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Intellectual capital disclosure commitment: myth or reality?

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Abstract

Purpose – The purpose of this paper is to compare intellectual capital disclosure in the prospectus of an initial public offering (IPO) with the intellectual capital disclosure in the subsequent annual report. The first objective was to investigate whether companies make a commitment toward intellectual capital disclosure. The second objective was to investigate whether companies report more on intellectual capital in the prospectus.

Design/methodology/approach – This study investigated the prospectus and annual report using a sample of 55 firms that applied for an initial listing in Belgium and The Netherlands from 2005-2009. A coding framework of 86 items was used to perform the content analysis.

Findings – The existence of intellectual capital disclosure commitment was confirmed. Moreover, the results demonstrated that companies report more extensively on intellectual capital in their prospectus in comparison to their annual reports.

Originality/value – This paper documents the first study to provide empirical evidence on the existence of intellectual capital disclosure commitment. Therefore, it offers a new path for future intellectual capital disclosure research.

Keywords Initial public offering, Intellectual capital, Content analysis, Disclosure commitment, Information disclosure

Paper type Research paper

1. Introduction

A common observation in recent years is that a company's market value is well above its book value. This might suggest that traditional accounting systems deliver a financial statement that does not fully reflect value-relevant information. Additionally, previous research has revealed that intellectual capital (IC), or intangible assets (an intellectual capital component), outside financial statements are value drivers of firms because firms increasingly base their own value on know-how, patents, skilled employees, and other intangible assets (Bukh, 2003). The importance of intangible assets gained the attention of the International Accounting Standards Board (IASB) who developed an accounting standard on intangible assets (standard IAS 38), which was updated in 2008. According to this standard, firms must disclose some IC elements their annual reports; however, most elements remain undisclosed due to the recognition criteria of an asset in IFRS. Consequently, investors lack information that could result in increased risk perception. This lack of information can cause difficulties in attracting funds, which can possibly lead to an underestimation of future earnings (Walker, 2006).

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To avoid underestimation of shares when attracting new shareholders, companies can decide to voluntarily disclose value-relevant information. On the one hand, Cordazzo (2007) found that, in the prospectus, companies provide investors with voluntary disclosure of IC elements by reporting additional information on the companies' risk, future profitability, and strategy. Guthrie *et al.* (1999) reported to the Organization for Economic Co-operation and Development (OECD) that reporting on intellectual capital is not common in Australia. Specifically, Guthrie *et al.* analyzed 20 annual reports and found that only some areas of IC were disclosed, namely human resources, intellectual property, and organizational and workplace structure. Conversely, Brüggen *et al.* (2009) focused on IC disclosure in the annual report of Australian companies and identified industry and firm size as possible explanatory variables for the level of disclosure.

Because the annual report generally focuses on the historical performance of a company from the past year, some differences are likely to be reflected in the nature of IC disclosure between the prospectus and the annual report. As such, some researchers argue that the quality of reporting in the prospectus could be seen as a role model for future information disclosure of a company (Cumby and Conrad, 2001; Beattie, 1999). However, one could ask whether companies that have a high level of IC disclosure in their prospectus also disclose more in their annual report. In other words, does IC disclosure commitment exist? Therefore, the objective of this paper was to investigate voluntary IC disclosure in both the prospectus for an IPO and the first annual report after the IPO. The research question addressed is whether companies make a commitment toward intellectual capital disclosure. To our knowledge, no literature makes a comparison between IC disclosure in the prospectus and annual report. Only a slightly comparable study by Nielsen *et al.* (2006) indicated similarities between IC disclosure in the intellectual capital statement and the annual report.

This paper adds to prior research in two ways. First, this paper empirically investigated the difference in IC reporting between the prospectus and the annual report. Based on content analysis, data on voluntary IC disclosure were hand-collected. Second, this paper contributes to the ongoing accounting and intellectual capital literature by investigating IC disclosure commitment. Leuz and Verrecchia (2000) found that commitment to increased levels of disclosure reduces the possibility of information asymmetry either between the firm and its shareholders or among potential buyers and sellers of firm shares. Therefore, additional insight on IC disclosure commitment of companies is relevant as it might have positive consequences for the firm.

This paper is structured as follows. To provide a context for subsequent discussion, section 2 provides the theoretical background as the basis for the studied hypotheses. The purpose of section 3 is to shed light on the research design and methods used to examine the data. Empirical results are described in section 4. Finally, section 5 concludes the paper and offers suggestions for further research.

