



# Why do firms measure their intellectual capital?

Why measure intellectual capital?

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**Abstract** *It is now generally believed, within the current literature, that an academic and practitioner focus on intellectual capital (IC) is important and that the measurement of a company's intangibles provides real business benefits. However, it is essential for researchers in the field of IC to be able to justify these newly formed theoretical assumptions through rigorous empirical testing. This paper reports on the results of a systematic investigation into the theoretical underpinnings of why firms measure their IC and existing empirical evidence that helps to prove that the measurement of IC is really worthwhile. The paper then critically reviews the state of research evidence in the field. The major finding of this paper is that the majority of research within the IC measurement field is at the theory building stage, and that very little of the proposed measurement theory has yet been fully tested. This paper outlines possible avenues scholars might pursue in order to further the development of the IC measurement field.*

## 1. Introduction

The research and published literature on measuring and reporting intellectual capital (IC) is growing rapidly (e.g. Cañibano *et al.*, 2000, Guthrie *et al.*, 2001). Research into the general topic of IC began in the 1990s and was mainly concerned with raising awareness about the existence and value of intangible assets within organizations and about developing classification models for IC (Hall, 1989; Itami, 1991; Roos *et al.*, 1997; Stewart, 1997; Brooking, 1996). Following this initial work, the strategy and economics field began to carry out research into intellectual assets and formulated the concept of the knowledge-based organization (Winter, 1987; Nonaka, 1991; Teece, 1998, Teece, 2000b; Spender and Grant, 1996). Specific focus on the measurement of IC has been concerned with the creation of frameworks, indices and guidelines to support the initial concepts (Sveiby, 1997; Mouritsen *et al.*, 2001; Bontis *et al.*, 1999; (DATI) Danish Agency of Trade and Industry, 2000; Lev, 2001; MERITUM, 2002), even though none of the above is developed in accordance with accounting principles. The literature in the area of IC measurement and the number of measurement frameworks is continuously growing as researchers attempt to develop metrics that inform strategy formulation and



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implementation, improve disclosure, benchmark performance, and predict future business performance.

Articles that have focused on the measurement of IC differ in their reasons as to why organizations should measure their IC. Much of the discussion is based on no coherent rationale or theory that often leads to confusion as to what drives organizations to measure their IC. Therefore, the aim of this paper is to shed some light onto this complex field, by segregating and explaining the different rationales for the measurement of IC. In order to achieve this aim we conducted a systematic literature review (Tranfield *et al.*, 2002), which enabled us to identify a set reasons or motives that drive the measurement of IC. Those reasons include those that help develop, monitor or manage a business from an internal perspective, as well as externally driven reasons which focus on the ability to communicate measures and results to external stakeholders. Notwithstanding the confusion about the different reasons, researchers and practitioners alike continue to develop tools without questioning the premise that “measurement is assumed worthwhile” (Guthrie, 2001). Many research articles assume that positive benefits accrue from measuring and reporting IC. In section 3 of this paper we will review the theoretical underpinnings and the different rationales for measuring IC and critically review existing empirical evidence that purports to test the rationales put forward for each of the IC measurement drivers. The systematic identification of the various IC measurement drivers and the subsequent critical review of the empirical evidence have enabled us to put forward a detailed research agenda for the field of IC measurement.

Based on a systematic and critical review of the research to date in the field of IC measurement, the three contributions of this paper are:

- (1) a taxonomy of drivers as to why organizations measure their IC;
- (2) improved understanding of whether the extant research lends any credence to the thesis that measuring IC delivers business benefits; and
- (3) finally recommendations as to a future research agenda.

## **2. Methodology**

In order to fully map the prior research in the field of IC measurement a systematic literature review was undertaken (Tranfield *et al.*, 2002). Traditional “narrative” reviews often lack rigor, and in many cases are not undertaken as genuine pieces of investigatory science. Tranfield *et al.* (2002) recommend the specific principles of the systematic review methodology that are used in medical science in order to counteract bias and produce transparent, high-quality and relevant literature reviews in management research. Conducting a systematic review means adopting a replicable, scientific and transparent process, in other words a detailed process that minimizes bias through exhaustive literature searches of published and unpublished studies

and by providing an audit trail of the reviewers decisions, procedures and conclusions (Cook *et al.*, 1997)

The way in which the systematic review was undertaken ensured that it was both methodical and replicable. In order to assess the relevance and size of the literature and to state clearly the focus of the research study, the scope of the literature review process were delimited by factors of disciplinary perspective, keywords and the quality of the research sources. For replicability, the full research criteria are given in Appendix A to this paper. The results of the initial search on papers using the specified keywords, resulted in 707 papers being stored and their abstracts initially assessed. The initial assessment criteria used were studies specifically related to business, theoretical and empirical studies, quantitative and qualitative studies and only studies published in academic or high quality business journals. Following the initial assessment approximately 10 per cent of the articles and books were deemed to be of a suitable quality to be fully read and analyzed further. The papers were studied and coded in regard to IC measurement drivers. The results of the coding formed the sub-headings of the various sections of this paper. This paper is intended to give an overview of the drivers of measuring IC and therefore not all the papers researched have necessarily been referenced in this paper.

