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Intellectual capital disclosure and intangible value drivers: an empirical study

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ICDs and
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1163

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Abstract

Purpose – This paper aims to study the relationship between intellectual capital disclosures (ICDs) and the relative importance of intangible assets as company value drivers.

Design/methodology/approach – Annual reports of Swedish, British and Danish firms are analysed to measure the extent of ICD. The level of intellectual capital (IC) in firms, measured with proxies for the categories of human, structural and relational capital.

Findings – As to the components of IC, the empirical results indicate that there is a strong significant positive relationship between (the level of) structural capital possession of a firm and the firm's ICD.

Practical implications – This suggests that firms with a relatively high level of structural capital, disclose more information on IC in the annual report. The study found no such significant association between human and relational capital in firms and ICD regarding these items. Firms might have a transparency drawback in addressing these issues in the reports when these IC categories are relatively of greater importance for firms.

Originality/value – The paper provides evidence for the argument that firms focus their ICD on those IC elements that are most relevant for the company's value creation process.

Keywords Intangible assets, Intellectual capital, Disclosure, Sweden, United Kingdom, Denmark

Paper type Research paper

1. Introduction

One of the main factors that highlight the importance of intellectual capital (IC) within firms is to shift in the focus of management from tangible to intangible capital when considering the “value creation” processes within firms (Abeysekera, 2006). Research

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suggests that there is an increasing trend among firms to provide additional information on intangibles on a voluntary basis (Williams, 2001; Abeysekera and Guthrie, 2003; Bozzolan *et al.*, 2003; Vandemaele *et al.*, 2005; Gray *et al.*, 2004; Burgman and Roos, 2006, 2007). An obvious reason for doing so is reducing the information asymmetry between management and shareholders and investors, thereby meeting, as Burgman and Roos (2006) suggest “forces that make the basis of the case for the provision of operating and IC information” in a rapidly changing environment. Research has shown that a positive correlation exists between market-to-book ratios and the IC-intensity of firms, and managers can address this “hidden value” by voluntarily disclosing information on IC in annual reports (Brennan, 2001). In Europe, and especially in Scandinavia, initiatives from both firms and governmental institutions try to stimulate organisations to address intangibles in the annual accounts. These developments have resulted in a continuous increase in the level of IC disclosure (ICD), although substantial differences across countries and industries have been reported in empirical studies.

Although it has been shown that an increased level of IC does result in a higher level of ICD, empirical studies have reported considerable differences in the level of disclosure on particular IC elements (see, e.g. Guthrie and Petty, 2000; Abeysekera and Guthrie, 2003; Bozzolan *et al.*, 2003; Goh and Lim, 2004; Vandemaele *et al.*, 2005; Gray *et al.*, 2004; Burgman and Roos, 2006, 2007). These variations could be a result of the fact that the costs of producing information on the various elements of IC are unequal. For example, firms may provide more information on relational capital (RC) because existing information systems may hold abundant information on business partners such as customers and suppliers. Based on this argument, the variation in ICD may be explained by differences in information production costs. An alternative explanation may be that firms focus their ICD on those IC elements that are most relevant for the company’s value creation process and, as Burgman and Roos (2006) argue, for stakeholders given the changing nature of stock exchanges and the influence of different investment fund types such as hedge funds and private equity. This would imply that the ICD level on each of the various IC elements provides information on the relative importance of that particular IC component. In other words, if the ICD regarding a particular IC element varies with the relevance of that particular IC element for the reporting firm, users of the IC information are thought to be interested in being able to better assess the IC of that firm. The main goal of this article therefore is to examine the relationship between intangible value drivers and the level of ICD.

The next section of this paper (section 2) briefly defines IC and overviews some of the IC literature on ICD we draw on. Section 3 specifies the research hypotheses and describes the methodology used in this paper. Section 4 discusses the research findings and, finally, section 5 concludes with a discussion on the limitations of the study and proposes avenues for further research.

2. Literature overview and hypothesis development

The present financial accounting framework is criticised as inadequate and failing to communicate the most important assets and resources of today’s business (Seetharaman *et al.*, 2002). The problem with the traditional financial accounting framework is that reporting lacks the recognition of IC value and creates an information gap between insiders and outsiders. To decrease the information asymmetry, firms can choose to voluntarily disclose information. Voluntarily ICD is

beneficial for several reasons. It mitigates the information asymmetry problem (and, hence, the agency problem) and has positive effects on the firm's (external) reputation, trust and confidence (from all stakeholders) in the firm's management. The firm's perceived risk is also reduced because an open disclosure strategy supposedly results in a better assessment of future wealth creation capabilities, and therefore, a decline in the firm's cost of capital (Williams, 2001; Burgman and Roos, 2007). Furthermore, "new sources" of wealth, not readily identified in the value chain" such as value networks, value shops and the matching business risks, force companies to find alternative ways to disclose this information in a credible way (Burgman and Roos, 2007). In short, ultimately, value relevance is an important factor for managers to disclose additional information since financial statements are created to provide a true view of a company's underlying performance (Vergauwen and van Alem, 2005).

