IC VALUATION & MEASUREMENT

WHY AND HOW?

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Abstract

Many methods for the valuation or measurement of Intellectual Capital can be characterized as ‘solutions in search of a cause’. It is often unclear what the organizational problem is the methods intent to solve. In general, the field of IC performance measurement has paid little attention to organizational diagnosis and the 'Why' question. Another area that requires clarification is the 'How' question. There seems to be confusion about the distinction between valuation and measurement. The distinction is fundamental yet not recognized in the field. This paper helps to clarify these two areas of confusion: 'why' and 'how'. It describes the various motives for IC performance measurement. In addition, the paper clarifies the difference between various forms of valuation and measurement. Answering these questions will help the field to move forward, both in the theoretical discussion of IC measurement as in reconciling the tension between high quality research and practitioner relevance.

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Introduction

In the past ten years we have witnessed an explosion of new methods for the valuation or measurement of intangibles. Overviews by Sveiby (2002), Bontis (2001), Bontis et al. (1999), Luthy (1998), Petty and Guthrie (2000) and Andriessen (2004) identify over 30 different methods and there are many more models out there. The subject of intangibles is addressed by various disciplines including accountancy, information technology, sociology, psychology, human resource management and training and development (Bontis, 2002) as well as management research.

The enormous amount of methods is probably the result of the fact that "…*Intellectual Capital research has primarily evolved from the desires of practitioners*" (Bontis, 2002, p. 623). Great progress has been made in creating sophisticated measurement tools and methods. Great confusion has been created about the underlying concepts and motives.

Analysis of the various methods (Andriessen, 2004) shows that they are based on a wide variety of problem definitions that are sometimes made explicit but often remain implicit. In fact, many methods can be characterized as ‘solutions in search of a cause’. It is often unclear what the organizational problem is the methods intents to solve. In general, the field of IC performance measurement has paid little attention to organizational diagnosis. Generic methods have been proposed as a cure for all diseases, without even knowing which diseases exist. Therefore, it is of no wonder that Rylander et al. (2000) found that analysts consider IC statements of little use.

Another area of confusion is the distinction between valuation and measurement. The methods use a broad array of approaches under various headings like valuation, financial valuation, measurement and assessment. However, there is a clear and distinct difference between valuation and measurement. This distinction is not yet recognized in the field and the concepts are being confused. For example, lack of insight into the value of IC is often used as a motive for creating IC reports, like for example by Edvinsson and Malone (1997) and Roos et al. (1997). Yet, the methods these authors propose do not value intangibles; they merely measure variables.

This paper explores these questions of the 'why' and 'how' of IC valuation and measurement. The inquiry into the underlying problem definitions of the IC movement will both help to build a strong theoretical foundation and make the field more practical and successful in solving business problems. In addition, the paper clarifies the difference between various forms of valuation and measurement. This answers the “how” questions in the title. Answering these questions will help the field to move forward, both in the theoretical discussion of IC measurement as in reconciling the tension between high quality research and practitioner relevance.

Why: Motives for valuation or measurement

IC valuation and measurement methods address a wide variety of problems. We can group these into problems around improving internal management or improving external reporting (Andriessen, 2002b). There can also be statutory or transactional reasons to analyze the value of intangible resources, creating a third group of problems. A fourth group of problems deals with the accuracy and reliability of national accounts (see for example Gröjer & Johanson, 2000). This latter issue is beyond the scope of this paper.

Improving internal management

Some authors refer to improving internal management as improving management accounting (Stewart, 2001) and management control (Gröjer and Johanson, 2000). According to Eccles (1991), the use of non-financial performance measures to improve internal management dates back as far as 1951 when General Electric installed a high-level task force to identify key corporate performance measures. The French 'Tableau de Bord' is a measurement tool that even dates back to 1932 (Nørreklit, 2000). During the 1980s, the Total Quality Movement introduced various quality measures. In the beginning of the 1990s measures of customer satisfaction where introduced. In 1992, Kaplan and Norton published their famous article on the Balanced Scorecard.

The issue of improving internal management is a wide issue. Various problem definitions fall into this category. The problem definitions can be grouped into eight categories of problems (see table 1). This categorization is based on an analysis of 25 existing methods and additional literature on the subject (Andriessen, 2004).

Table 1: Internal management problem definitions

(Andriessen, 2004)

1.	"What gets measured gets managed"
2.	Improving the management of intangible resources
3.	Creating resource-based strategies
4.	Monitoring effects from actions
5.	Translating business strategy into action
6.	Weighing possible courses of action
7.	Measuring income in a reliable way
8.	Enhancing the management of the business as a whole

The first category of problem definitions is the popular notion that management requires measurement or that measurement will lead to better management. A typical example is Standfield's motivation for measuring intangibles: "*As intellectual assets are the most important assets within any business, they must be measured and managed according to the most objective means possible*." (Standfield, 2001, p. 316). If we compare this with the following statement: "*As food and drink are the most important means for any human being to stay alive, they must be measured and managed according to the most objective means possible*", it becomes clear that the importance of intangibles is neither a necessary nor a sufficient condition for measurement. Moreover, measurement is neither a necessary nor a sufficient condition for management. Stewart (2001, p. 291) calls the phrase 'You cannot manage what you cannot measure' *"…one of the oldest clichés in management, and it's either false or meaningless. It's false in that companies have always managed things – people, morale, strategy, etc. – that are essentially unmeasured. It's meaningless in the sense that everything in business – including people, morale, strategy, etc. – eventually shows up in someone's ledger of costs or revenues.*" Therefore, we need a more detailed problem definition to justify the measurement of intangible resources.