### **3. Theoretical versus empirical research**

As already discussed the first aim of this paper is to identify the reasons why organizations are seeking to measure IC. Through the systematic literature review we were able to identify five main reasons. These were:

- (1) to help organizations formulate their strategy;
- (2) assess strategy execution;
- (3) assist in diversification and expansion decisions;
- (4) use these as a basis for compensation; and finally
- (5) to communicate measures to external stakeholders.

In the following sections we will explore the theoretical benefits that are proposed in the literature and contrast those with the empirical evidence found in the review.

#### *3.1 Strategy formulation*

Measuring IC can be used to help formulate business strategy. Kenneth Andrews defines corporate strategy as “the pattern of decision making in a company that determines and reveals its objectives, purposes, or goals, produces the principal policies and plans for achieving those goals, it defines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers, and communities” (Foss, 1997, p. 52). IC of organizations is of

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strategic importance (Grant, 1991; Stewart, 2001; Andriessen and Tissen, 2000; Teece, 2000a). Organizations realize that when formulating a corporate strategy it is not enough to just identify the competitive forces, opportunities, and threats of the industry as suggested by Porter (1979), in addition organizations have to identify their corporate competence and resources in order to evaluate opportunities (Andrews, 1971). Different firms develop different distinctive competence (Selznick, 1957) and the question they have to ask themselves is “does the organization have the right competence to pursue certain opportunities?” Kenneth Andrews brings the strategic importance of competences to a head when he states that “opportunism without competence is a path to fairyland” (Andrews, 1971).

This view of competence-based competition was first framed by Edith Penrose (1959) and then later enhanced by Birger Wernerfelt (1984) and Richard P. Rumelt (1984) who are seen as developers of the modern resource based view of the firm (Foss, 1997). Resource based theorists sees firms as heterogeneous entities characterized by their unique resource base (Nelson and Winter, 1982, Barney, 1991) and this resource base consists increasingly of IC (Stewart, 1997; Ross *et al.*, 1997; Lev, 2001; Sveiby, 2001, Sveiby, 1997; Marr and Schiuma, 2001).

This means that the IC of a firm should be one of the central considerations in formulating strategy and one of the primary constants upon which a firm can establish its identity and frame its strategy, as well as one of the primary sources of the firm’s profitability (Grant, 1991). Therefore, firms need to strategically identify and develop their IC in order to gain a competitive advantage and to increase their performance (Petergraf, 1993; Prahalad and Hamel, 1990; Teece *et al.*, 1997). The key to a resource-based approach to strategy formulation is to understand the relationships between IC, competitive advantage, and profitability (Grant, 1991).

Most research in this field seems exploratory in nature and not empirical. The field seems more concerned with an epistemological discussion (Sveiby, 2001) and a focus on theory building rather than theory testing. There is little empirical evidence of strategy formulations based on IC. An exception is the case of telecommunications software company APiON which documents how the company developed and implemented a growth strategy that allowed it to realize a dramatic increase in shareholder value through proactively focusing on harnessing its IC resources (Peppard and Rylander, 2001). Ten years ago Richard Hall (1992) conducted a survey of 95 UK chief executives to determine the relative contribution each intangible resource makes to the success of the business. Across all sectors the perception was that company reputation, product reputation and employee know-how were the most important intangible contributors for overall strategic success. Hall (1993) confirms his survey findings with research results from six case studies. He concludes that intangible resources should play a major role in the strategic management

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process. Marr *et al.* (2001, 2002) have documented how Lycos and Great Universal Stores identified their knowledge-based assets to influence their strategy formulation process. Collins and Montgomery (1995) identified companies such as Disney, Newell, Cooper, and Sharp as ones that demonstrate the power of resource-based strategies and the return they generate, although neither of these companies may have set out explicitly to formulate their strategy around their key resources.

### 3.2 Strategy assessment and execution

The second driver for measuring IC is to develop key performance indicators to help evaluate the execution of strategy (Neely *et al.*, 1996; Kaplan and Norton, 1996, Meyer and Gupta, 1994; Bassi and Van Buren, 1999). Experience from the pioneers of reporting on IC (Edvinsson and Malone, 1997) indicate that information on IC has little value for users unless it is linked to the strategy of the firm. Any performance measurement system should be used to assess and challenge the assumptions underpinning the current strategic direction (Neely, 1998). Verifying or rejecting strategic assumptions will potentially impact the resource allocation in organizations. Therefore, the development of a set of performance measures should be guided by strategy (Meyer and Gupta, 1994; Neely *et al.*, 1996). Kaplan and Norton (1996) elucidate that in order to execute a strategy measurement has to be continuous and include single-loop as well as double-loop learning. However, many organizations seem to struggle with strategy execution and with the application of strategic single loop and double loop learning (Argyris and Schön, 1978).

