



MD
47,10

Intellectual capital disclosure, cost of finance and firm value

Raf Orens

*Department of Business Studies, Lessius (Associatie K.U. Leuven),
Antwerpen, Belgium*

Walter Aerts

*Department of Accounting and Finance, Universiteit Antwerpen,
Antwerpen, Belgium, and*

Nadine Lybaert

Department of Business Studies, Hasselt University, Diepenbeek, Belgium

1536

Received April 2009
Revised July 2009
Accepted July 2009

Abstract

Purpose – The purpose of this paper is to examine empirically the impact of web-based intellectual capital (IC) reporting on firm's value and its cost of finance.

Design/methodology/approach – A content-analysis of corporate web sites is conducted from four continental European countries (Belgium, France, Germany and The Netherlands) on the presence of IC information. Simultaneous regression modelling is used to control for endogeneity within a firm's disclosure strategy.

Findings – The data show that cross-sectional differences in the extent of IC disclosure are positively associated with firm value. Greater IC disclosure in continental Europe is associated with lower information asymmetry, lower implied cost of equity capital and lower rate of interest paid.

Research limitations/implications – The study is restricted to an analysis of firm's benefits of increased web-based disclosure without considering related costs.

Practical implications – The results of the study show that firms tend to benefit economically from better IC disclosure.

Originality/value – Existing evidence is extended by considering the capital market implications of IC related disclosure and web-based related disclosure.

Keywords Disclosure, Intellectual capital, Worldwide web, Internet, Western Europe

Paper type Research paper

1. Introduction

Prior literature tends to define intellectual capital (IC) as non-monetary assets or resources without physical substance, such as innovation, knowledge, research and development, employee training or customer satisfaction, underlying a firm's value creation process (Meritum, 2002; Lev and Zambon, 2003). The importance of IC resources in firm's value creation process has continuously increased due to the transition from manufacturing-based economies towards knowledge-based economies (Barth and Clinch, 1998; Kallapur and Kwan, 2004). IC is a key issue in strengthening a firm's competitive position and in achieving its objectives (Guthrie and Petty, 2000). The increased importance of IC results in a reduction of the valuation relevance of financial statement information since general accepted accounting standards hardly capture IC (Petty and Guthrie, 2000; Mouritsen *et al.*, 2001). Users (e.g. investors or



financial analysts) therefore increasingly demand firms to voluntarily disclose their intellectual resources to be able to judge firm's performance and value (Eccles *et al.*, 2001; Upton, 2001).

By content analysing annual reports, many studies observe that firms respond to users' request of providing IC information voluntarily (e.g. Guthrie and Petty, 2000; Brennan, 2001; Bozzolan *et al.*, 2003; Abdolmohammadi, 2005; Vandemaele *et al.*, 2005; Cerbioni and Parbonetti, 2007). However, the advent of the Internet brings firms to reconsider their disclosure strategy as it allows for direct communication with their stakeholders. Striukova *et al.* (2008) find that UK firms disclose more than one-third of their IC on their web sites. Firms use the internet extensively to provide detailed and timely information for a larger group of existing and potential investors (Ettredge *et al.*, 2001; Bollen *et al.*, 2006). The internet allows firms to better control their reporting strategies as they are less dependent on intermediaries such as journalists or financial analysts for the diffusion of their message (Lymer, 1999). Internet reporting also reduces dissemination costs (Geerings *et al.*, 2003). Many studies examine the extent and the drivers of IC disclosure, but our knowledge is scarce about the benefits firms realize by producing IC information voluntarily (Wyatt, 2008). Our paper extends existing evidence by studying web-based IC reporting behaviour for a sample of continental European firms and by empirically testing whether cross-sectional variation in the extent of web-based IC reporting is associated with cross-sectional variation in firm value and cost of finance. If IC disclosure is economically relevant, we expect it to affect a firm's cost of finance and to contribute to a firm's value creation. IC disclosure would be economically worthwhile if it is associated with lower average return expected by all investors of a firm. The expected return of debt investors, or the cost of debt, is relatively easy to calculate as it is composed of the rate of interest paid. Cost of equity is more challenging to compute as equity does not pay a set return to its investors. In this regard, we use different proxies for the cost of equity. To capture a firm's value creation, the market valuation of a firm is measured over the value of firm tangible assets (Tobin's *q*).