ICDs also come at a cost, such as the cost of gathering, processing and interpreting the necessary data. Vergauwen and van Alem (2005) identify three other opposing factors for IC disclosure, such as:

- (1) the transparency drawback in competitive markets;
- (2) regulatory barriers; and
- (3) auditor conservatism.

Other possible costs include reputation, political, contracting or proprietary issues. A driving force behind such costs may stem from external stakeholders, holding no ownership in the entity but having an interest in the actions taken by the company, undertaking actions detrimental to the firm's future cash flows (Karpoff and Lott, 1993).

Academic studies are way ahead in classifying and representing IC schematically but hardly any systematised intellectual reporting frameworks can be found and the extent of reporting varies greatly (Guthrie and Petty, 2000; Abeysekera and Guthrie, 2003). Table I presents an overview of empirical studies focussing on the level of ICD. These studies indicate that ICD is still in its infancy and is poorly defined in the annual reports. The studies that analysed on a longitudinal basis indicated increases over years (Williams, 2001; Abeysekera and Guthrie, 2003; Vandemaele *et al.*, 2005; Vergauwen and van Alem, 2005). Furthermore, it was found that firms provide little quantitative information (Guthrie and Petty, 2000; Goh and Lim, 2004). Country of origin was found to be an important factor for ICD (Kurvink, 2005). Voluntary ICD differs substantially across countries because of country specific regulations and auditor conservatism (Vergauwen and van Alem, 2005).

Another finding is that the various components of IC are treated differently in IC reporting. Overall, IC reportings related to relational/customer capital (RC) ranked first (40 per cent to 49 per cent of total ICD), followed by items on structural capital (SC) (20 per cent to 37 per cent) and human capital (HC) (22 per cent to 36 per cent) (see Guthrie and Petty, 2000; Abeysekera and Guthrie, 2003; Bozzolan *et al.*, 2003; Goh and Lim, 2004; Vandemaele *et al.*, 2005). These findings suggest the presence of systematic differences in the level of reporting on IC elements. A potential explanation for these differences could be based on information production costs. Based on the availability of relevant information to incorporate in ICD, firms may find it more difficult to report on certain IC elements or components. For example, firms may have many information on suppliers and customers because this type of information is highly relevant in various

Table I.
Literature review on
intellectual capital
disclosure

Author	Article	Year of publication	Country	Sample size	Year of sample selection
Guthrie and Petty	"Intellectual capital: Australian annual reporting practices"	2000	Australia	20 annual reports from main stock index	1998
Brennan	"Reporting intellectual capital in annual reports: evidence from Ireland"	2001	Ireland	11 listed knowledge-based companies	1999
Williams	"Is intellectual capital performance and disclosure practices related?"	2001	UK	31 FTSE 100 listed companies	1996-2000
Bontis	"ICD in Canadian corporations"	2002	Canada	10,000 Canadian companies	1998/1999, 1999/2000
Abeysekera and Guthrie	"An empirical investigation of annual reporting trends of intellectual capital in Sri Lanka"	2003	Sri Lanka	30 annual reports from main stock index	
Bozzolan <i>et al.</i>	"Italian annual intellectual capital disclosure, an empirical analysis"	2003	Italy	30 companies listed on Nuovo Mercato exchange	2001
Goh and Lim	"Disclosing intellectual capital in company annual reports evidence from Malaysia"	2004	Malaysia	20 top profit-making public listed companies	2001
Gray <i>et al.</i>	"What intangibles resources do companies value, measure and report?"	2004	UK, Finland	95 UK and 16 Finnish companies	
Vandemaede <i>et al.</i>	"ICD in The Netherlands, Sweden and the UK"	2005	The Netherlands, Sweden and the UK	180 annual reports 20 * three countries * three years from main stock indices	1998, 2000, 2002
Vergauwen and van Alem	"Annual report IC disclosures in The Netherlands, France and Germany"	2005	The Netherlands, France and Germany	French CAC-40, Dutch AEX, German XETRA-DAX publicly-listed companies	2000, 2001
Kurvink	"Factors influencing intellectual capital disclosure report"	2005	9 EU countries	180 annual reports 20 * three industries * three years from main stock indices	2000, 2002 and 2004

operational processes. Based on the availability of this type of information, firms may find it relatively easy to report on RC in ICDs. In contrast, firms may gather less information on their employees because this type of information may be less relevant in operational processes. Therefore, reporting on HC in ICD may be more costly. As a result, firms may generally orient a larger portion of their ICD towards RC compared to HC.

