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Review of Prior IC research on measuring and reporting

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Review of Prior IC research on measuring and reporting

Abstract

Shortcomings of traditional financial reporting in providing information about business value and viability have attracted greater attention worldwide. Efforts to measure and report non-financials in addition to traditional financial measures have been the focus of various extended reporting approaches. This paper briefly describes roots and focuses of intellectual capital (IC) research. It then documented some of major historical development within the IC research. Finally, this paper updates the reviews prior research on measuring and reporting IC in the latest period of development.

Keywords: Literature review, measurement and reporting; intellectual capital

Review of Prior IC research on measuring and reporting

1. Introduction

With the rising of knowledge-based economy and the string of recent corporate collapses, greater attention has been drawn to the ability of the traditional financial reporting framework in providing information for the financial information users (see Barsky *et al.*, 2003; Boyle 2003, p. 8; Buffini 2003, pp. 1, 3; Byrnes & Der Hovanesian 2002, p. 34; Byrnes & Henry 2001, p. 51; Byrnes *et al.*, 2002; Collins 2003, p. 28; Fairlamb, Matlack & Ihlwan 2002; McNamee 2001, p. 34; Reed *et al.*, 2002; Sykes 2003a, p. 14; 2003b, p. 18; Weber 2003, pp. 68-9). The widening gap between market and book values suggests that the traditional financial reporting framework presents an incomplete account of firms' value. An incomplete view provided by a company balance sheet is an important issue that needs to be resolved because it can lead to many problems such as misallocation of capital and under-investment in IC creating activities (Carroll & Tansey 2000), higher cost of capital, and insider trading (Leadbeater 1999).

Brennan and Connell (2000, p. 206) indicate that many of the differences can be explained by IC items that are not recognised under the traditional financial reporting framework. With the important role IC plays in creating the firm's sustainable competitive advantage, information on the firm's activities for integrating, creating, transferring and applying IC can provide users with a more forward-looking view of the firm. Information on IC enables the information users to understand how the firm's value is created or diminished, which allows them to better assess viability and the 'true' value of the firm.

This paper updates reviews of IC research that have been previously conducted particularly by Guthrie (2001) and Petty and Guthrie (2000). In order to introduce broad concept of what IC research is about, this paper will first present Roos *et al.*'s (1997) conceptual roots of IC research. This is followed by an update of historical development of IC literature, which has been previously reviewed by Guthrie (2001), Petty and Guthrie (2000), and Sullivan (2000). Then, the focus of this review, the

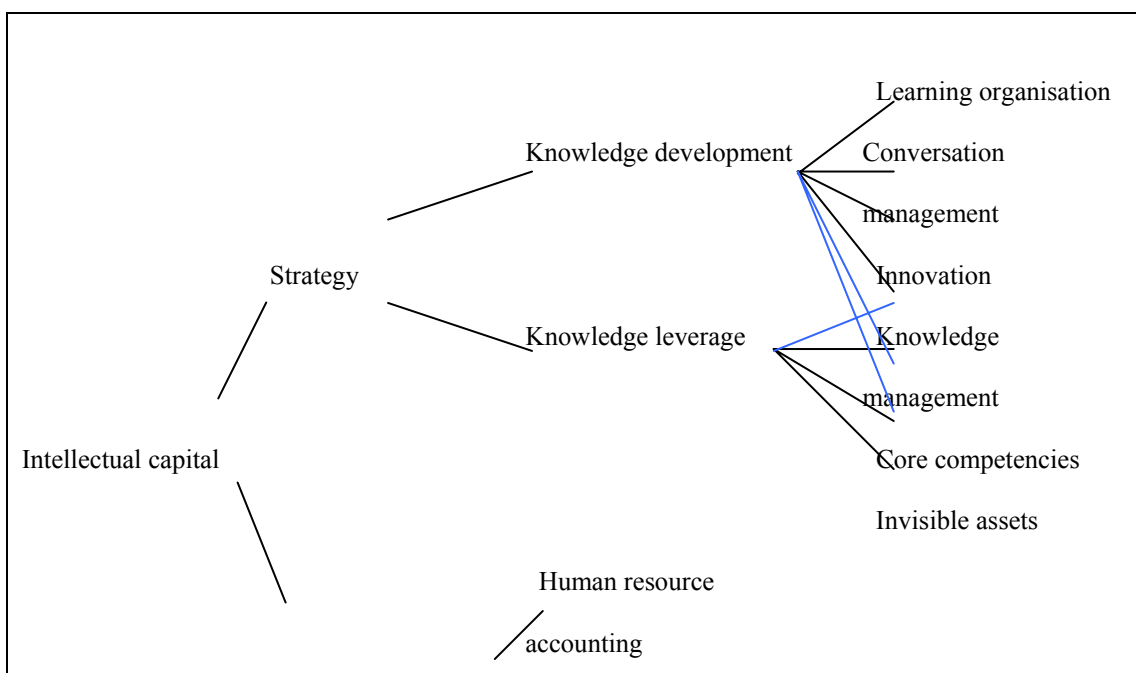
review of IC research on measuring and reporting IC in the third stage of IC development, is presented.