Our focus on continental European countries is contextualized by low quality of mandated financial disclosure, low levels of legal enforcement, and higher levels of earnings management (La Porta *et al.*, 1998; Leuz *et al.*, 2003), increasing investor need for voluntary disclosure in order to complement financial statements. Our findings show that firms with greater IC disclosure benefit from a lower level of information asymmetry, a lower cost of equity capital and a lower cost of debt capital and exhibit a higher firm value.

The remainder of the paper is structured as follows. Section 2 reviews prior literature and includes our hypotheses. Section 3 discusses the research design and Section 4 presents the results of the empirical analyses. Section 5 summarises the paper and provides some questions for further research.

2. The relevance of IC information and hypothesis development

The transition towards knowledge-based economies increases the role of IC resources in the value creation process of firms (Holland, 2003). This transition has increased the level of information asymmetry between capital market participants and corporate managers and increased the debate about the methods to integrate IC in business reporting. Various frameworks including IC metrics that reflect firm's activities are proposed, such as the intangible asset monitor classifying intellectual capital into

internal structure, external structure and competence of personnel (Sveiby, 1997), the Skandia Value Scheme including structural capital and human capital (Edvinsson and Malone, 1997) and the balanced scorecard integrating the concepts learning and growth, internal processes, customers and financial information (Kaplan and Norton, 2004).

Following Kaplan and Norton's (2004) framework, we observe in the literature growing evidence that IC performance measurements related to this framework have an impact on value creation. For example, from a learning and growth perspective, Lin and Lin (2006) find that employee learning and training as well as teamwork are key drivers underlying customer value creation in firms. From an internal perspective, Xu *et al.* (2007) find that biotech firms with more extensive drug development portfolios have enhanced revenue opportunities and, consequently, higher stock market valuations. From a customer perspective, Ittner and Larcker (1998) and Anderson *et al.* (2004) show that customer satisfaction and loyalty are useful predictors of firms' future financial performance and, ultimately, value creation. Smith and Wright (2004) report that product value attributes directly and differentially influence levels of customer loyalty as well as the prevailing average selling prices. From a financial perspective, Said *et al.*'s (2003) findings support the contention that firms employing a combination of financial and non-financial performance measures in their compensation contracts have significantly higher mean levels of returns on assets and higher levels of market returns.

These studies however do not allow us to conclude whether disclosure about IC resources influences firm value. Hassan *et al.* (2009) state that disclosure is a mechanism to mitigate agency costs arising from the possibility that managers may not act in the best interest of shareholders. Knowing that IC resources are key drivers of the firm's value creation process, disclosure of these resources helps investors to better monitor management. Merton (1987) in his theoretical model asserts that the investors' business comprehension increases with disclosure, lowering the investor risk perception and thus increasing firm value. Mechanisms allowing investors to increase their ability in firm monitoring, as disclosures, increase firm performance and firm value (Healy and Palepu, 1993; Pagano *et al.*, 2002; Reese and Weisbach, 2002). In an empirical study, Klein *et al.* (2005) observe that firm value increases with greater corporate governance disclosures. Hence, we expect that voluntary web-based IC disclosure has a positive effect on firm value, leading to the following hypothesis:

H1. Firm value is positively associated with the level of IC disclosures on its corporate web site.

