

Implicit Evaluations of Intellectual Capital in Practical Decision Making

Albrecht Fritzsche

Capgemini Germany

albrecht.fritzsche@capgemini.com

Abstract: A lot of the confusion about the measurability of intellectual capital can be explained by a neglect of the difference between an object, the capital it provides, and the profit from the application of this capital. An analysis of this difference leads to the distinction between the potential of intellectual capital for economic process and its actual realization. Case studies from different areas of managerial practice show that decision making about intellectual capital considers it both in the mode of potentiality and actuality. However, the level to which the difference of modality is made explicit varies a lot. Talent management and network planning tend to minimize reflections about potentiality. This is possible because these reflections are an implicit part of the preceding activities in the company that provide the basis for the decision situation. In intellectual property management, decision makers have more freedom to consider the further potential of the capital in question. In the application of different methods to evaluate intellectual capital, it therefore seems important to look for a strong consistency between the way how actuality and potentiality are taken into consideration by the structure of the business practice and the approach of the method.

Keywords: theory of action, business strategies, IC management in practice, human resources, supply networks, intellectual property.

1 The problem of having too many methods of evaluation

During the last decades, intellectual capital has received a lot of attention in management and accounting research. Many different methods have been developed to measure it. Based on the works of Luthy (1998) and Williams (2000), they can be categorized in four groups:

- Direct Intellectual Capital methods (DIC) identify and evaluate different components of intellectual capital separately and add their value together
- Market Capitalization Methods (MCM) focus on the gap between the tangible assets of a company and the stockholder's equity to deduct the value of intellectual capital in a company
- Returns on Assets Methods (ROA) calculate its value by comparing the earnings generated by company with the industry average.
- Scorecard Methods (SC) report indicators and indices that give account of the intellectual capital in a company grouped into different fields of interest

The four kinds of methods generate statements about intellectual capital with different focus and different level of detail (cf. Luthy 1998; Skyrme 1998). Strictly speaking, only DIC can meet the mathematical requirements of a measure in terms of scalability and comparability (Halmos 1950: 30-32). MCM and ROA calculate the value of intellectual capital on an interval scale, but they are unable to denote a non-arbitrary zero; scorecards give a non-monetary account of intellectual capital on an ordinal scale that allows comparisons between different fields of interest, but no expression of its overall value. From a pragmatic point of view, however, these lighter approaches to measuring are often sufficient: they allow the deduction of preferences that can be used for management decisions (Andriessen 2004: 10; Leliaert, Candries and Tilmans, 2003: 206-208).

Despite all differences one would expect that the preferences deduced from the assessment of intellectual capital were eventually consistent, independently from the method used to evaluate it. If the choice of the method had an influence on the result of the evaluation, the whole assessment would be questionable. Unfortunately, practice shows that this is indeed the case: The different methods often lead to contradictory results, because they focus on completely different aspects of intellectual capital (Roos, Pike and Fernstrom, 2005: 249-255). So far, no method has been established that could claim to capture the value of intellectual capital in its entirety. All approaches to measuring intellectual capital are contextually dependent and it proves to be very hard to draw distinct boundaries between different measurable items without overlap (Jurczak 2008: 45; Mouritsen, J. 2003; Lev and Zambon 2003).

Considering these difficulties it is not surprising that intellectual capital accounting is often referred to as “measuring the immeasurable” (e.g. Wall et al. 2004; Pyis 2011). The conversational tone in which this phrase is usually applied makes it easy to forget that the underlying problem is quite serious. It raises fundamental doubts about the methods, the object and the general credibility of intellectual capital accounting as a scientific discipline:

- The methods of measuring appear to be no more than arbitrary heuristics which receive their justification in practice merely from the fact that they are commonly used.
- It is unclear whether intellectual capital as an immeasurable entity can serve as a stable object of reference for the evaluation of company assets at all.
- Doing something that is apparently absurd, intellectual capital accounting does not seem to have any scientific validity apart from the description of best practices in industrial application.

Taking a closer look at this problem, it turns out that an important differentiation is missing. Intellectual capital, its resource and its monetary value are treated as if they were the same. Capital, however, is not identical to whatever it consists of. It can only be addressed as capital in terms of the economic potential it represents. Furthermore, its value can only be determined with respect to a realization of this potential. A certain set of information, a social structure or another kind of meaningful object can be considered as intellectual capital in different ways, depending on the economic activity in which it is involved. The value of this capital can change, too, given different circumstances under which it is applied.