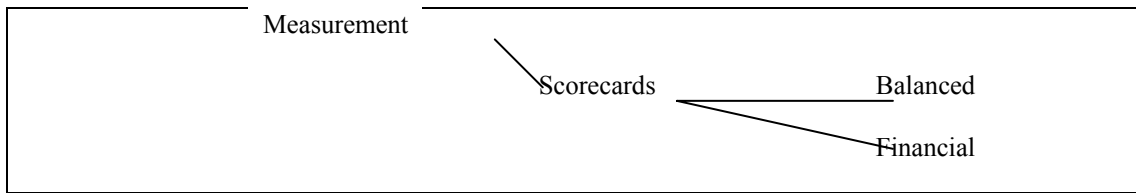
This paper is structured as follows. Roos *et al.*'s (1997) IC conceptual roots of IC research is presented in Section 2. Section 3 provides an update of major historical development in the IC literature. Section 4 reviews prior IC research in the third stage of the IC research, which has been focusing on measuring and reporting IC.

2. Conceptual roots of IC research

IC has only recently gained significant attention. Roos *et al.* (1997, p. 15) indicate that: 'the problem of management of knowledge is not new and there have been other theories that have tried to tackle it. "Intellectual capital [research]" then is only the latest development of this line of thinking.' They trace the theoretical roots of IC research to two different streams of thought: the strategic stream and the measurement stream as shown in Figure 1 below. The strategic stream focuses on the creation (knowledge development) and use of knowledge (knowledge leverage), as well as the relationship between knowledge and success or value creation (Roos *et al.* 1997, p. 15). The measurement stream focuses on developing information systems for measuring IC such as human resource accounting and scorecards (Roos *et al.* 1997).

Figure 1. Conceptual roots of intellectual capital





Source: Roos *et al.* (1997, p. 15)

Before reviewing recent development of IC research, it is important to understand what has been done in the past. Therefore, a historical view of development of the IC literature is needed as a background for the review of IC research of this paper. The next section will review the major historical developments in the IC literature. Some observations will be made from the review of major historical developments of IC literature.

3. An update of some major historical developments of IC Literature

Guthrie (2001), Petty and Guthrie (2000), and Sullivan (2000) have previously review some major historical developments of the IC literature. To identify major focus of current IC research, this paper updates the major historical developments of the IC literature up to 2003 and this is shown in Table 1.

Table 1. Some major development of the IC literature up to 2003

Stage	Period	Development
1	Early 1980s	Awareness of the importance of knowledge or other strategic intangible resources as the source of competitive advantage was rather limited. Many important books were published in foreign languages and IC was valued as goodwill. The importance of intangible assets to the corporation was highlighted in Itami's <i>Mobilizing Invisible Assets</i> , which was published in Japanese in 1980 (Sullivan 2000). According to Sullivan (2000), this is seen as groundbreaking work on the importance of intangible assets to the corporation.

Mid-1980s	<p>Sveiby published <i>The Knowhow Company</i> in Swedish in 1986 (Sveiby 2001b). Sveiby is the first thought-leader who proposed how to create, leverage and measure IC. Sveiby published the world's first book on how to manage 'knowledge organisations', which are defined as companies that have no traditional production (Sullivan 2000; Sveiby 2001b) in 1986 and the book was awarded 'Best Management Book' in Sweden in 1986 (Sveiby 2001b).</p> <p>In 1987 Itami and Roehl published <i>Mobilizing Invisible Assets</i> in English.</p>
Late 1980s	<p>Sveiby published <i>Managing Knowhow</i> in 1987 (Sveiby 2001b).</p> <p>In 1989, Sveiby published <i>The Invisible Balance Sheet</i>, the first theory of measuring intangibles, which inspired a large number of Swedish companies to start publishing intangible assets (Sveiby 2001b).</p>
Early 1990s	<p>From 1990, IC started to attract a wider group of thought leaders in the literature. In 1990, Sveiby published <i>Knowledge Management</i>, the world's first book on knowledge management, in Swedish (Sveiby 2001b).</p> <p>Stewart, in 1991, published his brief, first article, 'Brainpower' that highlights the importance of intellectual capital as the most valuable asset. Stewart (1991) also discusses how management can make the most out of IC.</p> <p>Skandia AFS established corporate IC function in 1991 (Sullivan 2000).</p>

