Delhi Business Review ✠ Vol. 5, No. 1, January - June 2004

VALUE OF KNOWLEDGE ASSETS
TECHNIQUES AND PROBLEMS

M. Shane Tomblin*
Suneel K. Maheshwari**

THE double entry accounting method developed during the 1400 has always been focused on tangible assets. Within the last several years, however, practitioners and researchers have begun to realize that intangible assets form the bulk of the value of modern organizations. One such intangible asset, knowledge, has received a great deal of attention in recent years. In fact, knowledge has become such an important asset to firms that the concept and practice of knowledge management have figured prominently in firms' strategic plans. If knowledge is going to be understood as an asset, some have begun to proclaim the need to assign a definite value to it. This has important implications for financial reporting and managerial decision-making. While a promising step in the right direction, the various methodologies that have sprung up to deal with the value of intangible assets have some serious shortcomings when applied to knowledge assets.

Introduction

When those inside or outside an organization want to know how well the business is doing, they tend to look for information on its assets. Assets are usually understood as those things with physical properties. Fleets of trucks, machinery, land, buildings, and cash are all easily understood as assets. Moreover, accountants have well defined ways of determining the value of such things. The problem is that such tangible assets are beginning to make up less and less of companies' perceived value, while intangibles are making up more and more. The accounting profession has been hard pressed to develop ways to determine the value of intangibles. While there are several types of intangible assets, the focus of this paper will be on knowledge assets. The organization of the paper will be as follows: first, as a foundation for understanding the difficulties in accounting for knowledge assets, knowledge assets will be defined followed by a discussion of the nature of knowledge and the reasons for its rise in value to organizations. The third section will discuss what has been done so far in the area of knowledge asset valuation. The fourth section will discuss some problems with proposed valuation methods. The paper will conclude with some suggestions for dealing with this problem.

Defining Knowledge Assets

A potential problem in determining the value of knowledge assets is to understand as to what they actually are. First, knowledge is an intangible asset. Intangible assets may be understood to be all other assets that are not tangible. A more precise definition is gleaned from IAS 38[1] and given by Cearns (1999):

> "… separately identifiable, nonmonetary, without physical substance and held by an entity in order to produce or supply goods or services, to rent to others or for administrative purposes."

With this definition the reader may begin to see as to why knowledge has been ignored for so long as an asset.

Next, knowledge assets are also known as intellectual capital and knowledge resources. You may find some of these used interchangeably in the remainder of the paper. Knowledge assets have been defined variously:

* *Division of Management, Marketing, and MIS, Marshall University, WV.*
** *Associate Professor, Division of Accountancy and Legal Environment, Marshall University, WV.*

- "…an intelligence-derived production input that companies combine with other production inputs – raw materials, producer goods and physical labor – to create goods and services for sale" (Rennie, 1999)
- "Everything that contributes to profitability that isn't a physical or financial asset" (Baruch Lev, quoted in Kroll (1999))
- "…the creativity of knowledge workers combined with technological and market know-how." (Halliday, 2001)

Knowledge and Its Importance

The importance of knowledge is attested to by many researchers. Sage and Rousse (1999) state that "*…availability of technologies for information capture, storage, and processing has led to information, as well as its product – information and knowledge – as a fourth fundamental economic resource for development*." Stewart, *et. al.* (2000) claim that "*… companies that use knowledge effectively tend to be more valuable and enjoy higher levels of success year after year than do other companies*." Truch (2001) gives similar weight to the importance of knowledge.

There are also some surprising numbers to back this up. Margaret Blair of the Brookings Institute in Washington (Dzinkowski, 1999) was able to show that the "missing value" [read intellectual capital] in companies has grown from about 38% in 1982 to about 62% in 1995. Baruch Lev (see Melymuka, 2000) estimates that the market value of the Standard and Poor's 500 averages six times the net asset value on the companies' balance sheets. This implies that traditional accounting methods are only measuring about 15% of companies' value. What is the missing value? A good deal of it at least, and maybe all, is knowledge capital.

The rise of the importance of knowledge is tied to the history of the development of information and communication technologies. The first business computers were mainly used to automate common business tasks, such as financial record keeping, data storage, and document development. Microsoft has made a fortune in developing its Office© suite containing database, word processing and spreadsheet applications. During the last three decades of the twentieth century these, and other, types of software were used to amass huge stores of data, information, and knowledge.[2] The World Wide Web upset the balance of power in the early 1990s. Seeing people flock to the Web, businesses realized the potential in attracting and retaining customers. Once companies began posting information and selling products on the Web, customers realized that they could obtain much more information to inform their purchase decisions. The Web was both blessing and curse to businesses for, while they could now reach customers that they never could before, they also found themselves competing with firms they had never competed with before. So, companies had to find new processes for doing business. New processes require new knowledge. In the background of these happenings, businesses also realized the potential of information and communications technologies to transform business-to-business relationships. E-mail and electronic data interchange were the first big tools. Orders for stock could be placed and filled faster. Electronically facilitated collaborations with suppliers altered business processes, requiring a change of know-how. Because of the volatility of the environment, businesses have begun to emphasize the processes that they are best at, called *core competencies*, and to slough off the processes that are least vital to their success. The knowledge associated with those deleted processes is no longer retained within the firm. Firms have also discovered that knowledge necessary to realize new business opportunities can be found outside their boundaries. The upshot of all the foregoing is that these changes make knowledge absolutely vital to the success of business organizations. Grover and Davenport (2001) give a similar history of the rise of knowledge.