An alternative explanation may be that firms focus ICD on those IC elements that are most relevant and consequently are expected to be most beneficial to its stakeholders (see also Gray *et al.*, 2004; Burgman and Roos, 2006, 2007). For ICD users, this would imply that the level of disclosure on each of the various IC elements provides information on the relative importance of that element. As a result, the level of disclosure on a particular IC element can be used to better assess the value of intellectual capital within that firm. This view is in line with Burgman and Roos (2006, 2007) and Gray *et al.* (2004) investigating the reasons for and importance of IC reporting, i.e. what intangible resources companies consider important to measure (quantify) and actually disclose to stakeholders. Main theoretical developments and findings of this strand of research concern the insight that disclosure should reflect management's understanding of strategy and value creation processes of the company. Understanding what intangible resources are perceived to create value and determining whether the pressure to disclose those drivers is indeed the key motivation for its measurement, management and reporting (Gray *et al.*, 2004). Sharing and signalling this management understanding of the company's value drivers to the stakeholders is indeed a strong, if not the strongest, motivator for disclosure. Based on these arguments, the next section develops a set of hypotheses that focus on the relationship between the relative importance of IC and the level of reporting on these assets through voluntary ICD.

3. Hypotheses, sample selection and research methodology

3.1. Hypotheses

Firms with high IC-intensity, derive their value for a major part out of non-tangible assets. Managers can address this "hidden value" by voluntarily ICD in annual reports (Brennan, 2001). IC intensive firms are most heavily confronted with the growing importance of IC (Lev, 2001), and for this reason these firms have a higher information asymmetry and are expected to address this information gap by providing more information (see also Gray *et al.*, 2004; Burgman and Roos, 2006, 2007). Therefore, the first hypothesis is:

H1. Firms with a high level of IC have relatively more ICDs.

IC can be further decomposed into its three elements. SC is often referred to as "organisational capital", i.e. internal (infra)structures of the firm. This part of IC comprises systems, processes, procedures, patents, concepts, etc. and is not only created by the employees or brought in from external sources, but is also embedded into the firm. Organisational culture is also considered part of the internal structure (Guthrie and Petty, 2000). RC is often referred to as "external" or "reputation" capital and consists of a firm's reputation, brands, and its relationship with clients, suppliers and other stakeholders. Distribution channels and franchising agreements are also elements of RC. HC consists of employees' knowledge and competences and can be further decomposed into individual

and corporate HC. Individual HC refers to the individual's tacit competences from genetic inheritance, education, skills, training, experience and values and beliefs. Corporate HC arises out of aggregate knowledge, i.e. "collective intelligence" a company achieves by sharing knowledge from the individuals' capacities.

In every firm, these three elements of IC are strongly related. HC cannot be aggregated in an enterprise without a proper infrastructure to work in. Without a well-established relationship and network between the firm and its external environment, HC and RC will be of little value.

Every successful company not only possesses all kinds of intangibles, but also always has a relative emphasis on one type of intangible (Hussi and Ahonen, 2002). Expectedly, firms put more emphasis in ICD, on those elements of IC that create the most value and therefore would differ in supplying this information. The following hypotheses therefore describe the relationship between the category information provided in annual reports and the level of IC in each category. The second hypothesis examines to what extent professionalism in a firm leads to more HC disclosures. The third hypothesis relates the level of SC in organisations to the disclosures of the SC category and the fourth hypothesis examines the external capital in a firm and relates this to the amount of RC disclosed in each firm under scrutiny:

- H2.* Firms with a high level of HC in the organisation have relatively more HC disclosures.
- H3.* Firms with a high level of SC in the organisation have relatively more SC disclosures.
- H4.* Firms with a high level of RC in the organisation have relatively more RC disclosures.

3.2. Sample selection

In order to facilitate a study that focuses on the relationship between IC and ICD on the level of HC, SC and RC, the sample is constructed around a set of companies that is expected to have a relatively high level of IC. First, the study focuses on three countries: Sweden, the UK and Denmark. Bonfour (2003) rated European countries with an IC performance index. Sweden had the highest overall IC performance index; Denmark was ranked fourth; and the UK fifth. Second, only large firms are included in the sample. Size is an influencing factor in voluntary reporting behaviour, which is demonstrated in social and environmental research (Mitchell *et al.*, 1995) and in ICD (Bozzolan *et al.*, 2003). Larger firms have incentives to provide more information because these firms are more dependent on their stakeholders. For these reasons, firms are selected from the top end of the market capitalisation scale. Stock market indices are used for the selection of the firms. For Sweden, the Stockholm Stock Exchange is selected. For Denmark, the Copenhagen Stock Exchange is used and for the UK, the UK FTSE 100 is selected. In order to obtain a reliable sample, 20 firms of each country are selected which results in a total sample of 60 firms. Table II provides some basic descriptive statistics with respect to the sample firms.