In order to measure the value of intellectual capital, it is therefore necessary to go through two acts of determination. First, the role of the resource as capital is explicated by naming its economic potential. Second, the utility of the capital is explicated by assessing the possibilities of realize the potential. The following pages are based on the assumption that practical decision making about intellectual capital implicitly involves both acts of determination. The question is when and how they take place.

2 Actuality and potentiality in intellectual capital accounting

One of the first to address the difference between a potential to act and its realization was Aristotle, who made a modal distinction between actuality and potentiality (cf. Dubray 1907 Contemporary theoretical approaches to the behavior of systems, networks and organizations consider this distinction in various ways. One example is the concept of loose and tight coupling (cf. Orton/ Weik 1990, pp204): Loose coupling describes the interaction between entities that work together in a system with the least amount of interdependency between them, but still connected in effecting a result together that could not be reached by any single one of them. Tight coupling describes the interaction of two entities if they depend so much on each other that they cannot be considered to operate on their own. A tightly coupled entity is a prerequisite to the operation of a system. A loosely coupled entity, on the other hand, expands the operation of the remaining part of a system and enables it to achieve more than what could be achieved without it. Tight coupling implies full operational determinacy. It is clear what the coupled entity is used for, because it is already described with respect to a general operation that comes together by combining the contributions of the coupled entities. In the case of loose coupling, the operation of the coupled entities remains indeterminate, but the way how the single entities work defines a set of possible interactions. In this respect, a loosely coupled entity provides a potential.

The notion of capital usually does not address these two aspects separately from one another. It represents a reference to utility in general. In an economic context, this makes a lot of sense, since the distinction of a coupling as being tight or loose is a matter of perspective (Hubig 2006, pp.107, pp. 165)). Whether an entity is considered to be tightly or loosely connected to the rest of a system depends on the understanding of the system operation. A CD player can be said to be loosely coupled to the CDs it plays, because the CDs can be exchanged and the player can reproduce many kinds of music and other noises. At the same time, the player can be said to be tightly coupled to the CDs, because the operation of playing CDs requires both of them together. This duplicity of the coupling is often reflected in the pairing of the words medium and instrument. The CD player is both a medium and an instrument. As a medium, it allows the reproduction of different kinds of noises. As an instrument, it plays CDs. With the word medium the CD player is addressed in terms of enablement, with the word instrument it is addressed in terms of necessity.

It is important to understand that the words instrument and medium are used here in their broadest sense. They address everything that can be referred to as a means to an end or a disposition to do something (cf. Pitt 2001), making them applicable to the complete range of entities subsumed under the expression capital, including intellectual capital. The words instrument and medium also make clear that the notion of capital is bound to the idea of a purposeful action. Inasmuch as the explication of a purpose contributes to the possibility to perform an action, one might wonder if it can be discussed in terms of intellectual capital itself, too. This, however, would require another framework that allows the discussion of purposes from an external point of view. Such a point of view may exist, but there is good reason to doubt that it is economically relevant.

Although the accounting debate on intellectual capital is usually guided by other distinctions, many contributions contain arguments that can be connected to actuality and potentiality. Non-monetary evaluations of intellectual capital, for example, are often explained by the need to capture what a company can do, expressing the ability to act (e.g. Kaplan/ Norton 1996). Monetary measurements of intellectual capital usually focus on the present market value of the company assets, which reflects the business performance of the company so far, but also the expectations of its future importance among analysts and shareholders. This way, monetary evaluations give account of both actuality and potentiality, particularly if they focus on the overall market value of a company instead of single components of intellectual capital. On the other hand, more knowledge about the internal structures of the company and its business strategies will probably lead to a quite different estimation about its future potential, which is expressed in many direct intellectual capital methods. One can therefore say that different methods of measurement consider actuality and potentiality differently in the evaluation of intellectual capital. Non-monetary approaches and approaches that focus on the overall value of a company seem to reflect the potential of intellectual capital better than the others (cf. Skandia 1994, Luthy 1998). All of them, however, are generally able to consider both at the same time.

At the same time, practical decisions about intellectual capital also include assumptions about its purpose and utility, which may be explicitly named or implicitly understood in the view of the given situation. If monetary evaluations of the objects in question are considered in the decision making process, the quality of their contribution depends on the level of correspondence between the way how they consider the actuality and the potentiality of the intellectual capital and the implications about it in the decision situation. In order to discuss the contribution of intellectual capital accounting to decision making, it is therefore important to get a better understanding of the decision making process first.