2	Mid-1990s	<p>It was 1994 that marked the established status of IC among the wider business community. Stewart (1994) published ‘Your Company’s Most Valuable Asset: Intellectual Capital’ as a cover article in Fortune magazine and Skandia produced a supplement to its annual report, ‘Visualizing Intellectual Capital’.</p> <p>The mid 1990s saw various thought leaders propose their own frameworks for managing and measuring IC.</p> <p>Brooking published <i>Intellectual Capital</i> in 1996.</p> <p>Edvinsson and Malone published <i>Intellectual Capital: Realizing Your Company’s True Value by Finding Its Hidden Brainpower</i> in 1997.</p> <p>Roos, Roos, Dragonetti, and Edvinsson published <i>Intellectual Capital: Navigating the New Business Landscape</i> in 1997.</p> <p>Stewart published <i>Intellectual Capital: the New Wealth of Organizations</i> in 1997.</p> <p>Sveiby published <i>The New Organizational Wealth: Managing and Measuring Knowledge Based Assets</i> in 1997 (Sveiby 1997).</p> <p>This was followed by experimenting with the IC frameworks that have been developed.</p>
	Late 1990s	<p>The international symposium on IC in Amsterdam was convened by the OECD (OECD 1999; 2000)</p>
3	Early 2000s	<p>Journal of Intellectual Capital was established in 2000.</p> <p>Stewart published <i>The Wealth of Knowledge: Intellectual Capital and the Twenty-First Century</i> in 2001 (Stewart 2001).</p> <p>The fourth World Congress on the Management of Intellectual Capital was held at McMaster University, Canada, January 2001.</p> <p>The fourth NYU Intangible Conference on Advances in the Measurement of Intangible (Intellectual) Capital was held in May</p>

	<p>2001 in New York.</p> <p>The international conference titled ‘The Transparent Enterprise: The Value of Intangibles’ was held at the Autonomous University of Madrid, in November 2002. The conference was to be an exchange forum for different practices, research initiatives and policies with regard to the management, measurement and disclosure of information on intangibles (Guthrie <i>et al.</i> 2003, p. 431). Output of the conference was a special edition of Journal of Intellectual Capital, ‘The Transparent Enterprise: The Value of Intangibles’, edited by Sanchez, Johanson, Bukh and Guthrie. It represented the wide scope of IC research on measuring and managing IC in Europe and Australia (Guthrie <i>et al.</i> 2003, p. 429).</p> <p>The Sixth World Congress of the Management of Intellectual Capital and Innovation was conducted in Canada in January 2003.</p>
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Some observations can be made from reviewing historical developments in IC literature. The developments can be divided into three major stages: before 1994, 1995-1999 and 2000 onwards. It should be noted that the division of the first two stages is similar to that previously made by Petty and Guthrie (2000). Much of the works in the first stage were focused on building up the significance of IC and acknowledging hidden capabilities of IC within the firm. Early attempts to manage and measure IC were proposed and were still limited to a small group of leaders in the field. The second stage of IC development saw IC gain in significance and attract interest from a wider group of research and business communities. The focus of IC research in the second stage is on measurement of IC and various IC frameworks. Both stock and flow approaches were developed.

In the third stage it is widely acknowledged that measurement and reporting of IC under the traditional financial accounting and reporting framework and attempts to assign value to IC are problematic. Bukh, Larsen and Mouritsen (2001) is an influential research that provides analysis and criticism of the market to book value argument that appears as a premise in most prior IC works and suggests that IC statements are about knowledge-management activities. Much research in the third

stage took on this proposition and focused on experimenting with various IC frameworks in existence to examine how companies identify, manage and report their IC. Other empirical research and literature reviews published in this stage suggest that IC frameworks still need further development. There are studies that focused on how to identify, measure and report IC without relying on existing IC frameworks. Prior published research (e.g. Bontis *et al.* 1999; Brennan & Connell 2000; Johanson, Martensson & Skoog 2001a, 2001b; Petty & Guthrie 2000) has suggested that the BSC is a way to explore how to manage, measure and report IC and the BSC has begun to attract greater attention as a framework that can be used to manage IC. However, the use of the BSC to manage IC may not be able to deliver intended benefits, considering criticism of the BSC in relation to the existence of the cause-and-effect relationships between perspectives in the BSC (see Norreklit 2000). The assumption that there are cause-and-effect relationships between perspectives, which are central to the validity of the BSC, has been criticised as being problematic (see Norreklit 2000). According to Norreklit (2000, p. 77), ‘Giving up the assumption that cause-and-effect relationships are involved has major consequences for the entire argumentation and for the techniques suggested for the balanced scorecard, which may not be valid the power of the instrument (BSC) to make statements and to serve the purposes of management control will be greatly reduced’. Relevant prior research in the third stage will be reviewed in greater detail in the next section.

4. A brief review of relevant prior research on measuring and reporting IC

This subsection reviews relevant IC research in the “third stage” continuing from the major developments previously outlined in Table 1 above. Prior research in the third stage has primarily focused on identification, management, and reporting of IC. They are classified into seven categories based on substance of the studies, which are shown in Table 2 below.

[Insert Table 2 about here]

The first two categories are about the stock approach to measuring IC, while the remaining five categories are about developing or employing the ‘flow-approach’ to measuring IC. These five categories are established to demonstrate the direction and

development of prior IC research in the third stage. Some observations and discussions on the direction and development of prior research in these remaining five categories will be made following the description of all seven categories. The description of these seven categories is presented below.