Many measurement systems assume causal relationships or are based on a business hypothesis which enables organizations to test or challenge any underlying hypothesis (see for example Kaplan and Norton, 2000a). Kaplan and Norton (2000b) have shown many examples of such causal systems in the form of strategy maps. Strategy maps or success maps (Neely *et al.*, 2002) manifest the strategic assumption and tell the story of how an organization transforms its IC into strategic objectives such as shareholder returns or market leadership. However, correlations between measures have rarely been empirically proven and some critics even doubt the assumption of causalities in widely implemented measurement systems such as the Balanced Scorecard (Norreklit, 2000).

Despite some doubt about causal relationships there is evidence of successful correlation analyses. Ittner and Larcker (1998), using customer and business unit data, find support for claims that customer satisfaction measures are leading indicators of customer purchase behavior (retention, revenue, and revenue growth), growth in the number of customers, and accounting performance (business unit revenues, profit margins, and return on sales). Ittner and Larcker's findings are supported by empirical evidence collected by Helmi (1998), and Yeung and Ennew (2001) who provide evidence for a positive

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impact of satisfaction on business performance using a range of different financial measures.

Furthermore, Rucci *et al.* (1998) developed a business model for Sears that tracked success from management behavior through employee attitudes to customer satisfaction and financial performance. The so-called employee-customer-profit chain verifies Sears' strategy to be a compelling place to work, shop and invest. Under each of those headings they developed objectives and measures which allowed them to challenge and test their hypotheses. Neely and Al Najjar (2002) also empirically prove a positive link between employee satisfaction, customer satisfaction, and financial performance. Marr *et al.* (2002) demonstrate how Shell International verified the impact of intangible assets such as employee satisfaction, organizational culture, environmental and social responsibility, on their corporate strategy and financial performance.

It seems generally accepted that measures affect managerial behavior and actions that in turn drive the strategy implementation (Neely *et al.*, 1996). This implies that performance measurement system should evaluate the journey towards achieving their strategic goals (Bassi and Van Buren, 1999). Jonathan Low demonstrated that 70 per cent of CEOs admit that there is a big gap between what gets measured and rewarded and what actually drives performance (Chatzkel, 2001). This is further substantiated by Stivers *et al.* (1998) who found that although 63 per cent of CEOs think measurement of intangibles is important only 10 per cent were using the results to evaluate strategic direction.

### *3.3 Strategic development, diversification and expansion*

This driver for measuring rent-yielding IC resources builds on the rationale of the first driver for the purpose of strategy formulation. But this comes into play when firms seek to better exploit these resources when they plan to develop, diversify, or expand in forms of mergers and acquisitions (Teece, 1980; Montgomery and Wernerfelt, 1988). Where firms lack the critical resources (intangible and tangible), they often seek to access these from other organizations through a variety of inter-organizational links (Markides and Williamson, 1994). These include strategic alliances, joint ventures and mergers and acquisitions. Lev (2001) suggests that network economies and synergies associated with R&D and other intangibles are fundamental issues in corporate acquisitions, diversification and alliances. The takeover prices paid for targets in many of these deals, especially those in knowledge intensive industries, often include very large payments for goodwill and IC. Thus many of the deals seem to have been driven by the need for the acquiring firms to access IC.

Value creation in these acquisitions therefore depends critically upon the acquirer's ability to leverage the intangible assets that it has acquired. In

acquisitions, the acquirer needs to combine its own intangible assets with those of the acquired firm (Sullivan and Sullivan, 2000). This requires an understanding of the nature and sources of intangible assets of the two firms, how they complement one another and how they can be leveraged to strengthen the acquirer competitive position (Montgomery and Wernerfelt, 1988). For organizations to effectively leverage intangible assets in acquisitions requires the ability to identify and measure its own IC as well as the IC of the target firm. Since many of the intangible assets are deeply embedded in organizational teams, routines and cultures (Nonaka, 1990) and many of these assets are highly dynamic in nature (Grant, 1996a,b; Teece *et al.*, 1997; Nonaka, 1994) this process poses a formidable challenge. Recent reports of massive post-acquisition goodwill write-offs and restructuring charges amounting to billions of dollars by Vodaphone, Vivendi, Marconi, AOL-Time Warner and many others emphasize the challenge of this process.

