	100	20.0	20
Customer Relationships	700	25.0	175
New Products (In-process R&D)	800	30.0	240
Distribution Rights	200	33.0	66
Assembled Work Force	500	35.0	175
	<u>2,300</u>	<u>29.4</u>	<u>676</u>
Goodwill	1,500	38.0	570
Total Assets	13,000	16.5	2,145
Debt	(2,300)	6.5	(150)
Equity	<u>10,700</u>	<u>15.4</u>	<u>1,996</u>

Valuing Knowledge Assets

Dual Capitalization Method

Applying a different suitable rate of return to each type of asset is difficult, and, for simplicity, the dual capitalization method is generally used. This assumes that two different rates of return: one for net tangible assets (usually 80% of the overall Capitalization Rate), the other (120% of the overall rate) to the intangibles. The latter is applied to the profits in excess of a "normal" rate of return on the tangibles. It implicitly assumes that there is more risk attached to the excess earnings and therefore their rate of return must be higher.

NET ASSETS	Fair Value
	\$'000
<i>Working Capital</i>	
Cash - net	800
Receivables	2,800
Inventories	1,950
Prepays etc.	<u>100</u>
	5,550
Debt	<u>(2,300)</u>
	5,650
<i>Capital Assets</i>	
Machinery & Equipment	<u>450</u>
Net Tangible Assets	6,100
Intangible Assets	<u>4,600</u>
Purchase Price	<u><u>10,700</u></u>

Analysis of Income

Net Income		907
Income Tax	45%	<u>742</u>
Pre-tax Profit		1,649
Interest		<u>181</u>
Operating Income		1,830
Income Tax	45%	<u>(824)</u>
Operating Income after Tax		<u><u>1,007</u></u>

Valuing Knowledge Assets

Return on Tangible Assets

Return on Tangible Assets-80% of Exit Cap Rate	11.8	6.78%
Net Tangible Assets		6,100
Debt		<u>2,300</u>
Tangible Assets		<u>8,400</u>
Net Income from Tangible Assets		<u>569.5</u>
Net Income from Intangible Assets		<u>437.0</u>

Value of Business

Return on Intangible Assets-120% Exi	11.8	<u>10.17%</u>
Implicit Value Intangible Assets		<u>4,297</u>
Estimated Value Intangible Assets (Rounded)		4,300
Net Tangible Assets		<u>6,100</u>
Calculated Value of Business		<u>10,400</u>
Sale Price		<u>10,700</u>
Difference from Actual Value		<u>-2.8%</u>

Terminal Value

The Terminal Value for a Discounted Cash Flows (DCF) calculation can be estimated in a number of ways. The most common is capitalising cash flow, but multiples of net income, EBIT or EBITDA, are often used. Underlying these latter techniques is the implicit assumption that at the end of the forecast period, the business, if it were to be sold, would realize that multiple of earnings. The figure is generally based on analyses of publicly traded guideline companies.

Establishing the Terminal Value for a firm requires an estimate of its long-run "sustainable" discretionary cash flow; this is capitalized at a rate that reflects both the expected growth and inflation. If continued real growth is assumed, working capital requirements, capital expenditures and tax payments have to be built into the projected sustainable discretionary cash flow.

For Knowledge Assets with relatively short useful lives, the most accepted method is to assume the benefits remain unchanged at the level of the last year of the projected period for the remainder of their life.

Avoided Royalties

In this method, the value of a Knowledge Asset is estimated by capitalising the royalty income the owner could earn if the Asset were licensed to a third party; this is assumed to be the same amount the owner avoids having to pay others as license fees for using the Knowledge Assets. While it is

Valuing Knowledge Assets

difficult to estimate the royalty that might be paid and the additional revenues a purchaser could generate, the information needed for the market approach is normally helpful.

Incremental Profitability Method

This method establishes the value for some of a firm's Knowledge Assets by comparing the operating performance of the business that owns them with that of comparable businesses without such Assets. Their value is then obtained by capitalising the incremental Net Income the business anticipates generating as a result of owning the Assets. This method is difficult to apply as it requires intricate assumptions and comparisons, as well as some extremely subjective judgements.

The Market Approach

Almost by definition, a value based on actual arm's length transactions as guidelines is preferable to one based solely on investment criteria. In any valuation of Knowledge Assets, it is desirable to apply the market approach, using information on both sales and license transactions.