2. Hypothesis development

Background

Based on prior literature, three different streams of IC research can be distinguished. The first stream deals with analyzing the definition of intellectual capital from a theoretical point-of-view. The OECD describes IC as the economic value of

organizational and human capital. However, most IC models are based on the assumption of three categories that are concerned with:

(1) external relationships;

(2) internal infrastructure; and

(3) people.

A recent study by Huang *et al.* (2007) showed that these conventional three categories of IC should be expanded into eight facets. Instead of the traditional category "Human capital", they use "Employee capabilities", "Employee development and retention" and "Employee behavior". The category "Customer capital" is subdivided into "Market perspectives", "Data on customers" and "Customer services & relationship". The last category "Structural Capital" exists out of "Development of products" and "Organization infrastructure". The eight facets are more detailed than the a priori categories, that result, according to Huang *et al.* (2007), in a better understanding of the intangible concept. Nevertheless, most authors in accounting research support the traditional three a priori categories of IC (e.g. Bukh *et al.*, 2004; Guthrie and Petty, 2000; Singh and Van der Zahn, 2008). A second stream of IC research focuses on *managing* IC in the company from the point-of-view of strategic management and management accounting. Brown *et al.* (2005), for example, developed an IC management strategy using a life cycle approach.

The third domain of research includes studies on how companies communicate about IC and the impact this communication on company measures such as cost of capital, company performance, and market value. Chen *et al.* (2000) indicated that a firm's intellectual capital has a positive impact on market value and financial performance. In addition, they found that investors may place different values on the three components of value creation efficiency and provided evidence that R&D expenditures may capture additional information on structural capital, which has a positive effect on firm value and profitability. Orens *et al.* (2009) examined the impact of web-based IC disclosure on a firm's value and cost of finance. The results showed a link between economic benefits and better IC disclosure. Our study is situated in the third stream, because of its empirical investigation of IC disclosure in company reports (i.e. prospectus and annual reports).

Disclosure commitment

Previous studies on IC disclosure in the prospectus used content analysis to determine whether stakeholder groups, with an interest in controlling certain strategic aspects of the organization, are informed voluntarily of the company's IC during the initial public offering (IPO) (Bukh *et al.*, 2004; Singh and Van der Zahn, 2008). During an IPO, the number of stakeholders of a company increases. Additionally, stakeholder theory suggests that an organization's management is expected to undertake activities that are deemed important by their stakeholders. According to the latter, a company will voluntarily disclose information about its intellectual performance above mandatory requirements in order to meet these expectations (Deegan, 2000). Nevertheless, traditional accounting rules are unable to meet these expectations because the new ways of creating value are not captured within this model. This results in a difference between the net book value and market value of a company (Holland, 2001). Specifically, firms that report a great difference between the two measures have a high level of IC. For some companies this difference may come from a brand name; for others, it may be the result of know-how or patents. The value of the intangible assets

could represent more than 60 percent of the business assets (Lev, 2001) and, therefore, the necessity to voluntarily report these value creation indicators increases.

Even in an efficient capital market, managers have superior information compared to outside investors on their firm's expected future performance. If auditing and accounting regulations do not impose disclosure on value creation indicators, managers make a trade-off between not disclosing this information (and loosing interested investors) and communicating the superior knowledge of the firm's performance (and attracting investors). Because reporting on IC is voluntary, managers will only disclose this information if it entails some clear advantages. According to Vergauwen and van Alem (2005) and Depoers (2000), these advantages are, among other things, related to a decrease in information asymmetry between the company and the users of financial statements such as lower borrowing costs due to a better estimation of the risk associated with a company and a higher value relevance of the financial statements. Furthermore, economic theory suggests that a commitment by a firm to increase the level of disclosure should lower the information asymmetry component of the firm's cost of capital. Leuz and Verrecchia (2000) showed that substantially increased levels of disclosure result in several economic benefits. Based on a sample of German companies, they found that an international reporting strategy (which assumes a commitment toward increased levels of disclosure) was associated with lower bid-ask spreads and higher share turnover. Due to the economic benefits, firms that undertake an IPO will have an incentive to maintain their level of IC disclosure in other company reports (e.g. annual report). Therefore, it could be assumed that IC disclosure commitment begins in the prospectus and is reflected in the subsequent annual report. This notion resulted in the following hypothesis:

H1. A *higher* than average level of IC disclosure in the prospectus leads to a higher than average level of IC disclosure in the subsequent annual report due to disclosure commitment.