Corporate acquisitions represent an exchange of both tangible assets and intellectual assets requiring these assets to be measured and valued (Deng and Lev, 1998). However, valuing intangible assets is often characterized by poor audits at the acquisition stage and poor post-acquisition strategy planning. Without correct assessment, measurement and valuation of IC, the acquirers may overvalue it thus causing value destruction for the acquiring firm's shareholders and other stakeholders (Sullivan and Sullivan, 2000). Post-acquisition integration is fraught with complexity and high risk of failure and acquisitions may fail to create new IC through innovation (Hitt *et al.*, 2001). These failures have perhaps contributed to long run value destruction in corporate acquisitions. On the other hand acquirers might overlook potential acquisition targets because they do not understand the value of IC the potential target company might possess. Through the fact that organizations are not properly measuring their IC it is possible that millions of dollars in revenue are sitting unrecognized in companies (Klaila and Hall, 2000).

According to the literature, there is little empirical testing of theories in the area of strategy development, diversification and expansion. Theory development and anecdotal evidence seems to be predominant starting with concepts put forward by Penrose (1959) and further developed by Teece (1980), Montgomery and Wernerfelt (1988), and Markides and Williamson (1994). Empirical evidence can be found in Gupta and Roos (2001) who use a case study approach to demonstrate how the measurement of intellectual capital can aid organization's mergers and acquisitions strategy. Furthermore, using data from the 1970s and early 1980s, Morck and Yeung (2003) produce empirical evidence, which demonstrates that diversification adds value in the presence of intangibles related do R&D or advertising, but destroy value in their absence. Das *et al.* (2003) report empirical evidence that on average strategic alliances do create value due to the creation of intellectual capital.

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### 3.4 Compensation

Most organizations have realized that relying purely on financial measurement can encourage short-term thinking (Johnson and Kaplan, 1987; Kaplan and Norton, 1992), especially if those financial measures are linked to compensation systems (Bushman *et al.*, 1995). Financial measures have been criticized for being too historical and “backward-looking”, for encouraging dysfunctional behaviors, and for giving inadequate consideration to the development of intangible assets such as employee capabilities and customer satisfaction (Ittner and Larcker, 1998). Furthermore, agency models (Feltham and Xie, 1994; Hauser *et al.*, 1994; Hemmer, 1996) suggest that financial measures in compensation plans alone are unlikely to be the most efficient means to motivate employees. Therefore, it has been suggested that financial performance measures should be supplemented or replaced by non-financial measures, which are more informative of employees’ actions and can improve contracting (Ittner and Larcker, 2002).

Evidence of the incremental use of non-financial measures in managers’ compensation plans have been noted during the past decade. For example:

- Chrysler Corporation paid bonuses to its 200 top executives based on the attainment of vehicle quality and customer satisfaction targets in addition to measures of profitability (Lavin, 1994).
- Ford Motor Company has an executive compensation plan, similar to the plan used by Chrysler, which includes non-financial customer satisfaction and operational measures (Anon., 1998).
- Ittner *et al.* (1997) report that 36 percent of the companies surveyed in their study used non-financial measures in executive compensation.

A principal justification for the use of non-financial performance measures in compensation schemes is that these measures are leading indicators of financial performance (Banker *et al.*, 2000). A second justification for the use of non-financial performance measures in compensation plans is the higher level of information these measures provide about managerial effort and actions desired by the firm. Ittner *et al.* (1997) studied this phenomenon in a sample of 317 firms by analyzing the relationship between each firm’s strategy and the performance measures included in its executive incentive plan. Specifically, the authors focused on the link between each firm’s strategy and the relative weight assigned to non-financial measures. Ittner and Larcker found that firms pursuing an innovation-oriented strategy tended to place relatively greater weight on non-financial performance in their incentive plans. Similarly, firms following a quality oriented strategy placed relatively more weight on non-financial metrics. This results support the notion that firms where “intangible” assets are more valuable, such as innovation or quality oriented firms, tend to place greater emphasis on non-financial performance measures. However, analytical research by Gjesdal (1981), Paul (1992) and Feltham and

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Xie (1994) shows that information systems useful for valuing the firm need not be useful in assessing a manager's performance. Consequently, just because an economic value measure or a non-financial indicator predicts stock returns or accounting performance better than an alternative measure does not necessarily imply that the same measure or weight should be used to evaluate and reward managers (Ittner and Larcker, 1998). It is also questionable whether the same measures used to develop strategic priorities and monitor strategic actions should be used to evaluate managerial performance (Ittner and Larcker, 1998).

### *3.5 Communication to external stakeholders*

Firms are sometimes legally required to communicate measures to external stakeholders, these requirements include for example financial accounts and regulator demands (Neely, 1998). Although it seems unlikely that all intellectual capital will soon be reported in financial statements as accountancy bodies, financial analysts and financial academics, are still defining and arguing over IC metrics and no generally accepted accounting principles have been agreed upon thus far. The pressure on companies to account for and disclose the value of their IC is growing. This pressure will undoubtedly affect the way in which companies operate and measure their IC. Although the disclosure of intangibles assets is yet to be made mandatory a number of companies are attempting to make public more information about their intangible value drivers ((DATI) Danish Agency of Trade and Industry, 2000; MERITUM, 2002; Williams, 2001). Failing to adequately communicate intellectual capital can have implications such as:

- smaller shareholders are disadvantaged, as they usually have no access information on intangibles often shared in private meetings with larger investors (Holland, 2001);
- insider trading if managers would exploit internally produced information on intangibles unknown to other investors (Aboody and Lev, 2000);
- volatility and the danger of incorrect valuations of firms, which leads to investors and banks placing a higher risk level to organizations; which in turn
- increases the cost of capital (Lev, 2001; Leadbeater, 2000).