The steps to be taken are as follows:

- Research available databases for information on sales or license transactions, listings and offers to purchase or license comparable Knowledge Assets. Comparability is based on factors such as the type of Asset, its use, the industry in which it functions, and the date.
- Confirm that the data is accurate and that the transactions are at arm's length. This procedure may also generate additional information about current market conditions for the sale or license of Knowledge Assets.
- Select a relevant unit of comparison (e.g. income multiples, royalty rates, or dollars per unit) and develop a comparative analysis.
- Compare guideline intellectual property sales or licenses with the Asset using the selected unit of comparison, after appropriately adjusting each guideline transaction to the situation of the Asset. If adjustment is not reasonable, the transaction may not be a satisfactory guideline.

The basic elements of comparison set out below are generally used in selecting and analyzing guideline intellectual property sales and licenses:

1. The specific rights of ownership conveyed
2. Special financing terms or other arrangements
3. If the sale or license is at arm's length
4. Market conditions at the time of the transaction
5. The industry in which the guideline intellectual property was or will be used
6. A comparison of the physical, functional, technological and economic characteristics of the guideline property with those of the Asset
7. The inclusion of other items in the guideline transaction, such as the sale of a bundle or portfolio of physical as well as legal and intellectual assets

Valuing Knowledge Assets

The last phase of the market approach is the reconciliation of the values that have been derived from the guideline transaction to reach an overall conclusion. In this, the valuator summarizes the empirical data, reviews the analyses, considers the strengths and weaknesses of each transaction as a guideline and examines the reliability and appropriateness of the material.

In the beginning, I mentioned the gold that's in them thare hills, Balance Sheets in our case; looking for something precious is always hard work, but I hope that your quest will not end like Humphrey Bogart's in *The Treasure of the Sierra Madre*, but like the successful forty-niners, make it to *The Promised Land*. If you need assistance in your pursuit, I will be happy to be your metal detector.

CASE STUDY I

In July 1996, Joiner Inc. ("Joiner", or the "Company"), a computer systems integrator concentrating on E-mail, wanted to raise additional capital to market a new, enhanced version of their innovative product, "Directory Exchange"; it asked CVS to value the Company as at its fiscal year end, May 31, 1996.

Joiner had been formed in 1985 as a supplier of electronic office automation services. Between 1987 and 1992, in conjunction with Soft-Switch, Inc., it developed five messaging gateways; these connected LAN-based E-mail systems directly with host-based units relying on IBM's messaging protocols.

Until 1992, these products were sold exclusively by Soft-Switch; Joiner could only use them in its systems integration business. The exclusive rights expired in that year, and the Company began creating a direct sales organization to compete with Soft-Switch, which retained a non-exclusive license.

In 1992, a major life insurer acquired a smaller competitor. The newly merged organization found itself dealing with five different E-mail systems, and the Company was asked to provide a solution. It developed the initial version of Directory Exchange, which permitted users of one E-mail system to enter E-mail addresses of another system in their normal format.

Value of R & D

Most companies write off R & D as incurred; however, it usually has a significant value, especially for software firms. Based on an average life of five years for an E-mail program, the first approximation of the value of Joiner's R & D is 50% of the amount spent during the period, after tax.

From its own resources, between 1992 and 1996, the Company had spent \$2,493,000 on R & D. Such expenditures by Canadian controlled companies are eligible for Scientific Research and

Valuing Knowledge Assets

Experimental Development (SR & ED) tax credits at the rate of 35%, which at that time were paid in cash to private companies. Joiner qualified and had a substantial tax recovery.

Adjusting the \$2,493,000 charged to R & D for the tax credits gives \$3,835,000 as the total R & D in the five years, with \$3,146,000 spent on improving Directory Exchange. A further \$540,000 had been budgeted for fiscal 1997 to ensure a continuing state-of-the-art product. In view of the Company's lead in this area, and that it would take any competitor a minimum of twelve months to create a similar product, CVS believes that the value of the R & D was at least \$3,146,000, the accumulated expenditures on Directory Exchange rather than 50% of that amount.

Value of Customer Base

Another major unrecorded Knowledge Asset of the Company was its customer base. At May 31, 1996, it had 1,042 installations, including those sold by Soft-Switch. Using an offer-to-buy by Control Data Systems as a guideline, they were worth at least \$350 each, for a value of \$365,000.