Comparison of disclosure: prospectus versus annual report

Daily *et al.* (2003) suggested that the IPO prospectus is often more precise than other reporting media because companies are liable for any misleading or inaccurate information. Therefore, compared to the annual report, the prospectus usually contains more information about future expectations regarding market developments and earnings, strategic direction, management, board composition, etc. Additionally, at the time of admission for listing on the stock exchange, a company must convince future shareholders to invest capital. Mather *et al.* (2000) found that a company's management poses an incentive to present the company in the best possible light to maximize the proceeds of the share issue. Although this could lead to earnings management, the IPO prospectus provides insight into which types of information are selected by a company to represent itself in relation to investors and analysts. In other words, it could be argued that management sees the prospectus as a publicity brochure that reports, in detail, its achievements, skills, and growth potential; these items are related to the IC of the company. Compared to the IPO prospectus, investors are not the only targeted readers of the annual report, but this report also conveys information to (potential) employees, customers, NGOs, and other stakeholders. As such, differences between the annual report and the prospectus may be the result of this enlarged group of readers. As to the annual report, the prospectus can be assumed to provide additional

disclosure on the company's long-term strategy and risks (Cumby and Conrad, 2001). As such, the following hypothesis was proposed:

H2. In general, companies disclose *more* IC information in the prospectus than in the annual report.

3. Methodology

Content analysis and data collection

To investigate, empirically, the prospectus and annual reports, a content analysis method was conducted. This method is widely used to quantify the amount of disclosure in company reports (Beattie and Thomson, 2007). Additionally, this study applied the IC disclosure index, developed by Bukh *et al.* (2004), which consists of 86 elements categorized into six subgroups:

(1) employees;
(2) customers;
(3) information technology;
(4) research and development;
(5) processes; and
(6) strategy.

For the subgroup "Strategy", three items were added:

(1) competitor names;
(2) suppliers; and
(3) business acquisitions.

Furthermore, the subgroup "Customers" was extended to include the items "Client name," "Customer satisfaction," and "Customer knowledge." Last, the items "Insurance," "Key employees," "Value added on employees," "Employee attitude," "Employee communicative activities," and "Expert teams" were added to the subgroup "Employees" (see Appendix). These amendments were based on the differences in indexes used in Bontis (2002), Vergauwen and van Alem (2005), and Beattie and Thomson (2007).

In addition to documenting the presence or absence of information that pertains to each IC item for a particular company, the difference between qualitative and quantitative information was taken into account. On the one hand, Bozzolan *et al.* (2003) introduced a weighting scheme for their IC disclosure index by counting qualitative disclosures as 1 and quantitative disclosures as 2. This coding is used because companies are more likely to be accurate in their quantitative disclosures. On the other hand, Guthrie and Petty (2000) highlighted the difficulty in quantifying IC because it is, in many instances, a qualitative item. For the current research the presence of a certain item was coded as 1 if that item was discussed in general, qualitative information specifically described on the selected item was coded as 2, and quantitative information as 3. The total score on the IC index was calculated as follows:

$$\text{SCORE} = \Sigma d_i$$

Where d_i expresses item$_i$ with value 1 if the item$_i$ contained general information, 2 if the item$_i$ contained qualitative information, and 3 if item$_i$ contained quantitative information. This index was used as the dependant variable in this study. The Cronbach's alpha score was calculated to check for the reliability of the IC scores. A value of 0.88 was obtained, which suggests that the items had relatively high internal consistency (Nunnaly, 1978).

Procedure

A disclosure index can include only voluntary information (Guthrie and Petty, 2000), mandatory information (Wallace *et al.*, 1994), or both voluntary and mandatory information (Beattie *et al.*, 2002). In the current study, the authors decided to use the latter method because, in Belgium, mandatory disclosure requirements exist for the social performance of a company (Bilan Social). Excluding this information would result in an incorrect interpretation of the results. Therefore, the prospectuses, as well as the annual reports, were analyzed manually for IC information. The annual report regularly contains both mandatory and voluntary information such as the financial statement (balance sheet, income statement, cash flow statement, notes, and auditor's report), mission statement, chairman's report, and corporate governance. Because there is no accounting regulation on IC, corporate managers might choose to include IC items that are not reported in the financial statements, but are included in other sections of the annual report in order to stress the importance to the reader. Therefore, every annual report and prospectus, was individually scanned for a list of IC-related terms for the index.