3 Researching the practice of decision making

This paper presents a summary of three case studies conducted in the automotive industry to research the practice of decision making about intellectual capital in different fields of application. In particular, the case studies were interested in two research questions:

- Are the decisions about intellectual capital mainly guided by its role as an instrument or by its role as a medium?
- Are the decision makers at liberty to consider intellectual capital in its other role or are there outside influences forcing them to approach intellectual capital in one specific way?

The automotive industry was chosen because of its fundamental economic importance and because of the attention that intellectual capital management has already received among the original equipment manufacturers in this business sector, which assured that explicit knowledge and experience on the topic was available (cf. Fritzsche 2009 pp 7, Schiemann 2007). The case studies are based on interviews with experts from different multinational companies with emphasis on Germany and China, conducted as an accompanying activity of various organizational and technical redesign projects in these countries. The interviews mainly addressed the communication and decision making processes in the companies in general and the information technology used to administrate and report data on the intellectual capital in particular, because the data structures and procedures available in the technical systems were suspected to have a strong influence on the decisions.

The automotive sector has been facing problems of overcapacity for various decades. The competitive pressure on both the original equipment manufacturers (OEMs) and their suppliers is therefore extremely high. In such circumstances, the different forms of intellectual capital are important assets, for design, marketing, engineering and production as well as supply and distribution

networks. At the same time, the possibilities to invest in intellectual capital are rather restricted. Unlike some of the currently emerging industries, for example in the creative sector, intellectual capital strategies are strongly monitored and repetitively verified in terms of success and reliability. The processes of intellectual capital management in the automotive industry may therefore not be the most dynamic, but certainly among the best assessed.

The projects that provided the background of the studies were not depending on each other. They were concerned with the following activities:

- Talent management in human resources
- Network planning in supply chain management
- Intellectual property management in research and development

Since all three activities relate to intellectual capital in a different way, a detailed comparison between the specific accounting methods used for the evaluation of intellectual capital seemed pointless. In addition, many interview partners stated that the intellectual capital in question was regularly evaluated in various different ways, but none of them provided a sufficient basis for decision making in practice. The research therefore focused on the comparison of intellectual capital management in very different fields of application. Talent management, network planning and intellectual property management gave the opportunity to look into the treatment of human capital, relational capital, and structural capital, thus covering all three major sectors of intellectual capital (cf. Guthrie 2001). Nevertheless, it has to be clear that the case studies only give insight into specific examples from these sectors. They highlight just a small extract of the whole area of intellectual capital.

In order to ensure comparability, the interviews conducted in the course of the study all followed the same pattern. In the first part, the decision about intellectual capital was clarified, making sure that all interview partners were concerned with a similar kind of problem. Next, the experts were asked to name the criteria on which the decisions were based, both formally, as they appear in official documents, and informally in the discussions going on in the department. These criteria were used to develop a clear understanding of the purpose which the intellectual capital in question was supposed to serve.

The following part of the interview was concerned with the steps preceding the decision about intellectual property and the input that was generated in these steps. The experts were asked to describe the integration of their work into general processes in the company. It turned out that information technology was a useful point of reference to clarify these processes, because the flow of information through the data processing systems inside the company defined to a big extent which activities were taking place. On this basis, conditions for the work of the experts could be identified, leading to conclusions about the degrees of freedom they had in their decisions. At the end of the interview, the experts were asked to share their ideas about what could be done differently in their field of work if it proceeded under different circumstances.

4 A comparative display of the results

Since the experts expressed themselves on the background of different company structures and work traditions, a direct comparison of their contributions was not possible. In order to provide a summary of the results, the statements of the interview partners were therefore reviewed and the information given was assigned to different abstract categories.

Table 1 gives an overview of the information collected from the interviews on the decision problems and criteria in the separate fields of application. While there is some diversity concerning the specific points mentioned by the experts, the distinction between statements referring to the instrumental role of intellectual capital and its role as a medium yields a rather clear result.

Decisions on talent management are strongly dominated by the instrumental considerations about the employees. Despite a growing awareness for the necessity to bind promising employees to the company, talent management is still mainly concerned with filling concrete positions in the company according to specific job descriptions. The shortage of qualified personnel in many countries has been mentioned by all interview partners and the conclusion that it is more important to look at the general talent of people instead of their particular qualifications has been drawn. Nevertheless, such

considerations are only reflected as secondary criteria in decision making, or other remarks that were made by some of the experts.