We find a second, more valid group of problem definitions in the IC and HRA literature. This category is based on the belief that intangible resources are not managed properly, that they deserve more management attention and that they need to be managed differently than other resources. This has been the driving force behind Human Resource Accounting, and has inspired IC authors like Roos, Sveiby and Edvinsson. Sveiby for example, has made it his task to supply managers with a toolbox to help them in managing knowledge-based companies. Included in this category of problem definitions are problems around the lack of awareness about the importance of intangible resources. Awareness is a requirement for management.

Yet, improving the management of intangible resources is not a very specific problem definition. Kaplan and Norton (1992) are more concrete and they identify a third category of problems. Their aim is to complement financial measures of company performance with operational measures in order to create a balanced view on both results of action already taken and drivers of future financial performance. This means they want to create insight into the value drivers: the vital resources that determine future success. Those resources will often be intangible. They are the basis for creating resource-based strategies. To help develop these strategies they use a tool called a 'strategy map' (Kaplan and Norton, 2001). Roos et al. (2001) also use the intangible perspective to help create resource-based strategies.

Second aim of the method of Kaplan and Norton – the Balanced Scorecard – is to measure performance in balanced way as a feedback mechanism for management actions. This fourth category of problems lies at the core of the performance measurement community but also plays an important role in the IC community. The accounting community also adopts this perspective, but is specifically interested in monitoring the effects of investments in intangibles to be able to calculate some form of return on investment (Webber, 2000).

After working with their method for a couple of years Kaplan and Norton found it addresses a more fundamental problem: how to link a company's long-term strategy with its short-term actions (Kaplan and Norton, 1996). Therefore, their problem definition shifted from measuring performance to strategy implementation. "*But we learned that adopting companies used the Balance Scorecard to solve a much more important problem than how to measure performance in the information era. That problem, of which we were frankly unaware when first proposing the Balanced Scorecard, was how to implement new strategies*." (Kaplan and Norton, 2001, p.viii). This leads to a fifth category of problems. Pike & Roos (2000) describe this category as translating strategic intent into actions.

Roos has been one of the strongest advocates of methods that allow for making trade-off decisions. According to Roos et al. (1997), that is where the early IC models (which they referred to as first generation models) fall short. "*IC systems have long lists of indicators with no prioritization, thus making it impossible for managers to evaluate trade-off decisions*" (Ibid., p.7). The sixth category of problems is especially concerned with making trade-off decisions. This requires a method that consolidates different indicators into one measure of value.

A seventh group of problem definitions originates from the accounting community. Although the accounting community is primarily concerned with the quality of corporate reporting, it does address elements of internal management because information that is reported externally is also used to make internal decisions. The accounting community is struggling with intangible assets because intangibles frustrate the important accounting concept of periodically matching costs with revenues. For example, R&D investment in product and process innovation is immediately expensed in financial reports as if no long-term benefits are expected from it. This interferes with the accounting concept of periodically matching costs with revenues. This concept is crucial in measuring income and assets in a reliable way.

The last category of problems looks at the business as a whole. An example is the method of Economic Value Added (EVA™, a trademark owned by Stern Stewart & Co). EVA is not a method specifically designed to measure the value of intangibles. Its aim is much wider. The problem EVA addresses is poor management decision-making that destroys shareholder wealth. According to EVA advocates, poor decision-making is often a result of using the wrong indicators of wealth creation, like return on investments or return on assets. The problem with most traditional indicators is that they are based on accounting derived earnings instead of cash flow and that they do not include the cost of capital into the equation. EVA was developed to correct this.

It is clear from this overview that authors in the field of measuring the value of intangible resources use many different problem definitions when it comes to improving internal management. They range from clichés like 'what gets measured gets managed', to the general problems of managing intangibles, to the specific problem of matching costs with revenues.

Improving external reporting

Within the accounting profession, the problem of intangibles is often described as one of "*relevance lost*" (Johnson and Kaplan, 1987). This includes a loss of relevance of the financial statements to managerial decision-making and a loss of relevance of financial reporting to external stakeholders. In this paragraph, I focus on financial reporting to external stakeholders. Problem definitions regarding external reporting can be clustered into five categories of problem definitions (see table 2).