The studies in the first category propose \$-valuation models. The second category is separated and established to highlight the method employed in the studies and the implication of the time-lag trap on the method. The method employed in the studies in the second category can be used to determine the appropriateness of measures¹ and to assess the impact of the measures on the firm's performance by examining the correlation between measures and proxies for value creation of the firm (e.g. performance, market capitalisation, market value to book value, Tobin q).² The measures that are highly correlated with the proxies are deemed to be appropriate (Joia 2000; Roos *et al.* 1997). Although examining correlation between variables is a rigorous method to examine which variable moves together with the market value at the time being examined, the delay that IC flow may incur in creating value for the firm makes the interpretation of this type of study less meaningful. That is, IC flow may take some time to create value for the firm. The variable that has low correlation with market value may be interpreted as either irrelevant or as relevant but suffering a time-lag problem. The variable that has high correlation with market value will be interpreted as relevant because it has created value or it is valued as forward-looking information which may actually create value for the firm.³ Furthermore, the imperfection of the performance proxies may add inaccuracy and unreliability to the results. Therefore, the frameworks used in these two categories will not be reviewed further in this paper.

¹ It is important to note that Joia (2000) is one such study that examined the correlation between IC value and market value. Joia (2000) found strong positive correlations with market value for process capital, relationship capital, and IC, but negative correlations with market value for human capital and innovation capital. Although the presence of time-lag trap is a convincing argument to account for the result, the result may also be driven by the world economy during 1995-1998. The world economy and the appropriateness of indicators may be alternative explanations.

² These proxies are all imperfect. Performance may be affected by accounting choice manipulated by management and the prevailing accounting rules. Others, which take market value into account, may be affected by disclosure and market imperfections.

³ If the variable actually creates value for the firm in the future, the information about the variable is useful forward-looking information. However, the variable may not actually deliver value to the firm because of the zero-plus-sum game nature of IC, which Roos *et al.* (1997, p. 54) define it as unpredictable outcome in terms of chance and magnitude from investing in IC. In the latter case, the information is not really forward-looking.

The studies in the third category are published research that is not interested in computing IC. These prior studies employed the prevailing popular IC frameworks and examined how companies actually managed IC and how IC should be reported. The methodology used in these studies mainly involved case studies and interviews to examine how the company actually managed and reported IC. Bukh, Larsen and Mouritsen (2001) and Mouritsen, Larsen and Bukh (2001a) explored how 19 Danish firms would develop their IC statement over a three-year period. These studies are based on three research methods: a semi-annual interview with each firm; researcher participating as observers and commentators; and annual survey within the firms. Intellectual capital was classified, based on the classifications of Sveiby, Stewart and Edvinsson, into employees, internal structure and external structure. Through the methodology adopted, Bukh, Larsen and Mouritsen (2001) and Mouritsen, Larsen and Bukh (2001a) sought to understand what IC is and how IC is mobilised, how it is made to perform, and how it is situated in particular organisational settings. It should be noted that the methodology used had, to some extent, influenced or shaped intellectual capital statements the firms produced.

Based on a similar proposition that IC statements are about knowledge-management activities, Carroll and Tansey (2000) discussed how Intel had been able to manage IC. Using the Skandia Value Scheme, they discussed how Intel built each component of IC in terms of the strategy Intel used. At the end, they offered some examples of metrics for each general IC category and proposed criteria for the development of IC measures.

Caddy, Guthrie and Petty (2001), employing the Intangible Asset Monitor (IAM) model, conducted case studies on six Australasian organisations, which were considered to be 'best practice' in managing IC, to assess potential for 'orphan knowledge' to be created. The premise of the study is that organisations need to broaden their management strategies. Caddy, Guthrie and Petty (2001, p. 386) argue that: 'it may be just as important for organisations to develop techniques or procedures that search for and recover orphan knowledge as it is to develop procedures and techniques that facilitate knowledge creation and knowledge retention.' Multiple case studies were conducted to explore how and why organisations

were developing internal intellectual capital statements and management practices. They found that even in organisations considered current ‘best practice’ in managing IC, there was a medium to high potential for orphan knowledge to be created.

In this category, prior research illustrated how companies, such as technology companies and companies that were considered to be ‘best practice’ in managing IC, create value from managing their respective IC components according to the adopted frameworks. Some observations were made from the review of each study in the third category. First, the methodology that Bukh, Larsen and Mouritsen (2001) and Mouritsen, Larsen and Bukh (2001a) used may influence empirics. Second, based on the notion that IC statements are about knowledge-management activities, it is likely that IC statements of different companies differ from one another because each company may have its own strategies and organisational practices. The findings of Bukh, Larsen and Mouritsen (2001) and Mouritsen, Larsen and Bukh (2001a) have shown that IC statements of different companies can show different indicators, much depending on organisational practices.