Value of Workforce

The key component of Joiner's workforce is their R & D team. Allowing for head hunter fees and salaries while learning on the job, its replacement cost was estimated at \$283,000.

Financial Position	May-31 1996
Cash	-
Receivables	503
Tax recovery	632
Prepaid	<u>8</u>
	<u>1,143</u>
Equipment-net	<u>91</u>
	<u>1,234</u>
Payables	606
Bank Overdraft	331
Deferred Revenue	<u>215</u>
	1,152
Net Worth	<u>82</u>
	<u>1,234</u>

Valuing Knowledge Assets

Conclusion

Based on the numbers set out above, the Asset value of the Company was \$3,876,000.

.	\$'000
Net Worth	82
Products	3,146
Customer Base	365
Workforce	<u>283</u>
.	<u>3,876</u>

The financing raised \$2 million for 35% of the Company, giving it an effective value before the transaction of \$3,714,000, a discount of 4% to the Asset value.

CASE STUDY II

In March 1997, Microsoft approached Joiner, offering to purchase it for US \$16 million. The Board of Directors reviewed the situation, and we suggested a value to Microsoft of US \$34 million as set out below. At that time, Microsoft was equal to God, with no one snapping at its heels, and an offer by them was greeted walking backwards.

Value to Microsoft

In 1997, Lotus Notes was the most popular sophisticated E-mail system. In the preceding year, Lotus, after buying Soft-Switch, had been acquired by IBM, which considered Notes to be a strategic vehicle, not only as a messaging mechanism, but also as a means of distributing mainframe data and applications. IBM was then quoted as having 1,000 programmers dedicated to converting its own 1,400 plus E-mail applications to Notes at the rate of about 100 per month.

The following is taken directly from a memo I wrote at that time. From a strategic point of view, the acquisition would give Microsoft, whose major E-mail system was known as Exchange, four advantages:

"Notes Containment"

The immediate addition of a tested Notes/Exchange connector and Notes Directory capabilities to Exchange, in time for Exchange Version 5.5 to be launched in September 1997. Migration tools using these technologies, will be available from Joiner in three months.

There is no doubt that Microsoft could build everything we have and successfully roll them out. The question is how long it would take, including testing, and how many copies of Notes, rather than Exchange, would be sold in that period.

Valuing Knowledge Assets

In my view, as development must, in part, be sequential, it would take Microsoft at best twelve, and probably about eighteen months to have all these products fully tested and commercially available. In the same period, Joiner could roll out at least two upgrades of all of them.

Currently, Notes has about nine million copies in use, compared with around two million for Exchange; in the next year, Notes is expected to add another six million. With full Notes connector capabilities integrated into Exchange Version 5.5, Microsoft should have a reasonable chance of obtaining 25%, or 1,500,000 additional copies of Exchange.

A further potential market for Microsoft, with Notes capabilities integrated into Exchange Version 5.5, is represented by the many users of Notes as a mailer rather than a workgroup product; these are estimated to be two-thirds of the total Installed Base. With the better mail transport of Exchange and Joiner's calendaring ability, it is likely that a large number of existing Notes Mail users would convert to an Exchange backbone; my estimate is 1,000,000 over three years.

Thus a "Buy" rather than "Build" approach gives Microsoft the potential of selling a further 2,500,000 copies of Exchange, which otherwise would go to Notes, as a result of the much faster time-to-market. Using an average revenue of US \$40 per copy, this opportunity could generate US \$100 million in potential revenue for Microsoft, and create at least US \$10 million in value for Joiner.

"Plucking the Low Hanging Fruit"

There are more than 40 million users of host-based mail systems looking for a migration path. Some of these enterprise systems are mainframe-based and some are LAN based; all are candidates for Exchange. However, Microsoft considers itself a "shrink wrap" company without the capability of supplying service at the level expected by "glass house" operations. Recent agreements with Digital and Amdahl will supply Joiner products with 7/24 service capability throughout the world.

Joiner has already built connectors for nearly all of the host-based systems so that they can co-exist with and migrate to Exchange. By integrating these and the Directory Synchronization capability into Exchange Version 5.5, Microsoft could outflank IBM, as that firm must rely on Soft-Switch to integrate any orphan (non-IBM) systems into Notes.