Further, the communication gap between companies and the stock market seems to be larger in knowledge based industries than in consolidated industries (Eccles and Mavrinac, 1995).

The appropriate level of capital is essential for all organizations and with the increasing proportion of intangible assets to tangible assets organizations have to prove how their intangibles will translate into organizational performance. Leadbeater (2000) has discussed how knowledge based companies have a

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higher cost of capital than companies with higher levels of tangible assets. The reason being that it is difficult to obtain security against intangible assets. In today's volatile market place it is becoming evident that those companies who were able to raise initial finance are now finding it more difficult given lower than expected results.

A recent survey of the UK market reported in the *Financial Times* of May 27th 1998 showed that most financial directors believe their company's shares have been undervalued in the past year. More than a third of companies said their share price had differed from what they perceived to be "fair value" for more than six months and 84 per cent said the price had been too low or too high at one point. Of these only a few thought they were overvalued. Most analysts included in the study said they firmly believed an open communication strategy would lead to a higher and more stable stock price (Rylander *et al.*, 2000). In a survey by Eccles and Mavrinac (1995) 65 per cent of the managers of high-tech companies thought their firm's shares were slightly to significantly undervalued, whilst the corresponding figure for consolidated industries was 20 per cent. Therefore one of the drivers for a company to measure its IC is to ensure a fair and stable share price and therefore a more favorable cost of capital.

Studies in both the US and the UK have shown that analysts value information about intangibles (Mavrinac and Siesfeld, 1997; Coleman and Eccles, 1997). In addition a number of empirical studies have also demonstrated that companies who are able to make meaningful disclosures about their long-term prospects achieve more satisfactory market valuations (Narayanan *et al.*, 2000; Gu and Lev, 2001). Consequently a growing number of companies are beginning to report their IC indicators in the annual report (see, e.g. Mouritsen *et al.*, 2001). Although it has been shown that companies typically try to manage the information disclosed to investors in order that they do not disclose information which will erode their competitive advantage (Williams, 2001; Narananan *et al.*, 2000). There are various empirical studies showing the impact of intangible assets on financial performance and stock price. The best documented and most widely researched is the area of R&D. Aboody and Lev (2000) show that one dollar invested in chemical R&D increases, on average, current and future operating income by two dollars. Econometric studies relating R&D intensities to corporate market value of book-to-market ratios yield consistently positive and statistically positive association estimates (e.g. Hirschley and Weygandt, 1985; Bublitz and Ettredge, 1989).

Based on Deng *et al.* (1999) and Hirschey (1998), Lev (2001) reports that three patent-related measures are predictive of subsequent stock returns and market-to-book values of public companies:

- number of patents granted to the firm in a given year;
- intensity of citations to a firm's patent portfolio by subsequent patents; and
- number of citations of a firm's patents to scientific papers.

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Brynjolfsson and Yang (1999) showed in a regression analysis that intangible assets such as R&D expenditure and investments in computers have a positive impact on market value of 1,000 large firms.

Seethamraju (2000) finds positive and statistically significant investor reactions to acquisition announcements of companies that acquired trademarks from other companies. This indicates that investors expect added value from these trademarks that are above the acquisition value. Further, Lev (2001) shows that quantitative measures of customer related intangibles can be defined and estimated.

Whereas the areas of R&D and organizational capital have been empirically researched, other areas of intangibles have received substantially less research attention (Lev, 2001). Bassi *et al.* (1999) examined financial reports of forty large public organizations, and found no relevant, quantitative information about human resources, although these firms frequently reported that employees are their most valuable assets. Even though there is growing pressure on companies to disclose the role of intangibles within their organizations a Brookings Institution Project (2001) looking at the role of intangibles in the economy concluded that although markets need improved information disclosure managers have no incentive to improve the information about their IC. Nondisclosure of most expenditures for intangibles is a major impediment to the advancement of knowledge about intangibles in particular and corporate performance in general (Lev, 2001, p. 54).

#### 4. Discussion

In this section we discuss in turn the literature findings for each driver for measuring IC and focus on the state of validating theoretical concepts using empirical evidence. This allows us to analyze the position of research for each of the drivers and enables us to suggest some future research directions.