Prior studies in the fourth category aim to provide insights into how a company reports their IC, but this was done through examination of the outputs such as annual reports. Similar to prior studies in the third category, the examinations were guided by prevailing IC frameworks. Using the IAM framework, Guthrie *et al.* (1999) and Guthrie and Petty (2000) examined how companies reported their IC. They conducted content analysis of the annual reports of the top 19 Australian companies (in terms of market capitalisation) and one Australian ‘best practice’ company in IC reporting to assess the extent to which they reported IC. They found little evidence of publicly-reported information on IC in Australia. Guthrie *et al.* (1999) also conducted a number of case studies to gain a richer and deeper understanding of how organisations identified, managed, measured and reported their IC. They reported that the key components of IC were poorly understood, inadequately identified, inefficiently managed, not reported within a consistent framework, and minimally reported.

Brennan (2001) replicated Guthrie *et al.* (1999) to a sample of Irish listed knowledge-based companies, which have substantial intangible assets. However, Brennan (2001,

p. 434) reported that such assets were rarely referred to in annual reports and, when referred to, they were in the most qualitative terms. Mouritsen, Larsen and Bukh (2001b) analysed Skandia's IC supplements to examine the whole presentation of IC supplements, what Skandia had done, why it was done, and how it worked. The aims of the study are similar to those of Bukh, Larsen and Mouritsen (2001) and Mouritsen, Larsen and Bukh (2001a), but the study adopted a different methodology by focusing on the output or IC statements.

The studies in this category also focused on how IC assets identified by the IC frameworks used in the studies were reported. While Mouritsen, Larsen and Bukh (2001b) have usefully provided an analysis of how this was done, other studies in this category found little evidence of IC reporting among their sample companies. It is interesting that Guthrie *et al.* (1999), Guthrie and Petty (2000) and Brennan (2001) found that the sample companies made little progress in reporting IC assets. Guthrie and Petty (2000, p. 248) indicated that the dearth of Australian IC reporting may result from: (1) the lack of an established, and generally accepted, framework for reporting; (2) companies' lack of, or lack of awareness of, mechanisms for assessing the change in their IC stocks; and (3) the view of some companies that development of IC is an internal management issue and, therefore, outside the scope of the annual report (Guthrie *et al.* 1999).

The fifth category is for the prior studies that do not provide empirics, but review and evaluate frameworks developed. Mainly, these studies suggest that there are still plenty of research opportunities in searching for a better classification of IC. Grojer (2001) compared and criticised the IAS 38, the BSC and the IC frameworks as being imperfect classification for intangibles. Grojer (2001) suggested that, at the present stage of experimentation, further development of classification for intangibles can be approached in two ways: deductive; and empirical approaches. Examples of studies that adopted the empirical approach are those in the third category.

Roslender and Fincham (2001) conclude that the traditional financial reporting framework is not likely to be capable of accommodating IC. They review various frameworks and criticise the emphasis placed on the management of IC. They argue the case for adopting a critical perspective on accounting for IC and encourage the

development of a self-management approach in which all organisational members are able to offer their 'self-accounts' of their workplace experiences, particularly those relating to the crucial process of IC formation and reproduction. Also, the content should be of interest to various stakeholders, since it will communicate how the company is performing from the perspective of those who contribute to that performance.

Prior studies in the sixth category called for more focus on the needs of financial report users and suggested examples of information that should be disclosed in order to improve business reporting. Financial Accounting Standards Board (FASB) (2001) indicates that the kind of information investors or financial report users require is the information that enables them to see the firm through the eyes of management. Some of the desirable information that business reporting should provide includes more forward-looking information, critical success factors, the information that management uses to manage business (FASB 2001), and information on 'execution of corporate strategy', 'management credibility' and 'quality of corporate strategy' (Mavrinac & Siesfeld 1998). In sum, these studies indicate the need to examine what information management uses to make effective and efficient decision making and establish the accountability of managers.

In addition, Mouck (1998) argues that a new vision endorsed by the theories of chaos and complexity is challenging many of the assumptions of the Efficient Markets Hypothesis (EMH) and that capital market researchers overly simplify the complexities of the behaviour of capital market. The typical methodology employed in the capital market research is an examination of usefulness of information (the informativeness test), which is the analysis of the impact of information disclosed on market value. However, this methodology is similar to that in the second category. With the time-lag problem and zero-plus-sum game nature, the informativeness test will suffer similar pitfalls as discussed above. Mouck (1998) suggests that the examination of how information is actually used to formulate adaptive strategies may be a more appropriate way to examine the usefulness of information.

The seventh category is for studies that examined the information management used in their decision making, not limited to the three general IC categories. The results of

recent studies in the seventh category (e.g. Holland 2001; Johanson, Martensson & Skoog 2001a) show that different companies have their own classification of IC or information they think important in helping communicate their strategies and story of knowledge-creation activity. Meer-Kooistra and Zijlstra (2001) aim at developing a reporting framework on IC. They argue that the content of an IC report should be determined by the components of IC and what causes changes in the various IC components. In order to develop the building block of an IC reporting framework, they interviewed management of three Dutch, knowledge-intensive companies to gain their perspectives on how to identify, measure and report on IC. To explore the perspective of external users of information, four financial analysts were also asked to identify important IC indicators they wanted in their decision making. They reported that management stressed the intertwinement of the various IC components and that management considered the BSC as a meaningful proactive tool, but it was in need of proper procedures to develop indicators. They developed a board IC framework which includes: knowledge and experience embodied in people, either formalised or tacit; organisational systems and processes supporting IC creation; innovation and technology; and business relationships. They indicated that practitioners observed these broad IC categories as being most important ones and suggested that each company should develop its own specific content of the IC report within the same broad framework. They concluded that no firm conclusions could be made regarding IC theory and suggested that future research should focus on the similarities between the various ideas.