3.3. Research methodology

3.3.1. (1) Dependent variables. Of the various methods available to researchers seeking to understand ICD, content analysis is the most popular (Guthrie *et al.*, 2004). A content

analysis is a research technique for making replicable and valid inferences from texts to the contexts of their use (Krippendorff, 2004). This technique gathers the data, involves codifying of systematically, objectively and reliably, qualitative and quantitative information into pre-defined categories in order to derive patterns in the presentation and reporting of information (Guthrie *et al.*, 2004). A list of IC items is categorised in a classification scheme as provided in Table III. The framework of this study incorporates the Bontis (2002) framework (see also Vergauwen and van Alem (2005)) and the Guthrie and Petty (2000) framework (see also Brennan (2001), Abeysekera and Guthrie (2003), Bozzolan *et al.* (2003); Goh and Lim (2004) and Vandemaele *et al.* (2005)). For the analysis, the annual reports were screened in full and every time an element or "hit" that is stated on the list occurred, it this was counted as one recording unit and therefore received a score of one. To increase the level of reliability, the content analysis is performed electronically.

3.2.2. (2) *Independent variables.* Designing indicators for IC that are applicable to all firms is difficult and the outcome is always debatable. Such indicators are perceived as being idiosyncratic, meaning that they are unique for each enterprise (Grasenick and Low, 2004). Additionally, this study is dependent on the data that are publicly available. Since managers do not publicly reveal all information for competitive reasons, establishing indicators that reflect the level of IC in an organisation is a challenge:

- (1) *IC indicators.* To measure the overall IC level of firms, Brennan (2001), used a value-based measurement, suggesting that the value of IC can be measured by the difference between the market and the book value (MBV). Empirical studies indicate that the so-called knowledge-intensive companies have a market value that is significantly higher than their book value of equity (Hussi and Ahonen, 2002). Brennan (2001) argues that this value-based approach is not the best measure of testing IC in a firm for two reasons. The first reason is that not all the differences can be assigned to intangibles and secondly, daily fluctuations of share prices arise on the stock exchange. However, since other measurements require unavailable internal information, the examination of market and book value differences is feasible here. This value-based approach nevertheless gives a gross but overall indication of IC in order to test differences in intellectual possessions between firms (Brennan, 2001).
- (2) *HC indicators.* The following indicators will be used to measure HC:
 - personnel costs/revenue (P/R); and
 - Revenue/full-time employees (R/FTE).

	Total sample	Sweden	UK	Denmark
<i>n</i>	60	20	20	20
Market value	31,824,717	9,031,082	79,047,969	3,414,386
Book value	11,618,457	4,099,607	28,050,533	2,705,230
Total revenue	15,201,011	8,123,121	33,750,421	3,729,491
Total assets	70,132,101	30,615,475	150,349,980	29,430,848
Full-time employees	52,644	50,159	89,539	18,236
Number of industries covered	23	13	11	13

Table II.
Summary statistics for
sample firms
(amounts in €)

MD 45,7		Absolute	Relative
	<i>Structural capital</i>		
	Network	1,267	0.36
	R&D/research and development	607	0.17
	Telecommunication	458	0.13
	Patents	372	0.11
1170	Innovation	214	0.06
	Leadership	170	0.05
	Methodologies	76	0.02
	Intellectual property	74	0.02
	Trademarks	62	0.02
	Philosophy	45	0.01
	Management processes	40	0.01
	Corporate culture	21	0.01
	Information systems	20	0.01
	Knowledge sharing	20	0.01
	Knowledge resources	7	0.00
	IC	5	0.00
	Electronic data interchange	2	0.00
	Trade secrets	2	0.00
	Management focus	2	0.00
	Corporate university	2	0.00
	Software systems	2	0.00
	Cultural diversity	1	0.00
	Proprietary process	1	0.00
	Intellectual assets	1	0.00
	Business knowledge	1	0.00
	Technological processes	1	0.00
	Value added	0	0.00
	Soft assets	0	0.00
	Operating systems	0	0.00
	Operating software	0	0.00
	Organisational learning	0	0.00
	Organisational culture	0	0.00
	Management quality	0	0.00
	Knowledge stock	0	0.00
	Knowledge assets	0	0.00
	Intellectual resources	0	0.00
	Intellectual material	0	0.00
	Economic value added	0	0.00
	Corporate learning	0	0.00
	Product development cycle	0	0.00
	New product success rate	0	0.00
	New product revenue	0	0.00
	Research projects	0	0.00
	Networking systems	0	0.00
	Infrastructural assets	0	0.00
	Copyrights	0	0.00
	<i>Relational capital</i>		
	Customers	4,076	0.57
	Joint venture	1,082	0.15

Table III.
Results of search terms

(continued)