Table 2: External reporting problem definitions

(Andriessen, 2004)

1.	"Closing the value gap between book and market value"
2.	Improving information to stakeholders about the real value and future performance of the enterprise
3.	Reducing information asymmetry
4.	Increasing the ability to raise capital
5.	Enhancing corporate reputation and affecting stock price

The first category has to do with the notion that we need to close the growing value gap between book and market value. However, is that the case? Is the financial statement becoming less and less relevant because of this value gap? Let's dig a bit deeper into this issue. A discussion about the relevance of financial statements for external stakeholders must start with the objectives of financial reporting. FASB Concepts Statement No. 1 describes three objectives:

- Financial reporting should provide information that is useful to external stakeholders in making rational investment, credit and similar decisions;

- It should provide information to help users in assessing the amounts, timing, and uncertainty of prospective net cash inflows to the enterprise;
- It should provide information about the economic resources of an enterprise, the claims to those resources and the effects of events on those resources.

So contrary to popular belief, it is not the objective of the balance sheet to approximate the market value of a company (Rutledge, 1997; White et al., 1998). Upton (2001, p. 60) phrases this misunderstanding as follows: "*If accountants got all the assets and liabilities into financial statements, and they measure all those assets and liabilities at the right amounts, stockholders' equity would equal market capitalization*". This fallacy underlies the widespread statement that the difference between book value and market value represents intangibles or Intellectual Capital (see for example Edvinsson and Malone, 1997; Stewart, 1997, 2001; Sveiby, 1997; Roos et al. 1997).

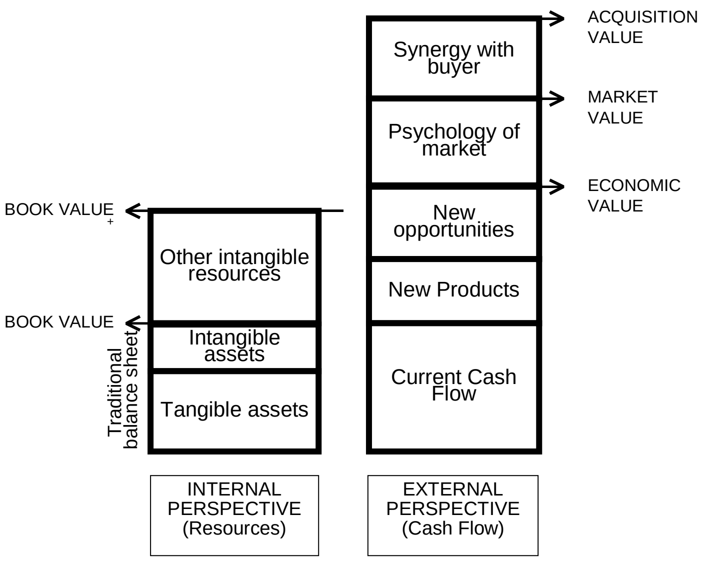

Figure 1 Book value vs. market value

Not only is there no need to make book value equal market value, it is also impossible. Contributing the gap between market value and book value of companies to Intellectual Capital is like contributing the difference between an apple and an orange to a banana. The book value represents the historic value of the assets of a company not yet amortized. The market value is equal to the perceived present value of the future cash flow of the company (See figure 1).

Using the concept of book value implicates taking an internal perspective on the company and listing its resources: tangible, intangible and financial. Using the concept of market value implicates taking an external perspective on the company. It means looking at cash flows that will be generated by current products, new products, and new opportunities. It also involves the psychology of the market, including puffery or pessimism. These two perspectives by definition cannot be subtracted.

Pike et al. (2001) add another argument by stressing the fact that all resources of a company combine and interact with each other. The equation Market Value = Book Value + Intellectual Capital is incorrect since the variables are not separable as required by the equation. For example, Book Value depends partly on retained earnings, which derive from operations, which involves Intellectual Capital (M'Pherson and Pike, 2001).

The second category of problems addresses the problem of poor information to stakeholders about the real value and future performance of the enterprise. This problem is at the root of the other types of problems mentioned in table 2. Lev (2001) and Lev and Zarowin (1998) show there is a deteriorating usefulness of financial reports. Over the period 1980-1996, the association between corporate earnings and stock price changes has decreased. The same decreasing pattern of association exists between stock prices and returns and key financial variables such as cash flow and book (equity) values. Traditional financial data as presented in the annual report are no longer leading indicators of future financial performance.

This leads to the third category of problems concerned with the growing information asymmetry between the public and those that have access to information on investments and returns regarding intangibles. According to Lev (2001) this asymmetry leads to:

- Abnormal gains to informed investors;
- Increased volatility of market values resulting in a lack of confidence of investors;
- An increase in the bid-ask securities spread. Traders quote this price differential for buying or selling a security. This may result in a market shut down;
- An increasing cost of capital.