5. Future research opportunities

Possible avenues for further research can be identified from observing the development and direction of prior research in the review above.

First, future research is needed to establish the case for measuring and reporting IC. Prior studies (e.g. Brennan 2001; Guthrie *et al.* 1999; Guthrie and Petty 2000) have found that the level of IC reporting was low. Possible explanations for the low level of IC reporting among their sample Australian companies given by Guthrie and Petty (2000, p. 248) are: (1) the lack of an established, and generally accepted, framework for reporting; (2) that companies do not have, or are not aware of, mechanisms for

assessing the change in their IC stocks; and (3) some companies may view the development of IC as being an internal management issue and therefore outside the scope of the annual report (also see Guthrie *et al.* 1999). This suggests that in order to see companies disclosing more on their IC, it is important to establish generally accepted reporting framework and present a strong case for reporting IC to the public.

Second, future research can devote effort to further develop IC frameworks. Future research for further development of IC frameworks can be pursued either in terms of more empirics of how the popular IC frameworks can be used as frameworks for managing and reporting of IC or how IC frameworks can be improved to be more comprehensive.

Third, future research can be conducted to provide more evidence on what companies are reporting, the processes in which they collect the information, and why they reported the information.

Fourth, what are the theories that can best explained how companies should report IC information.

Fifth, how the stakeholders' and financial analysts' decision-making processes look. How they use IC information in their decision-making. How useful is the information in their decision-making.

Finally, how stakeholders, accounting profession, accounting education, and regulatory bodies views and embraces the measurement and disclosure of IC information. What is needed for them to embrace the measurement and disclosure of IC information.

6. Conclusions

As Roos *et al.* (1997) indicate, IC research is the latest line of thinking in an attempt to tackle the problem of management of knowledge. Initiated in 1980s, IC research has gathered greater attention in the mid-1990s. It is considered that IC research now

is in its third stage of which the focus is on measuring and reporting IC. From the review in this paper, greater efforts are still needed in researching how to measure and report IC. Possible avenues for future research have been provided in this paper.

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Table 2. Relevant prior research in the third stage on measuring, managing and reporting IC

Categories of Prior Research	Author/Year	Purposes/Findings/Comments	Empirical Study/Methodology
1. Valuation models.⁴	Andriessen (2001)	Reviewed current practices and their consequences and proposed the Value Explorer.	\$-valuation model
	Bornemann (1999)	VAIP/ VAIC TM method.	\$-valuation model
	Lev and Mintz (1999)	Proposed knowledge capital earnings model.	\$-valuation model
	Low (2000)	Developed the value creation index that enables users to measure the impact of key intangible asset categories on a company's market value.	\$-valuation model
	M'Pherson and Pike (2001)	Aims to measure contributions of the intangibles to cash flow using IVM methodology. Shows that the process view of an organisation deconstructs the 'classical' structure of IC categories and formulations.	\$-valuation model
	Pulic (2000)	VAIC TM method	\$-valuation model
	Sullivan Jr and Sullivan Sr (2000)	Discussed the problem of valuing intangibles companies and suggested two approaches to determining their value.	\$-valuation model

⁴ These are only some examples of prior studies that proposed the \$-valuation models. Given the criticisms of \$-valuation discussed before, they are not the focus of this thesis. Therefore, there is no further attempt to review other studies in this category.

2. Variables of interest.	Bontis and Giradi (2000)	Developed a survey instrument that can be used to measure the extent to which an organisation's member understand and are committed to IC concepts and investigated whether Tango simulation is an effective means of heightening their receptivity to IC initiatives.	- Survey - 56 subjects
	Bontis, Keow and Richardson (2000)	Investigated the inter-relationships of the three elements of IC - human capital, structural capital and customer capital.	- Survey - 107 subjects - Employed IC framework
	Joia (2000)	Examined the correlation between IC and market value. Time-lag trap was presented.	- Case study - Employed Skandia Value Scheme
3. Examined how companies actually measure and/or report IC.	Bukh, Larsen and Mouritsen (2001)	Analysed the development of IC statements in 19 Danish firms to identify the main components of IC statement. IC statement comprises metrics, sketches/visualisation, and stories/narrative (a set of measures and an interpretation). IC is about management of knowledge in individual firms.	- Survey and interview - Closely follow the 19 firms for over three years to observe the crafting of IC statement. - Denmark - Employed Sveiby-Stewart-Edvinsson model