Second, we examine whether firm's cost of finance is associated with its extent of IC disclosure. Economic theory argues that increased voluntary disclosure has a negative impact on firm's cost of finance (Diamond, 1985; Glosten and Milgrom, 1985; Gibbins *et al.*, 1990; Diamond and Verrecchia, 1991; Lundholm and Van Winkle, 2006). First, better quality information allows investors to make more accurate estimates of the parameters underlying the future stock returns, decreasing nondiversifiable estimation risk and uncertainty about future cash flows and future profitability (Barry and Brown, 1985; Handa and Linn, 1993; Clarkson *et al.*, 1996). Second, an enhancement in the extent of disclosure leads to lower transaction costs. Improved disclosure increases the willingness for investors to trade, increases the shares' liquidity and decreases cost of finance (Glosten and Milgrom, 1985; Diamond and Verrecchia, 1991; Easley and

O'Hara, 2004). Empirical studies confirm the negative association between the cost of finance and the extent of disclosure to a large extent. Welker (1995), Healy *et al.* (1999) and Zhang and Ding (2006) demonstrate that information asymmetry decreases with an increase in voluntary disclosure. Botosan and Plumlee (2002), Hail (2002), Poshakwale and Curtis (2005) and Cheng *et al.* (2006) show an inverse association between the cost of equity capital and the financial analysts' evaluation of annual report disclosure. Sengupta (1998) and Nikolaev and van Lent (2005) find that the interest rate paid is negatively related to analysts' perception of disclosure quality. Botosan (1997) and Richardson and Welker (2001) show that only firms with low analyst following benefit from a decrease in their implied cost of equity capital with greater disclosure since greater analyst coverage substitutes for the information provided by firms. However, Richardson and Welker (2001) and Botosan and Plumlee (2002) find a positive association between cost of equity capital and extent of voluntary disclosure. As voluntary disclosure is considered as a response to information asymmetry between management and investors, we posit that this association also holds for web-based IC disclosure. Investors experience less uncertainty with better disclosure, resulting in lower risk premiums. This gives rise to following hypothesis:

H2. Firm's cost of finance is negatively associated with the level of IC disclosures on its corporate website.

3. Research design

We analyse the content of corporate web sites on the presence of IC information. Our sample consists of 267 non-financial listed firms from continental Europe split into 43 Belgian firms, 43 Dutch firms, 97 French firms and 84 German firms, being the largest ones in each country. We classify each firm into eight industries according to their S&P classification: Consumer goods and services, Energy, Chemicals and drugs, Industrials, Information technology, Materials (resources), Telecom and media, and Utilities. Data collection took place in the summer of 2002.

We focus on voluntary IC disclosure available from a corporate website in HTML format since it is comprehensive and accessible to all shareholders at low cost. The HTML web pages of the sample firms are analysed on the presence of IC information following a disclosure scheme that is based on IC indicators derived from Kaplan and Norton (1996), Ittner and Larcker (1998) and Robb *et al.* (2001). The disclosure index consists of 42 IC information items classified into following three categories:

- (1) Customer value (16 items).
- (2) Human capital (16 items).
- (3) Internal capital (10 items).

Appendix 1 presents the individual items included in each category. Each item gets a weighted score depending on the degree of detail. We allocate a score of three for an item that is described in quantitative terms, a score of 2 for an item that is specifically described, and a score of one for an item discussed in general. The aggregate score is the sum of the scores for these three categories. The reliability of the IC scores is checked by making use of the Cronbach's alpha score. We obtain the value of 0.82 for this metric, exceeding the acceptable level of reliability, which has traditionally been set at 0.70 or higher (Nunnally, 1978).

We proxy firm value as Tobin's q computed as the book value of total assets minus the book value of equity added with the market value of equity in the numerator and the book value of total assets in the denominator at year-end 2002. We measure cost of finance alternatively by means of the extent of information asymmetry, the implied cost of equity capital and the cost of debt capital. Level of information asymmetry is measured by means of trading volume and bid-ask spread. Trading volume is computed as the median daily turnover (i.e. volume of shares traded multiplied with stock price and divided by market capitalisation) in 2003. Bid-ask spread is measured as the median of the daily difference between bid-price and ask-price scaled by the average of the bid-price and ask-price in 2003. Implied cost of equity capital is based on the Easton (2004) approach and is measured as the inverse of the price-earnings-growth ratio which is the square root of the difference between the average analysts' earnings per share forecasts for year-end 2003 and year-end 2004 (made in May 2003) scaled by stock price at year-end 2002. Cost of debt capital equals the interest rate measured as the ratio between the interest expenses in 2003 and the sum of the long- and short-term financial debt at the beginning of 2003.