Lev is concerned about the non-informed investors; typically private investors. He draws attention to "…*the democratization and the externalization of decision-making processes both within organizations and in capital markets*" (Ibid., p.107). Democratization points towards the increasing role of individual investors in capital markets. They have less access to inside information than analysts and investment fund managers, which creates an uneven playing field. Externalization points towards the fact that increasingly important decisions that managers need to make are shared with entities residing outside the company itself. This increases the scope of information required. Therefore, Lev argues, there is a need "*…to provide the needs of the emerging constituencies – primarily individual investors and the myriad partners to the networked corporations – enabling these constituencies to make and execute decisions at the level of professional investors and managers*." Edvinsson and Malone (1997) share Lev's concern. They are looking for ways to provide nuanced, dynamic information to the small investor. They also state that the asymmetry leads to a misallocation of capital. "*As a result, too many deserving companies are under optimized and undercapitalized, and thus sometimes are unable to complete their* *destiny. Meanwhile, other, troubled firms are artificially propped up until they collapse, pulling down shareholders and investors with them.*" (Ibid., p. 8). The misallocation of capital, in the end, produces social costs like unemployment, reduced productivity, and even diminished national competitiveness.

A lack of transparency on intangibles makes it difficult for companies that lack tangible assets to raise money from investors or banks. The fourth category of problems focuses on the difficulty of companies to raise capital. Banking regulations may be biased against lending to companies with few tangible assets, which can be used as security (Leadbetter, 2000). This may especially disadvantage young, high-tech companies having little record of accomplishment.

This lack of transparency also leads to undervaluation of companies that are intangibles-intensive. Lev (2001) found that investors systematically undervalue companies with a high growth rate of R&D expenditures. Failing to identify and assess the value of intangibles and the lack of information on intangibles in the financial statements is likely to lead to the mispricing of companies (Cañibano et al., 1999). This leads to the fifth category of problems. There is strong interest among intangibles-intensive companies to report on their intangibles to influence stock price. The motive for reporting on intangibles may not only be raising a company's market value but also its reputation. Mouritsen et al. (2001b) found that many companies joining the pilot of the Danish Agency for Trade and Industry (2000) on creating IC statements did so to increase their reputation. The statements were used as media to communicate the corporate identity in order to improve recruitment and attract new customers.

Authors working on improving external reporting are more thorough in the way they describe the problem than those working on improving internal management. At the heart of the external reporting problem is the notion that there is no transparency in the reporting about intangible resources. This leads to a whole range of problems on both micro and macro level, ranging from the difficulty to raise capital to diminished national competitiveness.

Statutory and transactional issues

Literature on methods for the valuation of intangibles (Lee, 1996; Smith and Parr, 1994; Reilly and Schweihs, 1999) provides additional statutory and transactional reasons for valuing intangible resources. Statutory provision, administrative ruling, or regulatory authority can mandate a valuation. Alternatively, valuation can be discretionary in the case of a transaction. Based on Reilly and Schweihs (1999), the following motives can be distinguished (see table 3).

Table 3 Overview of statutory and transactional reasons

(Based on Reilly and Schweihs, 1999)

1. Transaction pricing & structuring, for the sale, purchase, or license of an intangible asset	Discretionary
2. Financing securization & collateralization, for both cash flow-based financing and asset-based financing	Mandatory
3. Taxation planning & compliance, with regard to all sorts of possible deductions, tax compliance and estate planning	Mandatory
4. Bankruptcy & reorganization, including the value of the estate in bankruptcy and the assessment of the impact of proposed reorganization plans	Mandatory
5. Litigation support & dispute resolution, including infringement of intellectual property rights and breach of contract	Mandatory / Discretionary
6. Impairment testing of goodwill as required by FASB statement 142 " Goodwill and Other Intangible Assets"	Mandatory

The first category of motives focuses on transactions. Transactions involving intangible resources include the purchase, sale or license of an intellectual property right. Gröjer & Johanson (2000) call this the tradability motive. This category of problems also includes the sale or acquisition of a business of which intangible assets are an important component (the merger and acquisitions motive, Ibid.). A valuation may be used to negotiate the transaction deal price.

The second category of motives covers the issue of financing securization. Many financial institutions require an independent appraisal of intangible resources that are pledged as collateral against loan commitments or lines of credit.

The third group looks at tax issues. Many tax jurisdictions allow for the periodic amortization of the cost of acquired intangible assets. Special tax regulations relate to the transfer of intangible assets between subsidiaries of the same parent company. Many international conglomerates transfer intangible assets and use intangible asset royalty rates to shift taxable income into countries with lower income tax rates. The sale and lease back construction used at the beginning of the 1990s by Dutch companies like Philips, DAF trucks, and Fokker is an example of using intellectual property to create tax benefits.

A fourth category of motives evolves around bankruptcy and reorganization. A valuation of the intangible assets of a debtor in possession may be necessary for bankruptcy-related accounting and taxation considerations. Bankruptcy judges are empowered to authorize the sale of intellectual property rights to outside parties because of reorganization.

A fifth group looks at litigation support and dispute resolution. Litigation may require the quantification of economic damages related to breach of contract and intellectual property infringement.

Finally, the valuation of intangibles became relevant for external reporting with the introduction of the FASB statement 142 'Goodwill and Other Intangible Assets'. This statement from the US Financial Accounting Standards Board states that goodwill and intangible assets that have indefinite useful lives will no longer be amortized but instead will be tested annually for impairment. This means that their fair value must be compared with their recorded amounts. This requires estimating a fair value of certain types of intangible assets.