	Caddy, Guthrie and Petty (2001)	<p>Examined these questions:</p> <ol style="list-style-type: none"> (1) What constitutes intellectual capital in this organisation?; (2) Why does the organisation want to measure its intellectual capital?; (3) Who is involved in the project?; (4) How does the organisation work with its intellectual capital?; and (5) What potential effect(s) is the reporting of intellectual capital expected to have? 	<p>- Australia</p> <p>- Employed the IAM model.</p>
	Carroll and Tansey (2000)	<p>Discussed the meaning, measurement, and management of IC. Examined how Intel has been able to manage IC. Discussed implications of traditional accounting on IC.</p>	<p>- U.S.</p> <p>- Employed Skandia Value Scheme</p>
	Chaminade and Johanson (2003)	<p>Examined culture effects on the assumptions of knowledge as well as the creation and the adoption of new knowledge. They compared the Meritum work in Spain and Sweden in relation to the interest and experience of IC among firms and the way the firms develop IC management and IC reporting. They found that culture affected the interest and experience of IC reporting and management among firms, but not with respect to the development of IC reporting and management.</p>	<p>No</p>

	Mouritsen, Larsen and Bukh (2001a)	<p>Presented similar three case studies to those in Bukh, Larsen and Mouritsen (2001).</p> <p>Research questions were:</p> <ol style="list-style-type: none"> (1) Why do the firms want to measure IC?; (2) Who is involved in the project?; (3) How does the firm work with IC?; (4) What is IC made to be in the specific firm?; (5) What potential effects is the reporting of IC expected to have? 	<ul style="list-style-type: none"> - Each firm was interviewed at least twice a year. - Monthly meetings between the firms were observed. - a questionnaire was administered each year. - Employed Sveiby-Stewart-Edvinsson model
	Thorbjornsen and Mouritsen (2003)	<p>Compared the use of competence measurements at three Danish companies. Analysing the three competence statements, they indicated that the individual is never alone and the three conventional 'levels' of competencies often suggested in the literature is difficult to uphold in empirical situations.</p>	<ul style="list-style-type: none"> - Interviews were conducted in three organisations. - Focused on human capital, an IC category commonly suggested by various prevailing IC frameworks.
4. Examined annual report.	Bozzolan, Favotto and Ricceri (2003)	<p>Examined voluntary intellectual capital disclosure provided by listed Italian companies in annual reports from the year 2001.</p>	<ul style="list-style-type: none"> - Content analysis of annual reports of 30 organisations chosen from the non-financial companies listed in the Italian Stock Exchange.
	Brennan (2001)	<p>Examined extent to which companies were adopting methodologies for reporting of IC in their annual report. Reported that the level of disclosure of IC attributes by 11 knowledge-based Irish listed companies was low.</p>	<ul style="list-style-type: none"> - Content analysis of annual reports of the 11 knowledge-based Irish listed companies. - Ireland

	Guthrie, Petty, Ferrier and Wells (1999) Guthrie and Petty (2000)	Examined the extent to which the companies report their IC and how organisations were managing the identification, management, measurement and reporting of their IC. Few companies appeared to have taken a conceptual approach to reporting their IC.	- Content analysis of IC reporting of the top 19 Australian listed companies and one other company, based on the IAM model. - Case studies (interview) focus on measuring and reporting human resources.
	Mouritsen, Larsen and Bukh (2001b)	Discussed what Skandia had done, why the statement was done, how it looked, and how it worked.	- Analysed all the supplements and focus on constitution, continuity, message, and relationship among the supplements.
5. Search for a better classification.	Caddy (2000)	Argued for the existence of intellectual liabilities. He also highlighted the difference between intellectual assets and intangible assets.	- No empirical evidence - Review prior research
	Grojer (2001)	Evaluated three classification concepts, IAS38, BSC, and IC, from the classification theory perspective.	- No - Part of MERITUM project.
	Johnson (1999)	Developed an integrative taxonomy of IC based on recent literature. Reviewed and integrated current IC categorisations.	- No empirical evidence - Review prior research

	Liebowitz and Suen (2000)	Limitations of the current measures were discussed and suggested additional measures to complement existing measures.	Proposed new metrics to compensate potential drawbacks of current metrics and apply them at UMBC, U.S.
	Marr, Gray and Neely (2003)	<p>Reviewed the theoretical underpinnings and the different rationales for the measurement of IC.</p> <p>Reviewed existing empirical evidence that purports to test the rationales put forward for each of the IC measurement drivers.</p> <p>Concluded 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.</p>	- Review prior research
	Roslender and Fincham (2001)	Advocated a self-management approach – organisation participants to offer their own account.	No
	Stolowy and Jeny-Cazavan (2001)	Examined 21 nations and two international accounting standard approach definition and treatment of intangibles. The study showed that there was no conceptual framework commonly accepted and that there was a considerable lack of consistency both inter-country and intra-country.	<p>- No</p> <p>- Review the accounting regulations of a sample of 21 countries.</p>