Decisions on network planning take place under a high cost pressure. All interview partners agree that good financial conditions and a high reliability of supply are the main criteria to be taken into account. It therefore can be said that this field of application is also dominated by considerations about intellectual capital in its role as an instrument for an efficient and effective production process. For many experts, however, the forming of long-term relationships and strategic alliances also plays a prominent role in decision making. Other strategic considerations are mentioned as secondary criteria, although it has been remarked that the formation of alliances usually start in the research and development departments. The experts agree that a good supply chain network is an important prerequisite to meet the challenges of changing markets, in particular after the experience of strong shifts in the demand for passenger cars and commercial vehicles during the last years.

Table 1 Decision problems and criteria

Field of application (no. of interviews)	Decision problem (no. mentioned)	Primary criteria (no. mentioned)	Secondary criteria (no. mentioned)	Others (no. mentioned)
Talent management (N=8)	Find the best people to staff positions in the company (n=8)	Education fits to job description (n=8) Experience fits job description (n=8) Personality fits to department (n=7)	Good general social skills (n=6) Age allows further development (n=5) Personal growth (international experience, gen. knowledge etc.) (n=4)	Payment expectations (n=2) Maturity or stable biography: no frequent job changes any more (n=1) Proof of creativity, music etc. (n=1)
Network planning (N=5)	Make contracts with suppliers (n=5) Ensure functioning production (n=5) Establish long-term relationship (n=3)	Pricing (n=5) Reliability of delivery (n=5) Strategic alliance (n=4) Company situation (n=2) Previous experience (n=2) Product uniqueness (n=1)	Product quality (n=4) Isolation of competitors (n=3) Company situation (n=3)	Connecting to innovative firms (n=1)
Intellectual property (N=6)	Claim possession of innovation (n=6)	Importance of innovation for product (n=6) Blocking competition (n=6) Importance of innovation for process (n=3)	Occupy strategic position (n=5) Build reputation as innovative company (n=4)	Performance indicator for R&D (n=1) Satisfy employees (n=1)

Decisions on intellectual property are dominated by the estimation of the payoffs that can be expected from the registration of patents, use patterns or similar rights of usage. When it comes to process innovation, these payoffs are described on the basis of traditional investment calculations concerning the introduction of the patented innovation in production processes. The decision to claim possession of the innovation depends on the expected benefit of the innovation. There is no question that beneficial process innovations have to be patented. When it come to product innovation, the importance of the innovation for the product depends on various different factors, such as the attractiveness of the innovation or the customers and the financial benefit of being the only one able to use it on the markets. In this respect, decisions about intellectual property are much more concerned with strategic questions than decisions about talent management or network planning. At the same time, other effects of claiming intellectual property for public relations and competitor relations are mentioned as criteria for decision making as well. This leads to the impression that the role of intellectual property as a medium to gain competitive advantage plays an important role in decision making. How intellectual property functions as an instrument is often not really clear.

Table 2 shows the information collected in the interviews about the processes environment of the decisions on intellectual capital and the structures serving as preconditions to the decision making.

Decisions about talent management are considered as part of the most fundamental processes in the company, the value generation itself, the implementation of the organizational structure and business culture. However, talent management appears in these processes at a rather late step, where most is already defined. What remains to be done is the staffing, either from the outside or from within the company in terms of talent development. The remaining freedom of decision making at this point of time is rather limited. Job profiles, the clear distinction of technical professions and the curricula of schools and universities with their different subjects are very strong preconditions for the assignment of persons to positions in the company. Three of the experts interviewed in the study criticized these structures very strongly because they were inadequate to react to the dynamics of modern industries, where a demand for new qualifications could rise very quickly. An example is the new hybrid technology that has become very sought after within just a few years.

In the case of network planning, the surrounding processes included such planning activities for new products and production facilities. Network planning was described to depend on the requirements for vehicles and their construction. Based on these requirements, suppliers could be chosen. The interview partners stated frequently that their activities started comparably late and that they would have liked to be involved in the planning earlier. While research and development co-operated already very strongly with suppliers. For the final negotiations on supplier networks, so many conditions from the bill of material and the product description had to be taken into consideration that it was hardly possible to choose suppliers that had not been involved in before in product development or the forging of a strategic alliance.