Conclusion

It is interesting to see how adopting an intangible perspective can result in as much as 19 categories of problem definitions. Yet, not all of them are adequate of precise enough to guide us towards solutions. This leads to the 'jumping to solutions' problem. Others guide us to very specific solutions. The way we define the problem will direct our solution.

Inadequate problem definitions

Some categories are insufficient in justifying the need for the valuation of intangible resources. Measurement is neither a necessary nor a sufficient requisite for management. The existence of a value gap between book value and market value is in itself not enough to justify the valuation of intangible resources.

Improving the management of intangible resources in itself is a noble cause but the leap to measurement is still big. The argument is that if we start to measure the value of intangibles, they will receive more management attention and this will improve the way they are managed. This hypothesis needs further testing. The question is whether measurement is the first place to start if we want to improve the management of intangibles.

Internal management problem definitions

When we look at the remaining internal management problems, we see they can be further grouped into two types of problem definitions. One type looks at the retrospective problem of measuring the results of past events by monitoring the effects of action or measuring income in a reliable way. Another type looks at the prospective problem of improving company strategy by creating resource-based strategies, translating these into action and weighing the effects of alternative actions. This is a rather distinct difference, so any designer of management methods will probably need to make a choice: do I want to improve monitoring or do I want to improve strategy development and execution. Both types of questions will probably lead to different functional requirements and will require different solutions. Still, many authors claim their method is a cure to many diseases (Andriessen, 2004). There is yet little empirical evidence for that claim.

External reporting problem definitions

The problems around the external reporting of intangible resources are a rather different set of problems. This group is less diverse and there is a strong relationship between the underlying problem definitions. Also, there is more empirical evidence about the nature and consequences of these problems. There is empirical proof that the usefulness of financial information is deteriorating, that this leads to a lack of transparency especially in the field of innovation, that this leads to information asymmetry and mispricing of companies, and that this makes it more difficult for certain types of companies to raise capital. These problems will lead to again a different set of requirements and will probably require different solutions.

Statutory and transactional reasons

Statutory reasons for valuing intangible resources are the result of situations in which it is mandatory to carry out a valuation exercise. In some of these circumstances, the method that needs to be used is specified. FASB statement 142 for example states what kind of fair value assessment is required to do an impairment testing. In the case of litigation, the court will demand that the valuation is carried out according to professional standards (Reilly and Schweihs, 1999). In these cases the requirements for the valuation method are given. The next paragraph shows that the methods that fulfill these requirements are already available. When the motive for valuation is a transaction, the trader is free to use a method of choice. In many cases, a standard financial valuation, using a cost-, market- or income approach or a combination of these, will be sufficient.

How: Valuation or measurement

I have characterized the exploration of methods for the valuation of intangible resources as a search for the Holy Grail (Andriessen, 2002a). Before we can engage in such a quest we need to know what we are looking for. What is the nature of value, what do we mean by valuation, and what types of methods for valuation exist?

Value

Nowadays we think about money when we talk about value, but according to Crosby (1997) it was only in the Middle Ages that money developed as a means to quantify value. Value closely relates to the concept of values. According to Trompenaars and Hampden-Turner (1997), values determine the definition of 'good' and 'bad' – as opposed to norms that reflect the mutual sense a group has of what is 'right' and 'wrong'. A value reflects the concept an individual or group has regarding the desirable. It serves as a criterion to determine a choice from existing alternatives.

Following the Longman Dictionary of Contemporary English (1978) as well as Trompenaars and Hampden-Turner, I define value as 'the degree of usefulness or desirability of something, especially in comparison with other things'. I use the term usefulness to emphasize the utilitarian purpose of valuation. This is in line with Rescher's (1969) value theory. He states that values are inherently benefit-oriented. People engage in valuation "…*to determine the extent to which the benefits accruing* *from realization of some values are provided by the items at issue*." (pp. 61-62). However, usefulness is not the only aspect of value. Things can be valuable because they are beautiful, pleasing or in other ways desirable. That is why I included the term desirability into the definition. I am aware of the fact that usefulness and desirability are not mutually exclusive. Things can be desirable because they are useful.

According to Rescher (Ibid.), two questions dominate the discussion about value: (1) is value a property, or is it a relationship linking the item at issue with the valuing subject in some special way? Is it strictly personal or does it have an objective grounding? (2) Is value something to be apprehended only in subjective experience or can it be based on specifiable criteria whose satisfaction can be determined by objective examination?

I agree with Rescher when he states that value is not a property inherent in the item at issue. It depends on the subject's view of usefulness or desirability. In that respect, 'value is in the eye of the beholder'. Therefore, valuation requires implicit or explicit criteria or yardsticks for usefulness or desirability. In the Middle Ages, things developed a price, which allowed for the comparison of the usefulness or desirability of any item against any other item. When we use money as a measure of value, it acts as a relative criterion that allows for comparing the usefulness or desirability of things that are very different in nature. This means that when do *not* use money as a criterion, other criteria or yardsticks need to be present to allow for a valuation.