Valuing Knowledge Assets

Despite the relatively high value of knowledge, determining a precise figure for the value of knowledge has proven very difficult. One of the reasons that precise measures for the value of knowledge are in short supply is that knowledge, being an intangible, is often lumped in with other intangibles in valuation approaches. Another problem stems from not being able to distinguish between the effects of different knowledge assets. Klock and Megna (2000) conducted a study in which they explored the impact of intangible capital, specifically advertising and R&D expenditures, on firm value in the wireless communications industry. R&D can be classified as a knowledge asset. Their study involved the regression of types of intangible capital on Tobin's q, or q ratio. Tobin's q is the ratio of the market's valuation of the financial claims on a firm to the cost of replacing that firm's assets. Of the four regressions conducted, the last containing variables for advertising, liscencing, and R&D had

the highest adjusted correlation. The authors' discussion of their results admits a difficulty in separating the effects of R&D and liscencing.

The approach advocated by Baruch Lev is described in different ways. Mooney (2000) details the four steps in Lev's approach to intangible asset valuation.

1. Determine an estimate of annual earnings. This can be, for example, an average of the past three years
2. Determine the expected earnings from tangible capital
3. Determine the expected earnings from intangibles. This is arrived at by subtracting earnings due to tangible capital from total earnings.
4. Discount the figure in Step 3 to arrive at the present value of intangible capital.

Bernhut (2001) provides another description of Lev's approach. This description of the method is similar to that given above, except it seems now that the residual value from subtracting the return on physical and financial assets from total earnings (what Lev labels 'performance') is now totally an estimate of earnings due to knowledge capital.

Economic value added (EVA) has also been used to determine the value of knowledge assets. EVA was developed by Stern Stewart & Company. The basic equation is

EVA = Net operating profit after taxes – (Capital × Cost of Capital)

Once again, the problem of being able to distinguish between knowledge assets and other assets remains.

A very promising system has been developed at Skandia AFS through the efforts of Karl-Erik Sveiby and Leif Edvinsson (see Melymuka, 2000). They have developed a three-model system that allows companies to identify their knowledge assets, assign specific financial values to them, and create an intellectual capital index to measure performance and make decisions.

Problems with Knowledge Asset Valuation

Even though some fairly great strides have been taken in the area of knowledge asset valuation, some really big obstacles remain in the way. First, the definition of intellectual capital needs greater solidification in the minds of those outside the research community. The idea of what makes up intellectual capital will affect how it is identified, and subsequently, how it is valued. Second, it is not entirely clear that knowledge assets are simply what is left over after deducting tangible assets. Moreover, the difference between the market value of a company and its book value, or the difference between total earnings and earnings due to tangible assets, may not be totally equal to the value of knowledge assets. After all, customers sometimes form preferences for certain products or brands, which translate into earnings for a company, that may not have anything to do with knowledge, *per se*. The place occupied by brand as a knowledge asset needs some rethinking. A third problem that remains to be solved is developing a standard method for knowledge asset valuation. The methods mentioned previously are all proprietary. They are also all a little bit different and could assign different values to the same knowledge assets.

A fourth problem is presented by the difference between actual and potential benefits of knowledge assets. Rennie (1999) points out that expenditures for intellectual capital can be divided into two categories, depending on the uncertainty associated with the future benefits to be derived. She calls *knowledge assets* those expenditures that are likely to generate future benefits. Potential knowledge assets are those expenditures with a high uncertainty surrounding future benefits. An understanding of this can be highlighted by an example. Compare a unit of software used regularly by a company to a customer database. The regularly used software has an identifiable benefit to the company, and can be assigned value as a knowledge asset. Depending on the nature of the database, the money put into its development, especially if it is a legacy database, may not be met with returns on the investment.

The stickiest problems involved in the valuation of knowledge assets will only be solved when the management of knowledge (the practice of which is known as knowledge management) becomes more ingrained in the minds

of managers, not to mention other business constituents. The nature of knowledge production and use needs to be second nature to future knowledge workers, as well as accountants. Consider the following list of knowledge production items by Hebeler and Van Doren (1997):

- **Costs of raw materials** – The raw materials of knowledge assets are data and information. Data and information that was inaccessible days or weeks ago, can suddenly become available.
- **Production costs** – Knowledge assets require early, high, fixed costs.
- **Production methods** – Producing knowledge assets is much less predictable than producing traditional ones. Software engineers and programmers can tell you that finished products are not always finished products.
- **Storage location** – The integration of knowledge with product and production methods is what creates the knowledge asset. Software, production methods and policies, and personnel know-how are all knowledge assets. The knowledge contained in these assets is stored differently.
- **Inventory and Depreciation** – Where are all of a company's knowledge assets? Knowledge that once held value may no longer. Conversely, information and knowledge stores that were once thought drained of their usefulness may yet yield new benefits. This is one of the hopes of data-maining.