Over the next two years, this capability has the potential of adding between 16,000,000 (40%) and 24,000,000 (60%) copies of Exchange. Using the minimum, and ascribing a value of only \$1.00 per potential sale, this opportunity adds \$16,000,000 to the value of Joiner.

The first two strategic advantages give US \$26,000,000 as the value of Joiner's major Knowledge Assets:

Valuing Knowledge Assets

	US \$'000
Notes Containment	10,000
Low Hanging Fruit	<u>16,000</u>
	<u>26,000</u>

There are also two other medium to longer term strategic advantages of an acquisition: "Soft-Switch Displacement" and "Application Distribution".

"Soft-Switch Displacement"

An integral part of IBM's emerging strategy is the use of Soft-Switch installations for linking disparate mail systems. At present, there are about 700 of these, with 400 using technology licensed from Joiner.

Recently, Joiner has started developing software, running on Windows NT that handles all the Soft-Switch functions, including those in the Soft-Switch ATK (Application Tool Kit) Utilities. This should be available in three months.

Many companies find Soft-Switch installations difficult to manage as they run only on Data General equipment, and would like to replace them with a Joiner System running on NT with Exchange on the same server.

Installation of such Systems would be undertaken by system integrators. Based on a retail price of \$100,000 (\$60,000 to Microsoft) and replacement of 350 (50%) Units, the potential revenue is \$21,000,000; this should add \$2 million to the value of Joiner.

"Application Distribution"

IBM has positioned Notes as a data and application distribution mechanism. This creates an opportunity for Microsoft to replace IBM 3270 terminals with BackOffice running on a PC.

Joiner is developing an NJE Connector that will allow Host Applications to be distributed by Microsoft Exchange Server. NJE is a protocol embedded in every IBM host operating system. Once Joiner replaces Soft-Switch's ATK, all components required to link IBM hosts to Exchange Server will be available to Microsoft on an Acquisition.

Conservatively estimated, there are 5,000 installations using mainframe applications; over three years, about 25% could switch to Microsoft Exchange distribution facilities. This type of software is sold through system integrators and is assumed to retail for about \$200,000, of which \$100,000 a copy would come back to Microsoft. For 1,250 installations, this represents a potential \$125 million in longer term revenue.

Valuing Knowledge Assets

At that time, CVS and the Board of Directors considered the value of Joiner to Microsoft to be US \$34 million, made up as follows:

US \$'000	Potential Revenue from Exchange	Value
Containment Lotus Notes	2,500	10,000
Low Hanging Fruit	<u>24,000</u>	<u>16,000</u>
	<u>26,500</u>	<u>26,000</u>
Soft-Switch Displacement	21,000	2,000
Application Distribution	<u>125,000</u>	<u>5,000</u>
	<u>146,000</u>	<u>33,000</u>
Cash, Receivables etc.-net		<u>1,000</u>
		<u>34,000</u>

Value from Comparables

At the time (1997), the best comparables to Joiner among US public companies were Worldtalk, with a market capitalization of about US \$80 million, and the smaller ISOCOR, at US \$41 million.

Worldtalk is about 2.9 times the size of Joiner, with December 1996 revenues of US \$14.2 million, compared with Joiner (May 1997) of US \$4,900,000. Worldtalk has a better distribution system but considerably inferior products; in fact, they license certain technologies from Joiner. On a comparative sales basis, Joiner is worth US \$27,600,000. Adding a 20% control premium and the other assets of US \$1 million gives a takeover value of US \$34 million.

While having a smaller capitalization than Worldtalk, ISOCOR is bigger than Joiner, with sales about the same as Worldtalk. It uses OEM distribution, resulting in lower margins. In our view, ISOCOR is worth only about a 20% premium to Joiner for being a public rather than a private company.

We all like stories with happy endings, and this one had a particularly happy one: after originally offering US \$16 million, Microsoft bought Joiner for US \$30 million, which was 12% below the figure I came up with. This was definitely a David and Goliath situation, but it clearly demonstrates an important factor in arriving at this conclusion: we had done our homework on the Knowledge Assets, taken all factors into account and could present their irrefutable value that Joiner would bring to Microsoft.

CASE STUDY III

Many companies making acquisitions do not know exactly what they are getting. The purchase price is normally based on earnings, future cash flows and the benefits of syzygies (unions of two

Valuing Knowledge Assets

related things). A rigorous analysis of what the buyer actually receives is essential. After all, cash flows come from the prudent utilization of assets, financial, physical, legal and intellectual.