With respect to the second question, I tend to disagree with Rescher. He states that because valuation is based on criteria, value has an objective basis and can be assessed by impersonal standards or criteria that can be taught to an evaluator through training. The problem is that those criteria may indeed as Rescher (p. 56) states "…*take account of objective features of the items that are being evaluated*", but they may also take account of *unobservable* features of these items. The question is whether all implicit criteria people use in their valuations can be made explicit and can be unraveled into observable criteria. I believe that is often not the case. We cannot always translate value into observable criteria. Some valuations are personal assessments that we cannot make explicit.

Valuation

Rescher (Ibid, p. 61) describes valuation (he uses the term ‘evaluation’) as: "…*a comparative assessment or measurement of something with respect to its embodiment of a certain value*". He describes the importance of values for valuation as follows (Ibid., p. 71): "*Whenever valuation takes place, in any of its diverse forms (...) values must enter in. It is true that when somebody is grading apples, say, or peaches, he may never make overt reference to any values. But if the procedure were not guided by the no doubt unspoken but nevertheless real involvement with such values as palatability and nourishability, we would be dealing with classification or measurement and not with grading and valuation".*

Furthermore, he states that any valuation makes use of a 'value scale', reflecting the fact that this value is to be found to be present in a particular case to varying degrees. This value scale can be an ordinal scale that reflects the varying degrees of value but does not show us how big the interval is between the positions on the scale. Rescher (Ibid., p. 63) gives the example of a value scale for patriotism that is of an ordinal nature: disloyal -> unpatriotic -> indifferently patriotic -> patriotic -> super patriotic.

A value scale can also be a cardinal scale. Such a scale is of an interval or ratio level (Swanborn, 1981). On an interval level the interval between the varying degrees of value is known, while on a ratio level it is also known what constitutes zero value. We can represent cardinal scales numerically. The advantage of using money as the denominator of value is that it creates a value scale at ratio level that allows for mathematical transformations.

Four ways to determine value

Valuation requires an object to be valued, a framework for the valuation and a criterion that reflects the usefulness or desirability of the object. Now we have several options:

- We define the criterion of value in monetary terms. In that case, the method to determine value is a *financial valuation* method.
- We use a non-monetary criterion and can translate it into observable phenomena. In this case, I call the method a *value measurement* method.
- If the criterion is not translatable into observable phenomena but instead depends on personal judgment by the evaluator, then I call the method a *value assessment* method.
- If the framework does not include a criterion for value but does involve a metrical scale that relates to an observable phenomenon, then I call the method a *measurement* method. Strictly speaking, a measurement method is not a method for valuation but this type of method is often used within the IC community. Swanborn defines measurement as the process of assigning scaled numbers to items in such a way that the relationships that exist in reality between the possible states of a variable are reflected in the relationships between the numbers on the scale. Measurement methods do not use value scales but measurement scales.

In literature, we find all four methods for the valuation of intangibles. Lev's Intangible Scorecard (Gu and Lev, 2002) is an example of a financial valuation method. M'Pherson's Inclusive Value Methodology (M’Pherson and Pike, 2001 a,b) is an example of a value measurement method. Viedma's Intellectual Capital Benchmarking System (Viedma, 2001) is a method to do a value assessment. In addition, some proposed methods for the valuation of intangible resources are merely measurement methods, as they do not include values. An example is the Skandia Navigator (Edvinsson and Malone, 1997).

Conclusion

Figure 2 shows the relationship between financial valuation, value measurement, value assessment and measurement. There are distinct differences between the four approaches. We can only talk about valuation when values are involved as criteria. Valuations can be divided further, depending on whether money is used as the denominator of value. If not, then a further distinction is whether the criteria for value used can be observed and measured.

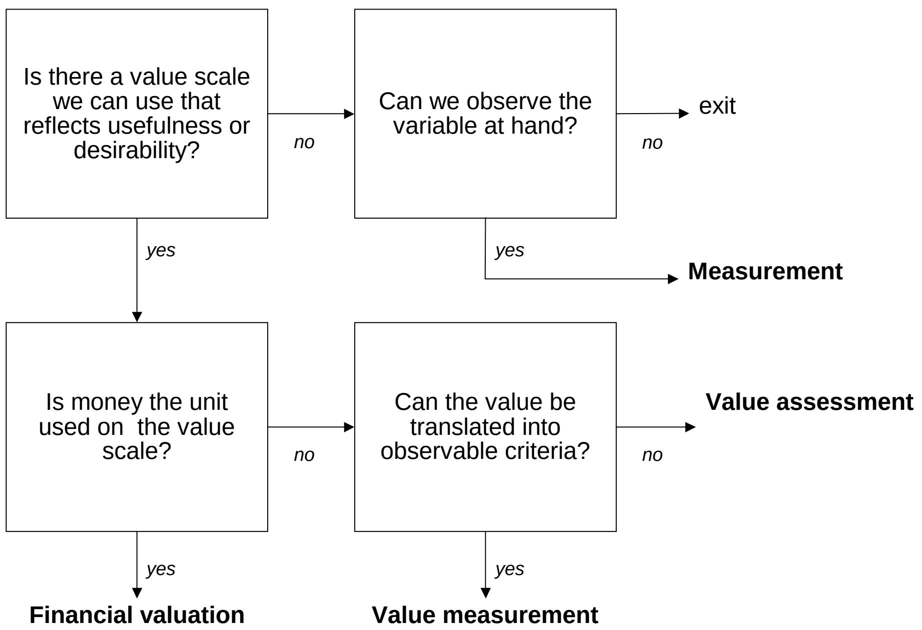

Figure 2 Financial valuation, value measurement, value assessment and measurement