The association of web-based IC disclosure with firm value and cost of finance respectively is assessed using simultaneous regression techniques in order to cope with endogeneity in the disclosure strategy. We explicitly control for other factors affecting firm value by including firm-specific variables, analyst properties and industry and country dummies in the regression models. Variable selection and variable specification is done in line with prior literature. In order to investigate the effect of the extent of IC disclosure on firm value, we regress the following model:

$$\text{Firm value} = f(\text{IC disclosure, analyst following, analysts' forecast dispersion, size, leverage, ownership structure, profitability, industry dummies, country dummies})$$

Key control variables with regard to the information environment of the firm are analyst following and analysts' forecast dispersion. In the empirical literature on firm value, analyst following is used as a proxy for the quality of a firm's information environment and for the extent of corporate financial information that is publicly available (Imhoff and Lobo, 1992; Roulstone, 2003). In that sense, analyst following is an efficient proxy to control for other information sources affecting firm value. We assume to observe a positive association between firm value and analyst following. Analysts' forecast dispersion is a proxy for the ex ante risk and it is assumed to have a negative impact on firm value (Chung and Jo, 1996). Larger firms have a lower firm value since the activities of these firms are more diversified (Chung and Jo, 1996; Chen and Steiner, 2000; Lang *et al.*, 2004; Klein *et al.*, 2005; Chen *et al.*, 2006; Ghosh, 2007). We expect a negative association between Tobin's q and leverage as the latter is a proxy for financial risk (Klein *et al.*, 2005; Chen *et al.*, 2006). A high level of ownership concentration gives rise to larger agency problems since it reduces the ability of investors to monitor the firm effectively, decreasing firm value (Lang *et al.*, 2004). Profitability tends to be positively related to Tobin's q since more profitable firms are less risky (Chung and Jo, 1996; Chen and Steiner, 2000; Chen *et al.*, 2006; Ghosh, 2007). Finally, we control for industry- and country-effects.

Similar to other studies (Chen and Steiner, 2000; Lang *et al.*, 2004), we use a three-stage-least square (3SLS) analysis since firm value, extent of IC disclosure and analyst following are endogenous variables. We associate the extent of IC disclosure

with analyst following, firm value, leverage, profitability, capital investment intensity and media exposure. Higher analyst following imposes more pressure on firms to disclose more extensively (Lang and Lundholm, 1996). We further assume that firm value and extent of IC disclosure have a positive association according to the signalling theory. Leverage could have a positive association (due to higher agency costs) as well as a negative association (due to a lack of financial resources to cover reporting costs) with the extent of IC disclosure (Inchausti, 1997; Watson *et al.*, 2002; Cormier and Magnan, 2003). Firm profitability could affect the extent of IC disclosure both positively and negatively. Signalling theory suggests that more profitable firms disclose more to inform their stakeholders about their good performance, but based on agency cost theory, less profitable firms disclose more to contextualise their worse financial performance (Inchausti, 1997). Capital investment intensity proxies for the barriers to entry of a firm, suggesting that firms with low barriers to entry report less information because new entrants may worsen a firm's competitive position (Dong and Antonakis, 2007). Media exposure is a proxy for firm's visibility in society (Cormier and Magnan, 2003) and is expected to be positively associated with the extent of IC disclosure.

Analyst following is regressed on firm value, size, ownership structure, the number of stock exchange listings and systematic risk. Firm value is indication of firm quality. A higher firm value is expected to attract a larger number of financial analysts (Chung and Jo, 1996). We assume that analyst following is positively related to size since larger firms generate more transaction profits (Healy *et al.*, 1999; Ackert and Athanassakos, 2003). Firms with a more diversified ownership structure as well as cross-listed firms are more attractive to cover (Baker *et al.*, 2002; Lang *et al.*, 2003). Financial analysts prefer to cover firms with a higher level of uncertainty since investors rely on analyses, recommendations and information provided by financial analysts to a larger extent (Bhushan, 1989; Ackert and Athanassakos, 2003).