Table 2 Environment and conditions of decisions

Field of application (no. of interviews)	Process involvement (no. mentioned)	Previous steps (no. mentioned)	Conditions (no. mentioned)
Talent management (N=8)	Support of core process of value generation (n=8) Implementation of company organization and culture (n=6)	Departmental structure (n=8) development initiatives (n=6) company values and climate (n=5)	Job profiles (n=8) Distinction of professions (n=6) Certificates and education subjects (n=6)
Network planning (N=5)	Global company strategy (n=5) Production design (n=5) Product development (n=5)	Scope of factory work and delivery requirements (n=5) Parts used in vehicles (n=5) Location decisions (n=4) Co-operations in product development (n=4)	Bill of material (n=5) Product description (n=5) Alliances and frame contracts (n=4) Government support (n=3)
Intellectual property (N=6)	Marketing strategy (n=6) Product innovation (n=6) Core business decision (n=5) Continuous improvement processes (n=5)	Product design (n=6) Market appearance (n=6) Core process design (n=5)	Business strategy (n=6) Legal and patent register structures (n=6) Production design (n=5)

In comparison to the previous two fields of application, decision making on intellectual property was considered as a rather free activity that was connected to the earlier steps of the core business processes. Intellectual property management was recognized to have an overall strategic importance. At the same time, however, the firm structures of intellectual property law were criticized because they made it difficult to protect the innovative activities of the company in an adequate way. In particular, a gap was mentioned between single patents that were useful on their own and combinations of patents and other mechanisms of protection that were necessary to create bundles that made sense for the company.

5 Towards more awareness for organizational and technical structures

Decision making in talent management and network planning depends to a high degree on the realization of the business strategies that a company pursues. During the realization, it is already rather clearly defined what purposes the intellectual capital in question must serve. Under such circumstances, intellectual capital is reduced to its role as an instrument that is necessary to execute a clearly defined action. Although all interview partners asked in the study agreed that the intellectual capital they were responsible for had a strong influence on the future of the company, their decisions were hardly affected by it. Being involved only very late in the strategic process, their decisions took place in an environment that did not allow an adequate reflection of the role of intellectual capital as a medium that offered an indeterminate potential to act.

Intellectual property management shows an alternative to this scenario. The decisions on patents and other legal claims of possession in innovations are already considered in the early stages of the strategic processes in the companies. Various other studies show that this is a relatively new development (cf. Fritzsche/ Geiger 2011, Granstrand 1999). Until recently, the strategic importance of intellectual property did not receive much attention. During the last years, however, more and more companies have recognized the multitude of different ways to make use of it to gain competitive advantage, forge alliances, support public relations etc. Intellectual property is discussed with respect to different purposes and as such included in strategic decisions that clarify purposes. As a corollary of this development, the value of intellectual property is increasingly assessed with respect to a certain business strategy, because it has become clear that it might have a different value with respect to other strategies (cf. Frietsch et al. 2010, Burr et al. 2007).

It is characteristic of rational thinking to proceed systematically to problem solution by identifying step by step the purposes, alternatives and means of an action (Davidson/ Sternberg 2003, Daft 1983). Potentials are clarified very early in the process, while the discussion of the instruments takes place rather late. If intellectual capital management is restricted to the latter steps of a strategic process, it can only contribute to the benefit of the company within the boundaries of the previous decisions and assumptions. Practical decision making is often dominated by various structural restrictions, particularly those that are caused by the company organization and the technology used for data processing. Methods of intellectual capital accounting have to correspond to the situation in which they are applied. In particular, they have to reflect the actuality and the potentiality according to the structure of the decision making process.

Considering all this, it seems reasonable to say that the huge diversity of different evaluations of intellectual capital using different accounting techniques is justified inasmuch as it allows an adaptation to the requirements of the given situation. Contradictions in the results of the evaluations do not necessarily mean an inconsistency in the notion of the intellectual capital in question. They can also reflect a difference between the expectations about the way how the potential of this capital can be realized. Future research has to analyze such differences in detail and clarify their implications on intellectual capital management. While there may be circumstances under which it makes sense to have differences, there is good reason to believe that a consolidation of the expectations can strongly contribute to the formation of a better strategy for intellectual capital management.