Conclusion: Combining Why and How

The distinctions made between the various motives for valuation or measurement and between the various approaches make it possible to categorize some of the popular IC methods. Table 4 gives an example for each cell in a 'Why x How' matrix based on my analysis of 25 methods (Andriessen, 2004).

Table 4: Examples of methods plotted in a 'Why' x 'How'-matrix

WHY \ HOW > ?	Financial Valuation	Value Measurement	Value Assessment	Measurement
Improving Internal Management	· Technology factor (Khoury, 1994)	· Holistic Value Approach (Pike & Roos, 2000)	· Intellectual Capital Benchmarking System (Viedma, 2001)	· IC Audit (Brooking, 1996)
Improving External Reporting	· Intangible Capital (Gu & Lev, 2002)	· Value Chain Scoreboard (Lev, 2001)		· Skandia Navigator (Edvinsson & Malone, 1997)
Transactional & Statutory Motives	· Cost, market & income approach (Reilly & Schweihs, 1999)			

The wide variety of approaches is immediately clear. The methods try to solve different problems and use totally different approaches. For the IC field to move forward it is important to acknowledge that problems are different, that each problem probably needs its own set of solutions and that there are several approaches that can be used. To make things more complicated, in particular company cases the problem will often not be clear from the onset. A diagnostic phase is needed to define the problem properly. I have also found in six cases (Andriessen, 2004) that problems that fall within the same problem definition category may vary enormously from case to case, making it absolutely necessary to develop a tailor-made solution. This indicates there are limitations to the necessity of coming to some sort of standardization of methods (1). If the IC community wants to solve practical problems, it needs diversity in its solutions.

Notes

(1) This necessity was expressed by Göran Roos when he summarized the results of the 2003 European Intangibles Summit, hosted and organized by PRISM and Cass Business School in July, 2003.

References

Andriessen, D. (2002a), “The financial value of intangibles; searching for the Holy Grail”. Paper presented at the 5th World Congress on Intellectual Capital, McMaster University, Hamilton, Ontario, Canada.

Andriessen, D. (2002b), "Measuring intangibles; Selecting the right tools for the job". In: Finance & Management; Monthly newsletter for members of the Institute of Chartered Accountants in England and Wales, December, pp. 6-8.

Andriessen, D. (2004), *Making Sense of Intellectual Capital*, Butterworth-Heinemann, Burlington, MA.

Bontis, N. (2001), "Assessing knowledge assets: A review of the models used to measure intellectual Capital". *International Journal of Management Reviews*, Vol. 3 Issue 1, pp. 41-60.

Bontis, N. (2002), "Managing organizational knowledge by diagnosing Intellectual Capital: framing and advancing the state of the field". In: Bontis, N. (Ed), *World Congress on Intellectual Capital Readings.* Butterworth Heinemann, Boston, pp. 621-42.

Bontis, N., Dragonetti, N.C., Jacobsen, K. and Roos, G. (1999), "The Knowledge Toolbox: A review of the tools available to measure and manage intangible resources". *European Management Journal*, Vol. 17 No. 4, pp. 91-401.

Brooking, A. (1996), *Intellectual Capital: Core Asset For The Third Millennium*, International Thomson Business Press, London.

Cañibano, L., Ayuso Covarsí, M.G., and Sánchez, M.P. (1999), "The value relevance and managerial implications of intangibles; a literature review". Paper presented at the OECD symposium Measuring And Reporting Intellectual Capital; Experiences, Issues And Prospects, Amsterdam.

Crosby, A. (1997), *The Measure of Reality; Quantification and Western Society*, 1250-1600, Cambridge University Press, Cambridge.

Danish Agency for Trade and Industry, (2003), *A Guideline for Intellectual Capital Statements*. Available at www.efs.dk/icaccounts.

Eccles, R.G. (1991), "The performance measurement manifesto". In: *Harvard Business Review on Measuring Corporate Performance.* Harvard Business School Press, Boston, pp. 25-46.

Edvinsson, L. and Malone, M.S. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower.* HarperBusiness, New York.

Financial Accounting Standard Board, (2001a), Statement No. 142; Goodwill and Other Intangible Assets. Available at: www.fasb.org.

Gröjer, J.E. and Johanson, U. (2000), "Accounting for intangibles at the accounting court". Work in progress. Available at: www.kunne.no/meritum/abstracts/court_a.pdf

Johnson, H.T. and Kaplan, R.S. (1987), *Relevance Lost.* Harvard Business School Press, Boston.