For the cost of finance regression models, we distinguish level of information asymmetry, implied cost of equity capital and cost of debt capital proxies. We use the following regression models:

Information asymmetry = f(IC disclosure, size, leverage, number of stock exchange listings, stock price volatility, ownership structure, industry dummies, country dummies)

Implied cost of equity capital = f(IC disclosure, size, leverage, number of stock exchange listings, analysts' forecast dispersion, market-to-book, negative earnings, earnings variability, systematic risk, industry dummies, country dummies)

Cost of debt capital = f(IC disclosure, size, leverage, analysts' forecast dispersion, market-to-book, negative earnings, earnings variability, industry dummies, country dummies)

Previous studies (Botosan, 1997; Sengupta, 1998; Hail, 2002; Brown *et al.*, 2004) find that cost of finance is negatively associated with size. Smaller firms are more difficult to monitor, resulting in a higher level of information asymmetry and a higher cost of equity/debt capital. We expect that all proxies for the cost of finance are positively

associated with leverage as it indicates higher risk (Sengupta, 1998; Khurana and Raman, 2004; Cheng *et al.*, 2006). The number of stock exchange listings controls for the quantity and quality of the information provided by the firm, suggesting a negative association with the level of information asymmetry and the implied cost of equity capital (Lang *et al.*, 2003). Two control variables, stock price volatility and ownership structure, are related only to the level of information asymmetry. Stock price volatility is assumed to have a positive association with the level of information asymmetry as it proxies for investors' uncertainty (Tkac, 1999; Huang, 2004). Dominance of a firm by one or a few shareholders is an indication of higher information asymmetry since these shareholders may have superior access to corporate information (Leuz and Verrecchia, 2000).

For the implied cost of equity and debt capital, we include financial analysts' forecast dispersion as a control variable as it proxies for the level of uncertainty perceived by financial analysts. We assume a negative association between these cost of finance proxies and the dispersion in the financial analysts' earnings forecasts (Khurana and Raman, 2004; Mikhail *et al.* 2004; Cheng *et al.*, 2006). Since lower market-to-book ratios reflect higher uncertainty about the firm's future growth opportunities, a negative association between this variable and the implied cost of equity capital and cost of debt capital is assumed (Sengupta, 1998; Khurana and Raman, 2004; Mikhail *et al.* 2004; Cheng *et al.*, 2006). Brown (2001) suggests that investors face more difficulties to assess firms with negative earnings since such firms tend to manipulate their earnings to a larger extent, increasing uncertainty and increasing cost of equity and debt capital. Earnings variability indicates higher uncertainty about the persistence of future earnings (Jaggi and Jain, 1998; Graham *et al.*, 2005), increasing cost of equity and debt capital. Botosan (1997), Khurana and Raman (2004) and Mikhail *et al.* (2004) demonstrate that the level of systematic risk, proxied by the beta coefficient, has a positive association with the implied cost of equity capital. All equations on the cost of finance include dummy variables to control for industry and country influences.

We take into account the endogenous association between cost of finance and IC disclosure as suggested in prior literature (Welker, 1995; Leuz and Verrecchia, 2000; Nikolaev and van Lent, 2005). We use the two-stage-least square (2SLS) method to associate cost of finance with the extent of IC disclosure. The first stage of the 2SLS method estimates the extent of IC disclosure based on exogenous variables of the cost of finance equations together with instrumental variables. The second stage relates the estimated value of the extent of IC disclosure with the cost of finance proxies. Instrumental variables selected in our analysis of the implied cost of equity capital and cost of debt capital are media exposure, capital investment intensity and ownership. The latter variable is not included as instrumental variable in the equation related to the extent of information asymmetry. We expect that the extent of IC disclosure is increasing with dispersed ownership structures as the agency theory posits that firms with dispersed ownership structures have more conflicts of interests between managers and shareholders (Depoers, 2000). We have already discussed the expected influences of capital investment intensity and media exposure on the extent of disclosure previously.