A second researcher independently confirmed the coding of the first researcher to maintain consistency in the coding decisions.

Sample

Based on the index developed by Bukh *et al.* (2004), 74 companies in Belgium and the Netherlands, from 2005 to 2009, were coded. Because not all corporate documents were available, the total sample resulted in 65 company prospectuses, and 41 annual reports and financial statements. Due to their specific reporting requirements, the banking industry was not included.

Control variables

To formally test whether there exists a disclosure commitment, a number of control variables were included in the analysis. Vergauwen and van Alem (2005) found that companies in the Netherlands disclose relatively little IC in comparison to French and German companies. Vandemaele *et al.* (2005) revealed that Swedish companies disclose, on average, more IC than do companies in the Netherlands and the UK. Orens and Derboven (2008) studied IC disclosure in the prospectus reports of Belgian companies and found that companies do not disclose an elaborated level of IC. Based on these outcomes, no significant differences were expected between both countries concerning the level of IC disclosure; however, a country dummy variable was included in the analysis.

Previous research has often viewed company age as a proxy for risk because more established companies are less risky. From this perspective, a company's amount of disclosure is related to company age. Additionally, Amir and Lev (1996) found that

non-financial information is of greater importance for the valuation of younger companies. Furthermore, Jaggi (1997) found more inaccurate information in the prospectus of younger companies. These previous studies might be an indication for a negative relationship between the level of disclosure of IC and company age. Of note, company age is measured as the amount of years the company exists since its foundation.

In addition to company age, researchers have also found a relationship between the level disclosure and company size. Watson *et al.* (2002) found that the cost of voluntary reporting is relatively high for smaller companies compared to larger companies. Furthermore, larger companies have more to win with an increased level of information because the trading of effects increases due to lower uncertainty. Such firms are under the control of the government and an increased level of disclosure can reduce governmental pressure. Moreover, the need for capital for large companies is higher than for small firms. A lower cost of capital is obtained because of a reduced information asymmetry. Based on a directive of Europe (2003/361/EG of the Commission of 6 May 2003) turnover, total assets and amount of employees can be used to determine the size of a company. In this paper, total assets were used as a proxy for size.

Previous research has attempted to find a link between the amount of disclosure on IC and the industry to which the company is affiliated. Due to historical reasons, some industries disclose more information than do others. Therefore, it is expected that if one company in a certain industry reports voluntarily on a specific topic, other players in the market will also report on that topic. Cooke and Wallace (1990) found that Japanese production companies disclose significantly more in their annual reports compared to other industries. Also, Wallace *et al.* (1994) and Dye and Sridhar (1995) suggested that the industry in which a company is active, will influence voluntary disclosure behavior. A company that chooses not to disclose on a topic is then viewed as a company that wants to hide bad news. The public attention that companies receive will also influence the amount of disclosure. Research has been conducted to find evidence for this hypothesis. For example, Cooke and Wallace (1990) used a detailed index for the variable industry and made a distinction among production, commercial, services, and conglomerates in his investigation of Swedish companies. The results indicated that commercial companies report less voluntary information compared to others. Further, Abdolmohammadi (2005) showed that certain industries in the new economy disclose more on intellectual capital and information systems compared to mature industries that disclose more on their brands and strategic alliances. The importance of intellectual capital disclosure is found in high-tech industries. Comparing the book value and market to book ratio of these companies, one can see that the values for IT and biotech companies are generally higher. Bukh *et al.* (2004) indicated that these companies report more voluntarily information compared to traditional financial reporting. In our study, industry was measured by different dummy variables to make a distinction among "Chemicals," "Consumer goods," "Industrial goods and utilities," "Financial services," and "IT." These categories were based on the Industry Classification Benchmark (ICB) used by Euronext. Allocation to the appropriate industries in the ICB classification system was completed in collaboration with the management of the companies.

Another control variable that was included in this study is audit firm. An audit firm uses its reputation as a competitive advantage. This reputation capital is strongly influenced by accounting scandals. The Enron debacle, for example, showed what

could happen to an auditing firm that is involved in such a scandal. Andersen, the auditing firm of Enron, went out of business even before a single lawsuit was filed. To avoid the risk of litigation, auditors prefer financial statements that are stated and audited strictly according to accounting regulations. Because of the vague and contradicting regulations on IC, it could be argued that auditors omit IC-related items from financial statements. Therefore, auditor conservatism could be considered to have a prominent influence on the disclosure of IC-related information. Clarkson *et al.* (2003) found that international accounting firms, in particular, show conservative auditor behaviors. Consequently, the dummy variable Big4Auditor was added to the current model.