##### 4.1 Strategy formulation

There is scope and opportunity to conduct empirical research into the usage of IC measurement and its influence on the strategy formulation process. Besides anecdotal evidence and a limited number of case studies there is little empirical evidence in the field of measuring IC to drive strategy formulation and deliver competitive advantage. Most research in strategic management is based on large sample, quantitatively-operationalized research designs (Vankataraman and Grant, 1986). Rouse and Daellenbach (1999) suggest changing the dominant research methodologies in the field of strategic management towards a higher level of intrusion, involvement or participation in an organization. Their argument is that intangible assets, which give organizations a competitive advantage, are often organizational in origin, tacit, highly inimitable, socially complex, probably synergistic, embedded in process, and often driven by culture (Rouse and Daellenbach, 1999, p. 489). Therefore, large

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sample, cross-sectional studies are unlikely to disentangle the variety of effects associated with time, industry, environment, strategy, and the resource/capability of interest. Whereas it is exactly this context of relevance that will provide empirical data needed to justify perceptions that the strategy formation based on intangible resources delivers competitive advantage (Beyer, 1997; Miller *et al.*, 1997; Rouse and Daellenbach, 2002). We suggest that future research studies need to provide deep context information following the suggestions put forward in Rouse and Daellenbach (2002). Further, larger empirical studies could be used to identify the process of how firms measure their strategic intellectual capital to influence strategy formulation.

#### *4.2 Strategy assessment and execution*

Although there is some empirical evidence showing how IC drives performance and how its measurement can be used to challenge, verify, or reject strategic assumptions, this research area offers a myriad opportunities for scholars to make contributions. Large-scale econometric studies based on publicly available data prove the value relevance of intangibles on a macro level (e.g. Aboody and Lev, 1998; Hand, 2003). However, there seems to be a lack of studies addressing the micro level that again could disentangle the context specific issues. One of the major problems here seems to be the availability of and access to relevant data. Few organizations have all the data available to run reliable econometric studies, and if they have the data it is rarely in a format that can be used in empirical studies. Furthermore, many organizations, especially those in competitive markets, might be reluctant to allow the publication of such data as it reveals their strategic direction to their competitors. Without better designed case study evidence and empirical research findings in this area it might be difficult for organizations to justify ongoing measurement of IC in individual firms. This area of research would benefit from more longitudinal and rich case studies, which define context and go beyond the classical interview based case research, in order to understand the process of IC measurement for strategic management purposes. In addition, more rigorous statistical correlation tests of measurement systems as seen in Neely and Al Najjar (2002) and Marr *et al.* (2002) might also inform this area of research and are strongly encouraged. This will enable organizations to confidently manage with measures and execute a “tested” strategy.

#### *4.3 Strategic development, diversification and expansion*

Given the great number of mergers and acquisitions in which a significant proportion of the take-over price was paid for IC, this area offers great opportunities for further research into the process of how organizations assess their own and the IC of the target firm in a merger and acquisition context. Limited access to the IC of potential target firms in a merger or acquisition context makes the process difficult for the acquiring firm as well as for researchers. Better disclosure of IC would make this process easier, which links

this field into the work on corporate reporting of IC conducted by Mouritsen *et al.* (2001) as well as other researchers involved in the EU Meritum project on managing and reporting intangibles. There is a clear need for a better and a more transparent valuation process that might have an impact on company reporting and information exchange in merger and acquisition situations. The area of strategic development would benefit from further micro-level case studies of how organizations identify matching and complementary intangibles and how organizations measure the post merger integration success.

#### *4.4 Compensation*

The primary reasons suggested for the use of intellectual capital performance measures in compensation systems are that these measures are better indicators of future business performance than accounting measures, and they are valuable in providing information for the evaluation and motivation of managerial performance. However, the existing studies that support these reasons suffer from several limitations that should be taken into account. For example, Ittner and Larcker (1997, 2002) use independent variables in their structural model that is endogenous choice variables that can create inconsistencies. As argued by the authors, this limitation could be overcome by using simultaneous equation models (including the choice of exogenous instrumental variables for identification). Another example is the Banker *et al.* (2000) study, which is based on the hotel industry but generalization to other industries is not feasible. Anderson *et al.*'s (1994, 1997) and Ittner and Larcker (1998) studies relied on short time series (the number of longitudinal observations is less than or equal to four), which might not be sufficient to fully confirm their findings. As a result, we believe that further research is needed to overcome the limitations of previous studies and to enhance our understanding of:

- the complex relationship between IC measures and performance of individuals;
- the applicability of IC performance measures that are useful for valuing the firm for assessing a manager's performance;
- the ideal structure of incentive plans; and
- how managers react to the use of less tangible measures in the evaluation of their performance.