Kaplan, R. and Norton, D. (1992), "The balanced scorecard; measures that drive performance". In: *Harvard Business Review on Measuring Corporate Performance.* Harvard Business School Press, Boston, pp. 123-45.

Kaplan, R. and Norton, D. (2001), *The Strategy Focused Organization*. Harvard Business School Press, Boston.

Khoury, S. (1994) "Valuing intellectual properties", internal paper, The Dow Chemical Company.

Leadbetter, C. (2000), *New Measures for the New Economy*. Institute of Chartered Accountants in England & Wales, London.

Lee, T. (1996), *Income and Value Measurement*. International Thomson Business Press, London.

Lev, B. (2001), *Intangibles; Management, Measurement and Reporting.* The Brookings Institution, Washington D.C.

Lev, B. and Zarowin, P. (1999), "The boundaries of financial reporting and how to extend them". Available at: www.stern.nyu.edu/~blev/

Longman Dictionary of Contemporary English, (1978) Longman Group Ltd., Essex.

Mouritsen, J., Larsen, H.T. and Bukh, P.N. (2001b), Intellectual Capital and the 'Capable Firm': Narrating, Visualizing and Numbering for Managing Knowledge', *Accounting, Organization and Society*, No. 7/8.

M'Pherson, P.K. and Pike, S. (2001a), “Accounting, empirical measurement and Intellectual Capital”. Paper presented at the 4th World Congress on the Management of Intellectual Capital, McMaster University, Hamilton, Ontario, Canada.

M'Pherson, P.K. and Pike, S. (2001b), “Accounting, empirical measurement and Intellectual Capital”. *Journal of Intellectual Capital*, Vol. 2 No.3, pp. 246-60.

Nørreklit, H. (2000), “The balance on the Balanced Scorecard; a critical analysis of some of its assumptions". *Management Accounting Research*, Vol. 11, pp. 65-88.

Petty, R. and Guthrie, J. (2000), "Intellectual capital literature overview: measurement, reporting and management". *Journal of Intellectual Capital*, Vol. 1 No. 2, pp. 155-76.

Pike, S. and Roos, G. (2000), "Intellectual Capital Measurement and Holistic Value Approach (HVA)". *Works Institute Journal* (Japan), Vol. 42, Oct./Nov.

Pike, S. and Roos, G. (2000), "Intellectual Capital Measurement and Holistic Value Approach (HVA)". *Works Institute Journal* (Japan), Vol. 42, Oct./Nov.

Pike, S., Rylander, A. and Roos, G. (2001), "Intellectual Capital Management and Disclosure". Paper presented at the 4th World Congress on Intellectual Capital, McMaster University, Hamilton, Ontario, Canada.

Reilly, R. and Schweihs, R. (1999), *Valuing Intangible Assets*, New York: McGraw-Hill.

Rescher, N. (1969), *Introduction to Value Theory*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Roos, G., Bainbridge, A. and Jacobsen, K. (2001), "Intellectual capital analysis as a strategic tool". *Strategy and Leadership Journal*, July/Aug. Vol.29 No.3, pp. 21-26.

Roos, G., Roos, J., Dragonetti, N. and Edvinsson, L. (1997), *Intellectual Capital; Navigating in the New Business Landscape.* New York University Press, New York.

Rutledge, J. (1997), "You are a fool if you buy into this". *Forbes ASAP*, April.

Smith, G. and Parr, R. (1994), *Valuation of Intellectual Property and Intangible Assets.* John Wiley & Sons, New York.

Standfield, K. (2001), “Time capital and intangible accounting: new approaches to Intellectual Capital”. In: Malhotra, Y. (Ed.), *Knowledge Management and Business Model Innovation*. Idea Group Publishing, Hershey, pp. 316-24.

Stewart, T.A. (1997), *Intellectual Capital; The New Wealth of Organizations*. Doubleday/Currency, New York.

Stewart, T.A. (2001), *The Wealth of Knowledge: Intellectual Capital and the Twenty-first Century Organization*. Doubleday/Currency, New York.

Sveiby, K.E. (1997), *The New Organizational Wealth: Managing & Measuring Knowledge-Based Assets*. Berrett-Koehler Publishers, San Francisco.

Sveiby, K.E. (2002), "Methods for measuring intangible assets". Available at: www.sveiby.com/articles/Intangible Methods.htm.

Swanborn, P.G. (1981), *Methoden van sociaal-wetenschappelijk onderzoek*. Boom Meppel, Amsterdam.

Trompenaars, F. and Hampden-Turner, C. (1997), *Riding The Waves Of Culture.* Nicholas Brealey Publishing, London.

Upton, W.S. (2001), *Business and Financial Reporting; Challenges from the New Economy*. FASB, Norwalk, Connecticut.

Webber, A.M. (2000), "New Math for a New Economy". *Fast Company*, January/February, pp. 214-224.

White, G.I., Sondhi, A.C. and Fried, D. (1997), *The Analysis and Use of Financial Statements*. John Wiley and Sons, New York.