References

- Andriessen, D. (2004) Making sense of intellectual capital designing a method for the valuation of intangibles. Oxford: Butterworth-Heinemann.
- Bontis, N. (2001) "Assessing knowledge assets: a review of the models used to measure intellectual capital", *International Journal of Management Reviews* Vol. 3, 1 Oxford, Blackwell, pp 41-60.
- Burr, W., Stephan, M., Soppe, B. and Weisheit, S. (2007) *Patentmanagement. Strategischer Einsatz und ökonomische Bewertung von technologischen Schutzrechten*. Stuttgart, Schäffer-Poeschel.
- Daft, R. L. (1983) *Organization theory and design*. The West series in management. West Pub. Co., St. Paul.
- Davidson, J. E., and Sternberg, R. J. (2003) *The psychology of problem solving*. Cambridge University Press, New York.
- Dubray, C.A.: Actus et Potentia, in: Catholic Encyclopedia, Vol. 1, New York, Robert Appleton 1907
- Frietsch, R., Schmoch, U., van Looy, B., Walsh, J. P., Devroede, R., Du Plessis, M., Jung, T., Meng, Y., Neuhäusler, P., Peeters, B., Schubert, T. (2010) *The Value and Indicator Function of Patents*. Studien zum deutschen Innovationssystem. EFI, Berlin.
- Fritzsche, A. (2009) *Heuristische Suche in komplexen Strukturen*, Wiesbaden, Gabler.
- Fritzsche, A., Geiger, R. (2011) "The Strategies and Tactics of Patent Management and their Importance for Competitive Advantage", *Proceedings of the 3rd European Conference on Intellectual Capital* (Turner, G. and Minnone C. ed.), Reading, Academic Publishing International, pp 157-164.

- Granstrand, O. (1999) *The economics and management of intellectual property*. Cheltenham, Elgar.
- Guthrie, J. (2001) "The management, measurement and the reporting of intellectual capital", *Journal of intellectual capital*, Vol 2, 1, pp 27-41.
- Halmos, P. (1950) *Measure Theory*, New York: Springer.
- Hubig, C. (2006) *Die Kunst des Möglichen I. Technikphilosophie als Reflexion der Medialität*, Bielefeld, transcript.
- Jurczak, J. (2008) "Intellectual Capital Measurement Methods", *Economics and Organization of Enterprise*, vol. 1(1), pp.37-45.
- Leliaert, P. J. C., Candries, W. and Tilmans, R. (2003) "Identifying and Managing IC: A New Classification", *Journal of Intellectual Capital*, (4) (2), 202-214.
- Lev, B. and Zambon, S. (2003) "Intangibles and intellectual capital: an introduction to a special issue", *European Accounting Review*, Vol. 12 No. 4, pp. 597-603.
- Luthy, D.H. (1998) "Intellectual capital and its measurement", *Proceedings of the Asian Pacific Interdisciplinary Research in Accounting Conference (APIRA), Osaka, Japan*. Maddocks, J., Beaney, M. (2002) "See the invisible and intangible", *Knowledge Management*, March 2002, pp 16-17.
- Mouritsen, J. (2003) "Overview intellectual capital and the capital market: the circulability of intellectual capital", *Accounting, Auditing&Accountability Journal*, Vol. 16 No. 1, pp. 18-30.
- Orton, J.D. and Weick, K. (1990) "Loosely Coupled Systems: A Reconceptualization", *The Academy of Management Review*, Vol. 15, 2, pp203-223 .
- Pyis, L. (2011) "Intellectual Capital Accounting – How to Measure the Unmeasurable", *Proceedings of the 3rd European Conference on Intellectual Capital* (Turner, G. and Minnone C. ed.), Reading, Academic Publishing International, pp 13-14.
- Roos G., Pike S., Fernstrom L. (2005) *Managing Intellectual Capital in Practice*, Oxford: Butterworth-Heinemann.
- Schiemann, W. (2007) "Measuring and Managing the ROI of Human Capital," *Cost Management*, 7/8, pp 5-15.
- Skyrme, D. J. (1998) "Valuing Knowledge: Is it Worth it?" *Managing Information*, Vol 8, No. 3.
- Stevens, S.S (1946) "On the Theory of Scales of Measurement". *Science* 103 (2684): pp677-680.
- Sveiby, K. E. (1997) *Methods for Measuring Intangible Assets* <http://www.sveiby.com/articles/Intangible-Methods.htm>, download date: 2011-09-09.
- Sveiby, K. E. (1997) "The Intangible Asset Monitor", *Journal of Human Resource Casting and Accounting*, Vol. 2, No. 1.
- Tan, H.P., Plowman, D. and Hancock, P. (2008) "The evolving research on intellectual capital", *Journal of Intellectual Capital*, Vol 9, No. 4, pp 585-608.
- Wall, A.P., Kirk R.J. and Martin, G. (2003) *Intellectual Capital: Measuring the Immeasurable*, Oxford: Elsevier.