#### *4.5 Communication to external stakeholders*

Overall the benefits of externally disclosing information on IC are not clear at this point. Thus far, the disclosure of information on IC is mainly voluntary. Reasons vary from general corporate governance to disclosing IC information to investors in order to improve stock valuation and cost of capital. There are potentially a number of downsides to such disclosure. The most common

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arguments against voluntary disclosure, from a managerial perspective, are fear of giving away sensitive information to competitors and the extra costs associated with the collection and disclosure of the information (Rylander *et al.*, 2000). Carroll and Tansey (2000) warn that firms need to be careful about disclosure as internal measures are not yet tried and tested and they therefore run the risk of exposing the company to external criticism. Therefore companies need to plan carefully and must try to balance the risk of disclosure against its potential gains. Even though this area of research has had significant attention in terms of empirical research, there are many questions left unanswered. More empirical work focusing on the positive and negative effects of disclosing information on IC is strongly encouraged. There are intangible assets that have had less empirical research attention in the area of disclosure such as knowledge, skills, relationships, culture, practices and routines would contribute to this field of enquiry. Researchers are strongly encouraged to include those “difficult to measure” intangibles in future studies. A major factor for analysts seems to be credibility of the information disclosed (Neely *et al.*, 2002). The question is then raised as to how analysts and investors see the disclosure of IC in terms of credibility and economic relevance (Narayanan, 2000). Especially as disclosing information is frequently used by managers to manage investors’ perceptions (Lev, 2001). More research into how analysts see and use disclosed information on IC would contribute to this debate. An effective, strategically managed disclosure process can help analysts to understand the long term view of the company, which should help with a fairer share price valuation, and hence lower cost of capital. In order to measure this assertion and enable companies to realize the benefit of their IC measurement costs, more research is encouraged to investigate whether the disclosure really does provide benefits such as better cost of capital.

Not claiming to be complete or exhaustive Table I gives an overview of possible research avenues categorized by the six drivers of measuring IC identified in this paper.

## 5. Conclusions

The discussion above showed the stage of research in each of the different areas that drive the measurement of IC. Areas such as stock price valuations show empirical research results that verify some of the theories put forward, other areas such as strategy development have had little empirical research attention. In summary there is much stage 1 (building theories/raising awareness) research and little stage 2 (theory testing). Baruch Lev states that to advance knowledge in the area of intangibles, “theoretical principles should be subjected to empirical examination and observation” Lev (2001). The above discussion has revealed many research avenues which scholars might consider pursuing to take the field of IC measurement further.

Driver	Research agenda
Strategy formulation	<ul style="list-style-type: none"> <li>Rich and context-specific case studies of how intangibles inform strategy formulation</li> <li>Empirical studies following the Rouse &amp; Daellenbach method</li> <li>Empirical studies to identify a process to measure resources to inform strategy formulation</li> </ul>
Strategic assessment and execution	<ul style="list-style-type: none"> <li>Econometric studies of relationships in measurement systems, in particular the impact of intangibles on strategic goals</li> <li>Empirical research into organizational processes using measures of intangibles to manage strategically</li> <li>Empirical investigations into contexts in which these processes work best</li> </ul>
Strategic development, diversification and expansion	<ul style="list-style-type: none"> <li>Empirical research into how intangibles drive mergers and acquisitions</li> <li>Empirical studies of processes organizations use to identify intangibles of the target firm</li> <li>Rich case studies of how organizations identify matching intangibles</li> <li>Rich case studies of how organizations measure the post-merger integration success of intangibles</li> </ul>
Compensation	<ul style="list-style-type: none"> <li>Empirical research into the potential impact of linking intangible performance drivers to compensation systems</li> <li>Case studies discussing the applicability of IC performance measures for valuing individuals' performance</li> <li>Empirical studies which identify the ideal structure of incentive plans and how managers react to the use of IC measures in the evaluation of their performance</li> </ul>
Communication to external stakeholders	<ul style="list-style-type: none"> <li>More empirical research into how IC disclosure influences stock valuations (especially for those intangibles that have had little research attention so far)</li> <li>Empirical research into the process analysts use to gather information on IC</li> <li>Empirical research on the link between credibility of IC information communicated and its potential impact</li> <li>Empirical research into how information on IC influences capital raising</li> <li>Rich case studies of how the usage of information on IC influenced capital availability</li> </ul>

**Table I.**  
Research agenda for  
measuring IC

Besides the obvious gaps in empirical research there are some fundamental questions raised regarding the research methodology (Rouse and Daellenbach, 1999, 2002). Empirical evidence should not just be provided by classical large sample, cross-sectional research projects but be complemented by rich, longitudinal case studies that will allow us to understand the specific context which seems to be critical for the analysis of IC. This kind of research will then allow us to answer questions of how the different drivers of IC measurement

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impact the way measurement is viewed and implemented in organizations and how it is perceived by external stakeholders.

To date, we can be assured that awareness has been achieved and academics as well as practitioners agree that IC plays an important role in today's organizations. In this paper we have taken a step back and have looked at the existing empirical evidence that validates the theoretical drivers of IC measurement put forward in the literature. The authors feel that the field of IC could run into danger of losing credibility if researchers fail to produce more research that tests the theories put forward, rather than further adding to the large body of literature of theoretical discussions and theory building. Without more rigorous research we will not be able to move beyond the stage of only assuming that measurement of intangibles is worthwhile (Guthrie, 2001; Lev, 2001).