6. Emphasised the need to incorporate users' perspectives and how information is used by external users.	Eccles and Mavrinac (1995)	Conducted a national survey of corporate managers, financial analysts, and portfolio managers to examine their opinions on regulations and how companies communicated with the capital markets. They preferred investor relations activities and voluntary disclosure which increased management credibility, rather than increased regulation.	- Survey
	FASB (2001)	The committee developed a guideline for providing voluntary disclosure. The information that should be disclosed includes forward-looking information, critical success factors, management's strategies and plan, and metrics used in management's decision making.	No
	Fletcher, Guthrie, Steane, Roos and Pike (2003)	Examined the important elements deemed to add value and to contribute to the performance of the Australian Red Cross Blood Service.	- Case study and mail survey with a response rate of almost 50 per cent from 90 surveys mailed
	Gregory and Stephen (1998)	Called for a more user focus in the standard setting process and encouraged academics to research information needs of users and the decision usefulness of information.	No
	Healy and Palepu (1993)	Argued that voluntary disclosure could be used to improve communication with investors and reinforce credibility of their financial disclosure by choosing financing, payout and hedging policies that complement their reporting strategies.	No

	Holland and Johanson (2003)	Used the concept of the value creation chain to explore how value-relevant information on corporate intangibles is created and processed by participants (analysts, fund managers) in the market for information. They also investigated barriers and problems likely to be faced by these market participants within their information creation and processing activities.	No
	Mavrinac and Siesfeld (1998)	Investigated the impact of non-financial factors on investors' decision-making and the extent to which they are leading indicators of future financial performance.	- Survey 275 portfolio managers of buy side and examine how non-financial performance was translated into share valuation.
	Mouck (1998)	Used theories of chaos and complexity to challenge many of the fundamental presuppositions of the Efficient Markets Hypothesis (EMH). Concluded that some investors may use accounting information and some may not. Suggested a need to understand the way accounting information is actually used in the context in which it is constructed.	No

	Rylander, Jacobsen and Roos (2000)	Reviewed recent approach to reporting IC: efforts to modify or complement the accounting framework to cope with impact of IC and reporting on the contribution of intangible as well as tangible resources to value creation. Argued that the former is unsuitable for IC reporting, while the latter is difficult to interpret because the link to value creation is unclear. Users' need of information should be the starting point to improve business reporting.	No
7. What and how information is actually used in management's decision making.	Collier (2001)	A case study of IC within the police service of the UK. Differentiated between stock and flow of IC. He argued that the utilisation of the knowledge base is more important than a valuation exercise.	<ul style="list-style-type: none"> - Participant observation, interview, and documentary research (ethnographic and action research) - UK -1996-1999 -emphasised the importance of leverage, capacity and context. Search for a better understanding of what is important in measurement and reporting.

	Holland (2001)	Explored the central role that private information on corporate intangibles plays in private corporate governance of financial institutions. Found that the structure and content of the private agenda reveal the different perspectives of the manager who has to create value and the fund manager who has to assess value. This study provided evidence to support the argument of Johanson, Martensson and Skoog (2001a) (management constructs/reconstructs their own portfolio of indicators).	<ul style="list-style-type: none"> - Archival research method and case study interviews. - Uses IC classificatory, customer (external) capital, human capital, organisational (internal) capital, as guidelines for looking at the structure of the private qualitative agenda. - UK
	Johanson, Martensson and Skoog (2001a)	Examined: (1) how intangibles are recognised, measured, reported and evaluated; and (2) how organisational change is mobilised through management control of intangibles. The study suggested that definitions of intangibles are entirely pragmatic for particular management purposes.	<ul style="list-style-type: none"> - Case studies - 11 Swedish companies, three companies were selected for further analysis - Sweden - Management control system - Part of MERITUM project.
	Matti (2003)	Analysed organisational value creation from a management control perspective. Conducted a case study in one of the largest banks in Sweden during a four-year period. Discussed possible key features of a management control system that enables organisations to understand and allocate attention to the value creation of the firm.	<ul style="list-style-type: none"> - Interviewed bank managers, collected and analysed internal documents, and open-ended conversations with bank 'informants'.

	Meer-Kooistra and Zijlstra (2001)	Developed the building blocks of a reporting framework. Reported that defining IC as the difference between market value and book value provoked criticisms (see also Bukh, Larsen & Mouritsen 2001).	<ul style="list-style-type: none"> - Analysis of various models - Interviews with management of three Dutch companies and four financial analysts. - Netherlands - Employed Skandia Value Scheme model
	Sanchez, Chaminade and Olea (2000)	Provided evidence on ‘best practice’ in the measurement and disclosure of information on intangibles by Spanish companies. Examined how the management control of intangibles was carried out and how organisational units interacted. Defined intangible resources.	<ul style="list-style-type: none"> - Case studies/ Grounded theory method - Sweden - Analysed management control system - Part of MERITUM project
	Waterhouse (1999)	Survey of CEOs and board members. Examined the extent to which financial and non-financial performance measures that are reported to boards of directors and senior management fit with corporate strategic priorities and the extent to which the fit between strategic priorities and performance measures improves with good governance.	<ul style="list-style-type: none"> - 812 people were surveyed. 114 people responded. - Canada