Finally, one of the soon-to-be recognized problems with assigning value to knowledge assets is tied to the evolving nature of modern firms. Organizations are increasingly forming alliances with other organizations. The realization that they cannot do everything well and remain competitive has caused many firms to rid themselves of certain functions to concentrate on what they do best. Alliances are formed with the specific intent of "borrowing" know-how from other businesses. If a relationship is a knowledge asset, who gets to record the asset valuation? Another problem may present itself in the value of knowledge obtained incidentally from 'communities of practice' involving members from outside an organizations boundaries. What is the expenditure associated with this?

Conclusion

It is obvious that steps are being taken to alleviate the problems of the valuation of knowledge assets. But much remains to be done. As mentioned previously, the worst problems associated with the value of knowledge assets will be overcome when knowledge management is more ingrained in the minds of managers and other business constituents. This will happen as the field of knowledge management matures and becomes a more solid strategy. When managers are able to confidently pair a knowledge asset with a product or service, valuation will follow a lot easier. This is already beginning to happen, but many of the projects attempting this have failed due to difficulty of use. Truch (2001) suggests that success will be found in projects that are "…based on strategic alignment of knowledge systems and use the organization's key processes as the framework for evaluation of knowledge assets." Truch recommends that organizations should identify and map the 'knowledge value chain.' This is achieved by following the main processes in an organization to develop an inventory of the more important knowledge assets. This allows the identification of the stages at which key knowledge assets are generated or utilized. This permits costs to be assigned to the knowledge assets identified in the chain and value added to be tracked as knowledge assets are used in the associated processes.

Notes

1 See http://www.iasc.org.uk/cmt/0001.asp?s=225009&sc={2D36FA73-04DD-477D-99E7-3F6832B0458D}&sd=822173565&n=982)

2 For the sake of convenience no distinction will be made between data, information, and knowledge. Knowledge will be used to encompass all three. The interested reader should see Holsapple and Whinston (1996), Decision Support Systems: A Knowledge-Based Approach.

References

Bernhut, Stephen (2001) Measuring the Value of Intellectual Capital, Ivey Business Journal, March/April, vol. 65, no. 4, p.16-20.

Cearns, Kathryn (1999) Accounting for the Intangible, Accountancy, July, vol. 124, no. 1271, p.82-83.

Dzinkowski, Ramona (1999) Managing the Brain Trust, CMA Management, October, vol. 73, no. 8, p.14-18.

Grover, Varun and Thomas H. Davenport (2001) General Perspectives on Knowledge Management: Fostering a Research

Agenda, Journal of Management Information Systems, Summer, vol. 18, no. 1, p.5-21.

Halliday, Leah (2001) An Unprecedented Opportunity, Information World Review, March, no. 167, p.18-19.

Hebeler Jr., John W., and Doris C. Van Doren (1997) Unfettered Leverage: The Ascendancy of Knowledge-Rich Products and Processes, Business Horizons, July/August, vol. 40, no. 4, p.2-10.

Klock, Mark and Pamela Megna (2000) Measuring and Valuing Intangible Capital in the Wireless Communications Industry, The Quarterly Review of Economics and Finance, vol. 40, p.519-532.

Kroll, Karen (1999) Calculating Knowledge Assets, Industry Week, July 5, vol. 248, no. 13, p.20-21.

Melymuka, Kathleen, (2000) Showing the Value of Brainpower, Computerworld, March 27, vol. 34, no. 13, p.58-59.

Mooney, Sean F. (2000) P-C 'Knowledge Capital' Can Be Measured, National Underwriter, Decemeber 18 – December 25, vol. 104, nos. 51/52, p.19-21.

Rennie, Morina (1999) Accounting for Knowledge Assets: Do We Need a New Financial Statement?, International Journal of Technology Management, vol. 18, nos. 5/6/7/8, p.648-659.

Sage, Andrew P. and William B. Rousse (1999) Information Systems Frontiers in Knowledge Management, Information Systems Frontiers, vol. 1, no. 3, p.205-219.

Stewart, Kathy A., Richard Baskerville, Veda C. Storey, and James A. Senn (2000) Confronting the Assumptions Underlying the Management of Knowledge: An Agenda for Understanding and Investigating Knowledge Management, Database for Advances in Information Systems, Fall, vol. 31, no. 4, p.41-53.

Truch, Edward (2001) Knowledge Management: Auditing and Reporting Intellectual Capital, Journal of General Management, vol. 26, no. 3, Spring, p.26-40.