Ownership retention during the IPO could be seen as an indication of the quality of the firm. Because it is costly to retain a significant stake in a firm, a large fractional ownership would preclude the entrepreneur from diversifying his personal investments. Leland and Pyle (1977) constructed a model to predict the behaviors of the owner of a company when information asymmetry exists. The model implies that the ownership retention will be high if the owner expects that the firm value is higher than reflected in the financial statements. Consequently, rational investors will perceive ownership retention as a signal of firm value. Furthermore, according to O'Sullivan (2000), less disclosure is expected from a company if the degree of ownership retention is high. If the directors do not own a substantial portion of the company, it can be expected that they will encourage more intensive disclosure in order to fulfil their monitoring role. Therefore, the variable "Ownership" (expressed as the percentage of shares before warrants) was added to the current model.

Model

The hypotheses were tested via linear regression. The independent variable industry was entered into the equation as several dummy variables. To avoid the dummy variable trap, one industry, "IT," was not included in the regression. Admission of this industry would lead to multicollinearity because there is a linear relationship between the industry-variables (Baker, 2006). This led to the following model:

$$\begin{aligned} Score\_AR_j = {} & \lambda 0 + \lambda_1 Score\_IPO_j + \lambda_2 Country_j + \lambda_3 Size_j + \lambda_4 Chemicals_j \\ & + \lambda_5 Cons\_Goods_j + \lambda_6 IndustrialGoods\_Utilities_j + \lambda_7 Services_j \\ & + \lambda_8 Age_j + \lambda_9 Auditor + \lambda_{10} Ownership + \mu_j \end{aligned}$$

where:

$Score\_AR_j$	= IC disclosure index for the subsequent annual report after initial public offering.
$Score\_IPO_j$	= IC disclosure index for the prospectus on the year of initial public offering.
$Country_j$	= A dummy variable equal to 0 for an initial public offering in The Netherlands and 1 otherwise.
$Size_j$	= The LN of the total assets of firm$_j$ at the date of the prospectus.

$Chemicals_j$	= A dummy variable equal to 1 if $firm_j$ belongs to that industry and 0 otherwise with IT as a reference category.
$Cons\_Goods_j$	= A dummy variable equal to 1 if $firm_j$ belongs to that industry and 0 otherwise with IT as a reference category.
$IndustrialGoods\_Utulities_j$	= A dummy variable equal to 1 if $firm_j$ belongs to that industry and 0 otherwise with IT as a reference category.
$Services_j$	= A dummy variable equal to 1 if $firm_j$ belongs to that industry and 0 otherwise with IT as a reference category.
Age_j	= The difference in years between 2010 and the year of establishment of $firm_j$.
$Auditor_j$	= A dummy variable equal to 1 if $firm_j$ was audited by a big 4 company and 0 otherwise.
$Ownership_j$	= The number of shares retained by the owners during the IPO, expressed in percent.

Interaction terms

A moderated regression analysis (MRA) is a regression technique that contains an interaction term. The interaction term represents the moderating effect of an independent variable (X_1) on the relationship between another independent variable (X_2) and the dependent variable (Y); the relationship between Y and X_1 is contingent upon X_2. An analysis is made to see whether the relationship between SCORE_AR and the variable SCORE_IPO is contingent upon the control variables. If the model that includes only the main effects presented above is not significantly different from the model containing all first-level interaction effects with the variable of interest (SCORE_IPO), then SCORE_IPO is an independent predictor and not a moderator variable (Zedeck, 1971). An *F*-test was performed to determine the significance of variance in R^2.

The Table I indicates that the simple model (with only the main effects) was not significantly different from the model with interaction terms. Therefore, the SCORE_IPO is an independent predictor. Furthermore, Hartmann and Moers (1999) analysed the use of the MRA technique by reviewing different studies in the contingency literature. They argued that the use of MRA in the existing research is seriously flawed because of the uncritical application of this statistical technique and too little knowledge of its specific requirements and underlying assumptions. Further, they argued, among other things, if

Table I. Comparing the model with and without interaction terms

	Model 1 (main effects)	Model 2 (including interactions)
R^2	0.634	0.694
Number of variables	9	17
F-value	0.75	

there is no theoretical foundation to include multiple interaction terms, they should be left out to diminish the chance of having an over specified equation. Specifically, over specification of the model leads to an increased standard error of the regression coefficients, which influences the significance test of the coefficient? Based on these two arguments, no interaction terms were included in the analysis.