	Absolute	Relative	ICDs and intangible value drivers
Brands	1,017	0.14	
Market share	461	0.06	
Partnership	308	0.04	
Customer satisfaction	63	0.01	
Supply chain	50	0.01	
Distribution channels	50	0.01	
Customer loyalty	21	0.00	
Distribution networks	20	0.00	
Quality standards	9	0.00	
Brand recognition	7	0.00	
Research collaboration	6	0.00	
Brand development	2	0.00	
Customer knowledge	2	0.00	
Customer base	1	0.00	
Business collaboration	1	0.00	
Customer recognition	0	0.00	
Supplies knowledge	0	0.00	
Customer capital	0	0.00	
Competitive intelligence	0	0.00	
Company reputation	0	0.00	
Customer retainment	0	0.00	
Customer turnover rates	0	0.00	
Favourable contracts	0	0.00	
Corporate image	0	0.00	
Franchising agreement	0	0.00	
Licensing agreement	0	0.00	
Financial contacts	0	0.00	
<i>Human capital</i>			
Employees	3,822	0.77	
Knowledge	252	0.05	
Personnel	225	0.05	
Expertise	139	0.03	
Competence	133	0.03	
Education	123	0.02	
Specialist	91	0.02	
Employee benefits	61	0.01	
Know-how	58	0.01	
Employee satisfaction	19	0.00	
Motivation	15	0.00	
Career development	10	0.00	
Empowerment	10	0.00	
Human capital	8	0.00	
Intelligence	7	0.00	
Employee expertise	4	0.00	
Employee skill	3	0.00	
Human value	1	0.00	
Expert team	1	0.00	
Employee value	1	0.00	
Flexitime	0	0.00	
Brain power	0	0.00	
			1171

(continued)

Table III.

MD 45,7			
	Absolute	Relative	
1172	Human asset	0	0.00
	Expert network	0	0.00
	Employee productivity	0	0.00
	Human resources	0	0.00
	Employee retention	0	0.00
	Value added statements	0	0.00
	Union activity	0	0.00
	Training programmes	0	0.00
	Vocational qualifications	0	0.00
	Work-related competence	0	0.00
	Work-related knowledge	0	0.00

Table III.

HC is measured by the extent of professionalism in a firm. In order to obtain and retain professionals in the organisation, firms need to invest in their human resources. Firms operate in a competitive environment and employees can have incentives to leave a firm if they can receive higher rewards elsewhere. Also, firms can attract people by paying a relative higher award. Therefore, investing in HC is a possibility to lever the overall HC level of a firm. The first proxy is therefore an indicator that measures the input of HC; the amount of costs spent on employees to the total revenue earned. Personnel costs are all costs spent on employees, this includes salaries, training and educational costs, perquisites etc

The output of HC indicates the effectiveness and efficiency of the employees in an organisation. Employees that receive high rewards are not per definition maximising their worth for the organisation. Therefore, the second indicator will be based on how much revenue can be generated by each employee, measured in full-time employees (fte). The higher the proxy, the more value each employee can generate.

- (1) *SC indicators*. Like the HC indicators, the SC indicators measure the extent of input and output and are as follows:
 - R&D expenditure/revenue (R&D/R); and
 - intellectual property/total assets (IP/TA).

Modernisation, renewal and development for products or for a firm, can be indicated by the expenses on research and development. Therefore a proxy for the SC measurement is defined by the investments in R&D to revenue. The higher the ratio, the more investments have been made to improve SC, which is used as an indicator to measure the input of SC.

The second proxy to measure IC is based on intellectual property (IP). IP also indicates renewal and growth because the rights originate from new developed attributes. Therefore, this can also be seen as the output that the investments generate. IP is capitalised and therefore measurable and comprises by patents, copyrights, computer software, etc.

- (2) *RC indicators*. The indicators that measure RC for this study are:
 - marketing-selling-distribution expenditures/revenue (MSDE/R);
 - Herfindahl Index of Business Segments (HBS); and
 - Herfindahl Index of Geographic Segments (HGS).

It is difficult to express the relationships with business partners, clients and brand awareness in monetary variables or even in units. However, the amount of expenses in marketing, selling and distribution costs can approximate the investment in RC since these costs are expenses to promote a product, to establish a brand name, to improve distribution lines and so on. Therefore these costs can be seen as investments or inputs in the relationships between a brand, the company and its connections.

The second and third proxies to level a firms' RC are based on the level of businesses and geographical segments. An organisation that is more active in different markets and geographical areas needs to adjust to different customer groups and cultures respectively. Therefore, this can form an indicator in the measurement of RC level. The ratios for business segments and geographic segments are measured with the use of the Herfindahl index[1].

4. Research findings

4.1. Descriptive statistics for the content analysis

The results for the content analysis are shortly discussed in this section. The number of "hits" per category of IC is displayed in Table IV. The amount of ICD corresponds to 60 firms originating from Sweden, Denmark or the UK for the year 2002. RC appears to have the highest amount of disclosure with a total of 7,176 items reported and an average of 120 per firm. This represents 46 per cent, and thus almost half of the total items disclosed. HC amounts to a total of 4,985 hits, an average of 83 per firm and SC to a total of 3,473 with an average of 58 per firm. These categories represent 32 per cent and 22 per cent of the total disclosure respectively.