In early 2000, a NASDAQ listed client purchased a company in the same line of business, communications equipment. The Target, operating since 1986, has installations in over 30 countries and offices in Nashville, Tennessee, Great Britain, Germany, and Beijing. Their segment of the market is small, only about US \$720 million a year, growing by about 3%. Sales in 1999 were: North America (32%), Europe (53%), Asia & Africa (15%).

Earnings Record

Unlike the big name Telco suppliers, Target's sales had been relatively static, between US \$15 million and US \$19 million, while profits had fluctuated, as shown in the table below.

	US \$'000				
Year to February 28	1996	1997	1998	1999	2000
Sales	19,220	17,150	15,675	15,380	18,000
Gross Profit	8,795	8,505	8,000	8,350	9,110
Expenses					
Sales	1,417	1,205	1,450	1,260	1,275
R & D	1,608	1,465	1,145	1,285	1,530
Administration	4,640	5,170	4,043	4,595	4,680
Interest-net	180	115	62	5	5
	<u>7,845</u>	<u>7,955</u>	<u>6,700</u>	<u>7,145</u>	<u>7,490</u>
Pre-tax Profit	950	550	1,600	1,205	1,620
Income Tax	405	235	680	515	690
Net Income	<u><u>545</u></u>	<u><u>315</u></u>	<u><u>920</u></u>	<u><u>690</u></u>	<u><u>930</u></u>

Target was owned by management (53%) and Venture Capital firms. The price was US \$10,975,000, of which US \$8 million was cash and US \$2,975,000 shares to a venture capitalist. The Price/Earnings Ratio was 11.8 times, with Goodwill of US \$7,288,000.

Valuing Knowledge Assets

Financial Position

The financial position of Purchase was good, as shown below:

	US \$'000
Assets	
Cash	739
Receivables	2,835
Inventories	1,940
Equipment-net	451
	<u>5,965</u>
Liabilities	
Bank	1,027
Payables & Accruals	903
Capital Leases	348
	<u>2,278</u>
Equity	
Share Capital	200
Retained Earnings	3,487
	<u>3,687</u>
	<u>5,965</u>

Intention

The intention of the acquisition was to increase market share by giving Buyer access to new geographical areas and a broader product range. A single item, SNOOKS, accounted for about 65% of Target's sales; re-sale units represented 18%.

The principal legal and intellectual assets acquired were:

- Long Term Leases on office and R & D space;
- Sales Channels, including distributors with whom Buyer had sought to obtain a relationship;
- Brand Name "SNOOKS";
- Core Technology, mainly relating to the SNOOKS products;
- Customer Base, principally SNOOKS users;
- New Products, including In-Process R & D.
- Distribution Rights from outside suppliers.
- Engineering Workforce.

Valuing Knowledge Assets

Long Term Leases

The long-term Leases expire in August 2017, with a remaining life of 17.5 years; they cover 12,000 sq. ft. of fully built-out office space, some of which is used for R & D and building of prototypes. Target sub-contracts all its manufacturing.

The Leases were entered into during 1992, the depths of the last recession, at a net rent of US \$1.60 per sq. ft. The current going rate is US \$5.50 a sq. ft., giving Target savings of US \$46,800 a year. The present value of this amount at 12% over the remaining term is US \$333,263. Rounded to US \$335,000, this is the value of the Leases.

Sales Channels

Another major asset of Target is Agreements with distributors in the US, Britain, China, France, Germany, Holland and Poland. Both Buyer and Target deal with two of the three large national distributors in the United States. Individually, their volume is close to minimum levels; together they easily exceed them. In other markets, Target had been successful in reaching national customers, while Buyer was usually limited to the regional level.

Total sales by Target in fiscal 2000 through distributors with whom Buyer did not have a relationship were US \$5,543,000 (30.8%); at a Gross Margin of 50.6%, this generated US \$2,805,000 of Gross Profit. Discussions with several computer hardware clients indicate that a long-term Distribution Agreement, such as those of Target, is worth about one month's Gross Profit for each future year. CVS has chosen US \$1,400,000 (six months' Gross Profit) as the value of the Sales Channels acquired.