4. Research findings

Descriptive statistics

An initial descriptive analysis of the dependent and independent variables revealed that the typical company included in the sample employed 712 people, reached sales of 196 million EUR, had total assets of 246 million EUR, retained 68 percent of the initial shareholders after the IPO, and existed for 18 years (See Table II). Moreover, the mean result on the index for IC in the annual report (M = 25) was lower in comparison to the prospectus (M = 34).

Table III provided an overview of the different industries and the areas of IC disclosure. A percentage of, for instance, 70 percent in the area customers (CU) indicates that 70 percent of the companies in the chemical industry reported on at least one item of the area customers in their prospectus. The areas of disclosure, human resources (HR), and strategy (ST) are areas that most companies include in both the annual and prospectus reports. A striking result, however, was found in the area of Research & Development (RD). A large number of companies within each industry provided information on this area in their prospectus. Nevertheless, in the subsequent annual report, the number of companies that reported on R&D significantly dropped in each industry. The same trend was found for all other areas of IC disclosure. This could be an indication that companies attach greater importance on providing extra non-financial information in their prospectus in order to convince potential investors to buy shares from a newly listed company. Another interesting result is noted in the area of Information Technology (IT). None of the companies in the consumer goods industry reported on IT-items and only 36 percent of companies in the IT industry disclosed information on IT-issues. Furthermore, the IT-industry reported significantly less in their prospectus compared to their annual report. Of note regarding HR, almost every company disclosed information in their annual report. This could be explained, for Belgian firms, by the tradition of providing employee statistics in an annex to the financial statements (Social Bilan).

Table II.
Descriptive statistics for dependent and independent variables

	N	Min.	Max.	Mean	SD
Score_AR	55	1	60	25.11	15.64
Score_IPO	66	5	60	34.59	13.63
Turnover (10,000 EUR)	53	0.27	381,500	19,600	58,710
Total employees	45	0	16469	712.49	2634.13
Total assets (kEUR)	54	211.91	4,152,609	246,000	696,700
Age	67	3	153	18.76	23.63
Auditor	67	0	1	0.39	0.49
Ownership	63	5.71	94.85	68.00	16.51

Note: Min = Minimum; Max = Maximum; SD = Standard deviation

	HR (%)	CU (%)	IT (%)	PR (%)	RD (%)	ST (%)
Prospectus						
Chemicals	100	70	40	20	80	100
Consumer goods	100	89	22	33	61	100
Industrial goods and utilities	100	93	50	50	79	100
Financial services	90	60	40	30	30	100
IT	93	93	53	27	87	93
Annual report						
Chemicals	89	33	44	44	44	89
Consumer goods	63	6	0	13	19	44
Industrial goods and utilities	65	41	12	47	35	65
Financial services	73	45	9	64	18	55
IT	79	71	36	50	64	79

Notes: HR refers to the area "Human Resources;" CU refers to the area "Customers;" IT refers to the area "Information Technology;" PR refers to the area "Processes;" RD refers to the area "Research & Development;" ST refers to the area "Strategy"

Table III.
Descriptive statistics for IC disclosure areas per industry

Hypotheses testing

In the OLS analysis, the primary interest lies in investigating the impact of the score in the prospectus on the score in the annual report to confirm the existence of disclosure commitment. Different control variables were added. When performing the regression analysis, 55 percent of the variance of the dependent variable was explained by the independent variables used in the regression; this percentage of the adjusted R-square takes into account the number of independent variables. Moreover, Table IV provides an overview of the VIF for each independent variable to check for multicollinearity. Because the VIF was less than ten, no indication of multicollinearity was present. In addition, a normality test was performed for the residuals. This test resulted in normal distributed residuals. Furthermore, the runs test and Breush-Godfrey test yielded that there is no indication of autocorrelation. Finally, the results of the White-test assumed homoscedasticity in the performed regression. Based on these tests, the obtained p-values can be interpreted correctly.