By separating out the various IC measurement drivers and then reviewing existing theoretical and empirical evidence supporting such drivers, this paper has established a starting point from where we would like to encourage scholars to pick up the themes identified in the research agenda in order to further the field of IC measurement.

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### Appendix

This Appendix explains the criteria followed in the systematic literature review as well as further detailed information about the search results.

In order to assess the relevance and size of the literature and to state clearly the focus of the research study, the scope of the literature review process was delimited by the following factors:

- research sources;
- keywords/subject areas; and
- journal impact factor score.

In order to summarize, integrate and collate the findings of the different studies on the research question three separate analyses were undertaken:

In the first stage of the analysis the specified categories of journals were subjected to a detailed key word search. In the second phase the relevant abstracts were read and scored with respect to the journal from which the paper emanated. For the third and final phase, the papers selected in the second phase were fully reviewed and a table was drawn up of what is known and established already, what were the core contributions and what were the key emerging themes and research questions. The results of this third phase are those discussed within the main body of this paper.

#### *Phase 1 – Keyword search*

Focusing the disciplinary perspective on the following factors delimited the search for the range of journals found within the following disciplines:

- intellectual capital;
- measurement; and
- business.

For the initial phase of the research the search covered as wide an area as possible and covered the following possible publications:

- published journals;
- unpublished studies; and
- conference proceedings.

For identification of relevant studies the search used the following database sources, electronic service databases:

- ProQuest;
- Emerald;
- Infotrac;
- Ingenta; and
- Centre for Business Performance reference database.

The following search terms were then used to search the abstract of papers within the research sources:

- intellectual capital;
- human capital;
- structural capital;
- knowledge capital;
- resource based perspective;

- resource based theory;
- business performance;
- firm performance;
- competitive advantage;
- stock returns;
- shareholder returns;
- valuation;
- value;
- intangible;
- knowledge management;
- knowledge economy;
- benchmarking;
- metrics;
- measurement;
- indicators;
- dynamic capabilities;
- competences;
- resources;
- assets;
- patents; and
- R&D.

The numerical results of the systematic literature search against the keywords defined in the scope of the research are shown in Table AI. The figures at the top of each of the “relevant” columns specify the total number of relevant papers for that category, the rows below then specify how these were split across the key words. Some papers covered more than one keyword and hence the columns do not necessarily sum to the total. Each of the cells represent a paper that contained both the word specified in the first column of the table and the word specified in the first row of the Table.

#### *Phase 2 – Quality selection*

Those abstracts that were of papers already published were selected firstly by identifying the quality of the journal with respect to the 2001 Journal Impact Factors list and FT ranked journals. A paper was only included if it emanated from a journal with an impact factor of 0.6 or greater. Any journals that were specifically focussed on intellectual capital were included even if they did not appear in either of these lists.

#### *Phase 3 – Categorization*

Of the 73 articles and books deemed relevant to this research Table AII shows how the literature splits into the categories specified in this paper. The research revealed that 50 per cent of the literature reviewed was classified under background material to the field and only 11 of the 73 articles and books were actual empirical studies.

	Intellectual capital		Human capital		Structural capital	
	Total	Relevant	Total	Relevant	Total	Relevant
Intellectual capital	378	37				
Human capital	25	8	320	31		
Structural capital	8	2	8	5	9	5
Knowledge capital	3	1	1	0	0	0
Resource-based perspective	11	2	19	5	0	0
Resource-based theory	11	0	23	2	0	0
Business performance	4	1	4	1	1	1
Firm performance	1	0	4	1	0	0
Competitive advantage	31	5	33	8	0	0
Stock returns	1	1	0	0	0	0
Shareholder returns	0	0	3	2	0	0
Valuation	27	7	30	6	0	0
Value	50	3	156	18	2	1
Intangible	79	17	21	10	5	3
Knowledge management	119	13	25	5	3	1
Knowledge economy	12	0	8	2	1	1
Benchmarking	3	1	1	0	0	0
Metrics	8	2	4	3	0	0
Measurement	30	9	26	9	1	1
Indicators	8	3	18	4	1	0
Dynamic capabilities	1	0	1	0	0	0
Competences	15	3	50	13	0	0
Resources	62	8	50	8	1	1
Assets	115	14	50	4	5	2
Patents	21	5	4	1	1	1
R&D	16	1	15	2	0	0

**Table AI.**  
Results of the initial  
systematic literature  
search

Research category	Relevant papers
Background	31
Theoretical discussion	4
Literature reviews	5
Definition and classification	7
Frameworks	6
Indicators	3
Measurement	6
Disclosure and accounting	9
Statements	2
Empirical	11

**Table AII.**  
Research categories