Table III shows the amounts of hits per search term and per category. The results of the eight most frequently mentioned items per category are displayed in Table V. We will discuss each category briefly:

- (1) *RC elements*. The attributes customer, joint venture and brands are most often mentioned. Since the sample consists of large firms, highest on the countries' market capitalisation scale, many are active in different geographical business segments. A strong brand, representing companies' reputation in a way, is essential for firms in promoting their values. Joint venture as well as partnership and market share indicate the importance of growth and globalisation. These elements can point towards the importance of strategic alliances for firms; the need to change market position in order to obtain a stronger competitive position in the world economy.
- (2) *HC elements*. Employees are paramount: 77 per cent of the total in the category. Managers are aware that human assets are pivotal for organisations. Hence,

	<i>n</i>	Minimum	Maximum	Sum	Mean	Std deviation
Structural capital	60	1	448	3,473	57.88	98.901
Relational capital	60	13	495	7,176	119.60	105.382
Human capital	60	2	232	4,985	83.08	52.164
Intellectual capital	60	22	984	15,634	260.57	214.93

Table IV.
Amount of hits per
category item of
intellectual capital

MD 45,7		Absolute	Relative
1174	<i>Structural capital</i>		
	Network	1,267	0.36
	R&D/research and development	607	0.17
	Telecommunication	458	0.13
	Patents	372	0.11
	Innovation	214	0.06
	Leadership	170	0.05
	Methodologies	76	0.02
	Intellectual property	74	0.02
	Other variables (38)	235	0.07
	Total	3473	100%
	<i>Relational capital</i>		
	Customers	4,076	0.57
	joint venture	1,082	0.15
	Brands	1,017	0.14
	Market share	461	0.06
	Partnership	308	0.04
	Customer satisfaction	63	0.01
	Supply chain	50	0.01
	Distribution channels	50	0.01
	Other variables (22)	69	0.01
	Total	7176	100%
	<i>Human capital</i>		
	Employees	3,822	0.77
	Knowledge	252	0.05
	Personnel	225	0.05
	Expertise	139	0.03
	Competence	133	0.03
	Education	123	0.02
	Specialist	91	0.02
	Employee benefits	61	0.01
	Other variables (25)	139	0.03
	Total	4,985	100%

Table V.
Most frequently disclosed
items in content analysis

knowledge, personnel, expertise, competence and education all indicate the importance of the development of employees in an organisation.

- (3) *SC elements*: This IC component is least disclosed. A possible explanation might be that because many of these items relate to internally generated assets, firms are tentative about providing this information to competitors. The most reported items in the SC category were network, R&D, telecommunication, patents and innovation. These terms point to the significance for renewal and growth in the “new economy” together with the importance of the internet.

4.2. ICDs and market to book value

This section discusses the relationship between market to book value and overall ICD in the annual accounts (*H1*). It is expected that the relation between ICD and market to book value is positive. The market also values the assets that are not reported in the financial accounts, which explains the higher market value. When there is a large difference between the market and the book value, firms are expected to address the

difference by additional disclosure for the market, to decrease the information gap. Especially “non-traditional” firms, those firms that depend much on is the annual reports. Also, Scandinavian firms, that are considered to be in a leading position of IC, are expected to have a positive relationship between disclosures and market to book value.

Table VI displays the results of the correlations between intellectual capital disclosures and intangible value drivers. For the total sample, although not significant, contrary to expectations overall the correlation between ICD and IC is negative. The result found is stronger for non-traditional industries[2] and for companies originating from Sweden. This finding is not consistent with previous research. For example, Abdolmohammadi (2005) relates ICD and market to book value in a sample of 58 *Fortune* 500 companies over the period of 1993-1997. In this study, a highly significant and positive correlation between IC disclosure and market capitalisation is found. A possible explanation for this unexpected result can be that firms with a high market to book value have a transparency drawback: in a tougher competitive situation, firms may fear that their position may be compromised by disclosing information. Another possible explanation might be that the firms under consideration have not yet recovered from the dot-com bubble between 1997 and 2000 and the burst of the bubble in 2000.

4.3. ICDs and IC elements

Table VI describes the correlations of SC, RC and HC to indicators that measure the level of each of these IC categories.

4.3.1. *HC*. The indicators used in this study to measure HC are:

- personnel expenditures to revenue; and
- revenue to ftes.

The correlation of these indicators with the level of HC disclosure in annual reports are $-0,054$ and $-0,084$, respectively, in both cases not significant. These findings are confirmed for all sub samples reported in Table VI. In conclusion, no significant association between the level of HC and HC disclosures is found and *H2* is, therefore, not confirmed.