Brand Name

SNOOKS is the leading brand in many markets, with a reputation as a solid, reliable, easy-to-configure, out-of-the-box product. In the year to February 29, 2000, SNOOKS' sales were US \$10,637,000, more than twice those (US \$4,710,000) of the second-ranked comparable product. With a gross margin of 63.0% and a pre-tax contribution of 19.0% after product development costs but before corporate R & D, these extra sales in the amount of US \$5,927,000 generate about US \$645,000 a year net of tax at 42.7%.

Even though the existing product design is likely to be replaced during the next five years, the SNOOKS name will continue to be used for the replacement units. The present value of the net contribution, at 20% for ten years (two product generations), is US \$2,706,000 (using a factor of 4.193 times). Rounded to US \$2,700,000, this is the value of the SNOOKS Brand Name.

Valuing Knowledge Assets

Core Technology

The Core Technology relates to the SNOOKS products; the others use either acquired technology or one that is being developed. CVS adopted the "relief-from-royalty" method to establish the value for the Core Technology. Licensing rates for this type of product range from 6% to 8% of sales. The middle of the range gives about US \$745,000 a year before tax, using fiscal 2000 revenues. The present value at 20% of the net amount over the expected five years' remaining economic life of the present product is US \$1,275,000 (a factor of 2.99 times); this is the value of the Core Technology.

Customer Base

As Target sells through distributors and warranty requirements are slight, it has not been able to persuade many end users to register; therefore, there is no database of customers. Volumes are increasing: in the United States, deliveries doubled between 1998 and fiscal 2000. Current shipments in that market are about 5,000 units a year.

From serial numbers and shipping records, management estimated that about 80,000 SNOOKS units had been sold. The average installation is estimated at 5.4 units, for a total of 14,800 customers. Using a modest US \$40 for each gives US \$592,000; rounded to US \$600,000, this forms the value for the Customer Base.

New Products (In-Process R & D)

When acquired, Target had fourteen R & D projects underway, of which six related to a new product family in the late Beta stage. At that time, US \$1,322,000 had been spent on its development, which was expected to generate sales as follows:

Year to February 28	2001	2002	2003	2004
Revenues US \$'000	1,250	2,400	1,600	1,425
Gross Margin	46%	48%	49%	50%
Gross Profit	575	1,152	784	713

Based on estimated future R & D and marketing costs, the contribution after tax of the New Products is US \$852,000, using a 25% discount rate; rounded to US \$850,000, it forms the value of the New Products, including the In-Process R & D.

Distribution Rights

Target distributes three sets of products manufactured by others; their revenues for fiscal 2000 were US \$3,185,000, at a gross margin of approximately 30%. Based on transactions in Distribution Rights, we believe that in this case, they are worth 4% of revenues annually, and that

Valuing Knowledge Assets

they have a life of five years; using a 20% discount rate gives a present value of US \$381,000. Rounded to US \$380,000, this forms the value for the Distribution Rights.

Engineering Workforce

The engineering team consisted of fifteen people in Britain and the United States. Our approach to valuing this organization was to establish the reproduction cost of two items: head hunter fees and salaries for the time spent climbing the learning curve.

The four principal engineers were considered individually and the remainder in groups. Head hunter fees were between 10% and 20% of payroll, increasing to 25% for the Chief Technology Officer ("CTO"). Learning curve pay was calculated using a sum-of-the-digits approach, based on estimates of the time to reach reasonable proficiency; this was nine months for the CTO, six for the principal engineers, and between three and five for the rest. The total of head hunter fees and learning curve pay for the Engineering Workforce is US \$426,000; rounded to US \$425,000, this forms the Value for the Engineering Workforce.

Intellectual Assets

The following table sets out the values of the various Intellectual Assets determined independently. Their total, US \$7,965,000, exceeds the Goodwill of US \$7,288,000 by US \$677,000, or 8.5%. The values of these Assets have been allocated by reducing each item by 8.5%.

	Determined Value US \$'000	Allocated Value US \$'000
Long Term Leases	335	307
Sales Channel	1,400	1,281
Brand Name	2,700	2,470
Core Technology	1,275	1,167
Customer Base	600	549
New Products (In-Process R & D)	850	778
Distribution Rights	380	348
Engineering Workforce	<u>425</u>	<u>388</u>
	<u>7,965</u>	<u>7,288</u>

Many acquisitions are considered to be failures as they do not result in an increase in the value of the shares of the combined company. The process described in this Case Study is a useful exercise in establishing which group of shareholders benefits most from an M & A transaction.