As hypothesized, the score for the prospectus was positive and significant at the 0.05 level, which suggests the presence of disclosure commitment. This means that IC disclosure in the prospectus is a good predictor of IC disclosure in the first annual report after the IPO. The regression coefficient of 0.31, as shown in Table IV, can be interpreted as follows: per unit increase of IC disclosure in the prospectus, the IC disclosure index for the annual report increases by 0.31, all the other independent variables are held constant.

Some control variables showed the expected effect while others did not. Whether a company is audited by a big 4 auditor had no significant influence on the level of IC disclosure in the annual report. This could be explained by the fact that the data collection consisted of companies listed in Belgium or the Netherlands. Of note, the pressure of auditors might be more intense in the United States were legal persecution is more severe than in Belgium or the Netherlands. In addition, company age did not significantly affect IC disclosure in the annual report.

Variable	Coefficient	Std error	*t*-statistics	*p*-value	VIF
C	0.97	23.78	0.04	0.97	
Score prospectus	0.30	0.15	2.04	0.04**	1.69
Auditor	−1.76	3.91	−0.45	0.65	1.63
Age	0.04	0.07	0.64	0.52	1.32
Country	−7.06	5.95	−1.19	0.24	1.36
Consumer goods	−17.40	5.16	−3.37	0.0017***	1.96
Chemicals	−2.37	5.08	−0.47	0.64	1.61
Industrial goods utilities	−8.06	4.60	−1.75	0.08*	1.74
Services	−15.78	6.98	−2.26	0.029**	2.19
Ownership	−0.21	0.13	−1.60	0.11	1.55
Size	2.48	0.98	2.52	0.01**	1.75
R^2	0.64		Adj. R^2	0.55	
Durbin-Watson	1.46		Included obs	51	

Note: The same OLS regression was performed when only the presence or absence (0 or 1) of IC index items was taken into account. Score prospectus ($p = 0.019$) was significant. *p-value < 0.1; **p-value < 0.05; ***p-value < 0.01

Table IV.
OLS regression analysis

As expected, the industry to which a company belonged has an influence on the level of IC disclosure. The consumer goods ($p = 0.0017$), industrial and utilities ($p = 0.08$), and services ($p = 0.029$) reported significantly less IC compared to the reference industry, IT. Ownership retention showed borderline significance ($p = 0.11$), which could become more significant if there are more observations. As expected, the higher the ownership retention, the lower the level of IC disclosure in the annual report. Furthermore, the size of a company affected disclosure in the annual report ($p = 0.01$). Finally, the larger the company, the higher the disclosure on IC in the annual report.

Table V presents the paired sample *t*-test for *H2* that confirms that companies disclose significantly more in the prospectus compared to the annual report ($p = 0.000$). The results yielded a difference in group mean, in terms of IC disclosure of 9.9. This result is similar to the results of Nielsen *et al.* (2006) who found that there was more disclosed in the intellectual capital report compared to the annual report.

5. Conclusion and discussion

The first objective of this paper was to investigate the existence of IC disclosure commitment via an analysis of the prospectus and annual reports using a sample of 55 Belgian and Dutch firms from 2005 to 2009. The results confirm the existence of IC disclosure commitment. Specifically, companies with a high level of IC disclosure in the prospectus maintain this rather high level of disclosure in the annual report. This could

	Mean	SD	St. Error mean	*t*	df	Sig.
Pair 1						
SCORE_PROS – SCORE_AR	9.945	14.653	1.976	5.034	54	0.000

Note: The same analysis was performed when only the presence or absence (0 or 1) of IC index items was taken into account. The paired sample *t*-test was significant ($p = 0.007$)

Table V.
Paired sample *t*-test for IC score in the prospectus and IC score in the annual report

have implications for both academic and practical use. Academic researchers could investigate, in a longitudinal study, whether this commitment towards IC disclosure results in financial benefits for a company (e.g. lower cost of capital or an increase in firm value). Moreover, as stated previously, some researchers argue that content analysis with weighted items is not useful in IC research. In the current study, weighted items were used but no significant differences were found if the study would have been performed with only the presence or absence of IC items. From a practical point-of-view, managers who undertake an IPO must consider that disclosing IC information in the prospectus only as a way to convince potential investors creates expectations toward the IC disclosure in the annual reports, which apparently were fulfilled in the current sample (though in a less extensive way in the annual report compared to the prospectus).