4.3.2. *SC*. This study’s proxies for SC are:

- R&D expenditures to revenue; and
- IP to total assets.

The correlations between these proxies and the disclosure of SC are both positive and significant on at least a 99 per cent confidence level. The correlations are 0.369 and 0.387 respectively. These results indicate that firms have incentives to report their importance of SC in annual reports. Firms tend to report more SC information when there is a higher level of SC present in an organisation. These results are consistent to the expectations that firms with a high level of SC have relatively more SC disclosures, which confirms the *H3*.

The correlation schemes that divide the sample under consideration into country differences do provide similar results. Almost all countries indicate significant correlations, and with one single exception, all correlations are positive. The industry

Table VI.
Intellectual capital
disclosures and
intangible value drivers

	Total sample	Traditional industry	Sub samples			
			Non-traditional industry	Sweden	UK	Denmark
IDC vs MBR	-0.121 (0.363)	0.034 (0.789)	-0.309 (0.211)	-0.455 (0.049)	-0.156 (0.512)	0.057 (0.818)
HCD vs P/R	-0.054 (0.684)	-0.047 (0.767)	0.276 (0.267)	0.282 (0.228)	-0.093 (0.696)	0.233 (0.324)
HCD vs R/FTE	-0.084 (0.522)	-0.003 (0.987)	-0.316 (0.202)	0.004 (0.986)	-0.122 (0.609)	-0.259 (0.269)
SCD vs R&D/R	0.369 (0.004)	0.536 (0.000)	0.282 (0.257)	0.552 (0.012)	0.444 (0.050)	0.641 (0.002)
SCD vs IP/TA	0.387 (0.002)	0.088 (0.581)	0.628 (0.005)	-0.001 (0.996)	0.432 (0.057)	0.642 (0.002)
RCD vs MSDE/R	-0.132 (0.464)	-0.271 (0.276)	-0.035 (0.901)	-0.137 (0.641)	-0.047 (0.912)	-0.180 (0.597)
RCD vs HBS	0.093 (0.555)	-0.339 (0.072)	0.513 (0.061)	-0.029 (0.912)	0.250 (0.369)	-0.354 (0.258)
RCD vs HGS	-0.073 (0.635)	-0.250 (0.199)	0.134 (0.607)	0.262 (0.382)	-0.050 (0.871)	-0.10 (0.972)

Notes: Pearson correlations reported. Significance levels reported in brackets

analysis which separates traditional and non-traditional industries show somewhat different results.

Non-traditional industries have their main focus in intangible assets; these industries are therefore expected to address these assets in the annual reports when they are relatively of more importance. Especially in the SC category this expectation was present for the reason that SC contains renewal and growth, which are kern factors for non-traditional industries. Additionally, the SC category contains intangible assets that are required to be capitalised and therefore expected to be addressed in additional disclosures.

Traditional and non-traditional industries show diverging results with respect to the level of SC disclosure and the level of R&D expenditures relative to revenues. For traditional industries the relationship found is significantly positive. For non-traditional industries the relationship is positive but not significant. A possible explanation for the difference of the outcomes between the industries is that for traditional firms it is more an exception to invest in R&D compared to other firms in their industry and therefore, these firms are more inclined to report these items. Another explanation can be that non-traditional firms have a transparency drawback in disclosing more information when their relative importance of R&D investments is higher. As already pointed out, firms in non-traditional industries derive their main value from these assets and therefore can therefore be more reserved to reveal information to competitors compared to firms operating in traditional industries that do not have their main focus in these intangible assets.

Another finding is the divergence of the correlation values of IP/total assets and SC disclosures between traditional and non-traditional industries. Non-traditional firms show a high positive and significant correlation of 0.628 to an insignificant correlation of 0.088 for firms in the traditional industries. These results confirm the expectations

that firms that possess more IPs address these assets in the annual reports. Since IP rights are one of the few intangibles that are recognised in the financial accounts it can be an incentive for firms to emphasise the IP rights in the disclosures of the annual reports. The properties are already measured, so such costs are no issue in deciding to provide disclosures. Also, IP is required to be capitalised and the rights are firms' properties, firms therefore might not have a transparency drawback herein.

4.3.3. *RC*. The final hypothesis that is tested concerns RC. The indicators that measure RC to the disclosures in the RC category are marketing expenditures to revenue and Herfindahl indices for business segments and geographical areas. For the total sample, the marketing expenditures to revenue shows a non significant negative correlation $-0,132$. The Herfindahl indices for business segments and geographical segments result in correlations of $0,093$ and $-0,073$, both not significant. These findings show no association; therefore the results do not confirm *H4*.

A notable result is found for the Herfindahl index based in business segments. For traditional industries, a significant negative is found whereas for the non-traditional industries an significant positive relationship is found. A possible explanation for this observation might be that traditional firms have a transparency drawback in disclosing customer and other types of RC information when this is relatively more important in a traditional industry. Since there are many retail firms classified here as being a traditional industry, it might be plausible that these firms are reluctant in revealing information on their, probably main focus, customers. Non-traditional firms, in contrast, might indicate with the positive correlation that when there is a relative emphasis of RC in the organisation, these firms provide relatively more information.

5. Conclusions, limitations and recommendations for further research

In this study, four hypotheses with respect tot the relationship between ICDs and intangible value drivers were tested. The first hypothesis, that relates the overall level of IC to the market to book value, was not confirmed. Possible explanations for these findings were a transparency drawback, and the result of under-valuations of firms due to the aftermaths from the dot-com bubble burst. Firms might have a transparency drawback in providing disclosures when the market values the firm considerably higher. Firms can be reluctant in revealing in formation that might be useful to competitors since it is this hidden value that provides firms with a competitive edge in the market. Similarly, firms may be reluctant to disclose "core competencies" which may differ from firm type to firm type, which further may explain the differences and "in-animosities" among the IC driver and disclosure correlations. However, the study of Abdolmohammadi (2005) indicated a significant and strong positive relationship between ICDs and the market to book ratio over the years 1993-1997, the negative result in this study might be caused by the aftermaths of the dot-com bubble. Abdolmohammadi (2005) examined disclosures in the period prior to the "dot-com bubble". The stock market crash might flaw the market values that possibly affect the relationship. This can be examined by investigating the trend in later years and, therefore, gives impetus for further research.

The second part of the study examined the relationship of the contents of disclosures in the IC categories and the relative IC level in firms. There are highly positive and significant correlations found for the relation between SC disclosures and all measures for the level of SC in firms. In contrast, HC and RC in firms seem not to

have an association with disclosures in these categories. This might indicate the significance of dividing the concept of IC into the three categories of SC, RC and HC. Furthermore, since the SC level indicates to have a positive effect on the SC disclosures, organisations should focus on this separate item.

The results found in this study have to be interpreted with a few limitations in mind. A first limitation concerns the sample selection. The sample consists of 60 firms from the top end of the market capitalisation scale in three European countries. A second limitation is the use of annual reports to measure IC information. Firms might use other modern information sources to reveal IC information such as web sites or conference calls. However, these sources have not been addressed because an annual report is the only source of communication that is reported on a regular basis by all public firms and provides a possibility for a comparative analysis. Third, the content analysis is, although performed electronically, still subject to a certain degree of subjectivity. The “hits” were all reviewed for their meaning in the context in order to make sure that it really concerned IC information. Therefore, the analysis still is partly dependent on the discretion of the coder. The fifth limitation is subject to the proxies. Measuring the value of firm’s intellectual assets is complex, and indicators were designed to measure the degree of IC in enterprises. Since these are approximations, it limits the research because they do not perfectly reflect firms’ relative level of their value drivers.

The results of the study give impetus for further research. The first hypothesis that tested the relationship between market to book ratio and IC resulted in negative correlations. Previous research (Abdolmohammadi, 2005) showed a significant positive correlation for this relationship over the years 1993-1997. Since this study concentrates on the year 2002, it would be very interesting to examine the years after the dot-com bubble burst. A longitudinal study can provide more insight in this finding, and might indicate that the negative relationship is caused by the aftermaths of the stock market crash.

The second, third and fourth hypotheses tested the relationship between the relative level of HC, SC and RC in organisations respectively, with the disclosures in these categories. Interestingly, SC in firms is positively correlated with SC disclosure items indicating that firms have incentives to report their value of SC when there is a higher level of SC present in an organisation. HC and RC in firms related to their disclosure did not seem to have an association. When the sample is divided into traditional and non-traditional industries, non-traditional industries seem to report more on RC when this is relatively more important. Since these results indicate that the categories of IC provide different results in the relationship between disclosure and their importance in firms, a suggestion in further research would be to focus more on this division of intellectual in firms and in different industries, and not consider IC as a one concept only.

Notes

1. This index is basically a firm’s concentration ratio and used to measure the degree of competition among firms. For this study, the index is applicable in measuring the degree of concentrations in different markets or segments. The formula is as follows:

$$H \sum_{i=1}^n (s_i^2)$$

Where s_i is the proportion of revenue per segment, i the business segment or geographic segment, and n the number of segments.

The proportion of revenue for a segment is expressed in a percentage of the total and then it is squared. The outcome in each segment is added up which results in the Herfindahl Index. The score of the index is between 0-1. The closer the score approaches to zero, the more diversified an organisation is in businesses or geographic areas which indicates more relational capital. Or the reverse, the higher the score, the more a firm is concentrated in one market or area.

2. Similar to other studies in this area, we separate between traditional industries such as production and retail, and non-traditional industries such as telecommunications and pharmaceuticals. In general, intangible assets are assumed to play a more important role in non traditional industries whereas traditional industries depend more on tangible assets.

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