The second objective of this study was to compare the level of IC disclosure in the prospectus (for an IPO) with the subsequent annual report (after the IPO). The results of this study indicate that companies disclose more IC information in the prospectus compared to the annual report. This seems to suggest that managers believe that the disclosure of IC-related information could reduce information asymmetry. Guthrie *et al.* (1999) provided evidence that IC disclosure helps the capital market provide more accurate market capitalizations of firms. Hence, this results leads to a possible reduction in the risk associated with investor decision-making and a more accurate valuation of firms that enter the stock market.

This study has two limitations. First, and most important, due to the focus of companies that undertook an IPO and the nature of content analysis methodology, the current sample size was small. Therefore, it would be interesting to replicate this study and include firms with an initial listing on similar types of stock markets (e.g. Euronext Paris and Euronext Lisbon). Second, the procedures for content analysis are not without critique. Mainly, doubts concerning the fundamental subjectivity in the text analyses exist. To overcome this critique, two independent coders applied the content analysis. However, the results presented are fairly robust, which indicates that the general conclusions in this study would still hold after elimination of some misclassification errors in the IC disclosure index.

A further development of the current study would be to analyze the effect of disclosure commitment on firm value and cost of capital. However, investigating this relationship poses additional difficulties. First, the link between disclosure commitment and firm value is often analyzed using a 3SLS methodology. To perform a 3SLS, a strong instrument must be found. Previous research has often neglected the importance of this instrument in the interpretation of the results, which could possibly lead to ambiguous conclusions. Next, the association between disclosure commitment and cost of capital is not easy to proof. Because cost of capital cannot be measured objectively or directly, various alternatives for a firm's implied cost of equity and for the extent of information asymmetry exist (Joos, 2000). Nevertheless, this topic remains interesting for future research. Furthermore, the reason why some companies decide to disclose more extensively on IC in the prospectus, compared to other companies, could be explored by taking management literature into account. Moreover, the effect of IC disclosure commitment could be linked to other areas of research. For example, it would be interesting to analyze the relationship between IC disclosure commitment and elements from the corporate social

responsibility literature. Another interesting research topic would be to analyze the relationship between the economic climate in which a company operates and its effect on disclosure commitment.

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Appendix

Groups	Items
Human resources	29
Staff breakdown by age	
Seniority	
Equality	
Nationality	
Staff breakdown by department	
Staff breakdown by function	
Education	
Rate of staff turnover	
Comments on turnover	
Employee health and safety	
Absence	
Staff interviews	
Competency development	
Programs on competencies	
Employees' training costs	
Employees' general costs	
Recruitment programs	
Careeropportunities	
Remuneration systems	
Pensions	
Insurance[a]	
Description of key employees[a]	
Revenue on employees[a]	
Value added on employees[a]	
Employee attitude[a]	
Employee communicative activities[a]	
Expert teams[a]	
Customers	17
Client number	
Sales by customers	
Annual sales/segment or product	
Average customer size	
Dependence on key customers	
Customer involvement	
Customer relationship	
Education/training of customers	
Customers on employees	
Value added: segment/customer	
Absolute market share of a firm	
Relative market share	
Market share by country, segment, product	
Repurchase by clients	
Client name[a]	
Customer satisfaction[a]	
Customer knowledge[a]	

(*continued*)

Table AI.

Groups	Items
Strategic statements	18
Description of new production technology	
Quality of firm performance	
Strategic alliances of the firm	
Objectives and reasons for strategic alliances	
Comments on the consequences of strategic alliances	
Supply and distribution systems	
Firm image and brand	
Organizational culture	
Statement of best practices	
Organization structure of the firm	
Use of energy, raw materials and other goods	
Environmental investments	
Community particpation	
Social responsibility	
Employee contracts	
Competitor names[a]	
Suppliers[a]	
Business acquisitions[a]	
Research and development	9
Statements of policy, strategy, objectives and R&D	
R&D expenses	
R&D expenses on sales or costs	
R&D invested into basic research	
R&D invested into product design and development	
Future prospects regarding R&D	
Existing company patents, licenses	
Number of patents, licenses	
Information on pending patents	
Processes	8
Internal communication system	
Working environment system	
Working from home	
Internal sharing of information	
External sharing of information	
Measure of internal and external risk	
Social programs and plans	
Environment programs,	
IT	5
Description of investments	
Description of existing IT systems	
Software assets	
Description of IT facilities	

Table AI.

Note: [a]Items added to the index of Bukh *et al.* (2004)