Table I presents the measurement of the independent variables used in our analysis. The data to measure both dependent and independent variables are collected from the Worldscope and IBES databases (as included in Datastream). These databases also

Description	Measurement
IC disclosure	Extent of IC information disclosed on the corporate web site in 2002 including customer value, human capital and internal capital
Analyst following	Number of financial analysts following a firm in 2002
Firm value	Tobin's q is measured as the book value of total assets minus the book value of equity added with the market value of equity scaled by the book value of total assets at year-end 2002
Analysts' forecast dispersion	Standard deviation of the financial analysts' earnings forecasts made for 2003 scaled by the average financial analysts' earnings forecasts
Size	Logarithm of total assets in 2002
Leverage	Total debt scaled by total assets in 2002
Ownership structure	Dummy variable representing 1 if an investor possesses more than 20 per cent of firm's shares in 2002 and 0 otherwise
Profitability	Net results scaled by total assets in 2002
Capital investment intensity	Total fixed assets scaled by total assets in 2002
Media exposure	Average number of articles in international publications that are surveyed by ABI-Inform for the period 1997-2001
Number of stock exchange listings	Sum of the number of stock exchange listings in 2002. We assign a value of 1.5 for each listing on either an US stock exchange or the London Stock Exchange, and a value of 1 for each listing on another stock exchange
Systematic risk	Beta coefficient in 2002
Stock price volatility	Standard deviation of the daily stock price returns in 2003
Market-to-book	Logarithm of the ratio between market capitalisation and book value of equity of a firm in 2002
Negative earnings	Dummy variable representing 1 if a firm has negative earnings in 2002 and 0 otherwise
Earnings variability	Logarithm of the percentage change in earnings per share between 2002 and 2001

Table I.
Measurement of the independent, control and instrumental variables

provide financial data to compute the control and instrumental variables included in the regression models. Due to missing values and outliers, the sample size of our regressions ranges between 208 and 228 cases.

4. Research findings

Table II provides mean statistics for the variables used in our analyses. This table exhibits that French firms obviously present a larger amount of IC information on their corporate websites compared to other continental European firms. This result is consistent when breaking down the IC aggregate score on the three information categories. Our sample firms provide, on average, more customer value information than human capital or internal capital information. Table II also shows that German firms are larger. French and German firms are generally traded on a larger number of foreign stock exchanges and are more present in the media compared with Belgian and Dutch firms. Ownership is more diversified in French firms compared to the other continental European firms.

Table III provides the multivariate research findings relating firm value, extent of IC disclosure and analyst following.

Table II.
Mean statistics of the
variables included in our
analyses

	Continental Europe (<i>n</i> = 267)	Belgium (<i>n</i> = 43)	France (<i>n</i> = 97)	Germany (<i>n</i> = 84)	The Netherlands (<i>n</i> = 43)
<i>Dependent variables</i>					
Trading volume	1.909	1.729	3.132	1.244	3.613
Bid-ask spread	0.011	0.022	0.005	0.017	0.006
Implied cost of equity capital	0.144	0.125	0.136	0.145	0.178
Cost of debt capital	0.069	0.058	0.051	0.094	0.071
Firm value	1.654	1.940	1.676	1.438	1.733
<i>Independent variables</i>					
IC disclosure	23.637	11.534	37.454	18.333	14.930
Customer value disclosure	10.438	4.698	17.381	7.119	7.000
Human capital disclosure	7.918	4.651	10.485	7.643	5.930
Internal capital disclosure	5.281	2.186	9.587	3.571	2.000
Analyst following	14.919	7.861	16.719	13.987	18.947
Analysts' forecast dispersion	0.676	0.440	0.829	0.847	0.196
Size ^a	15.343	8.449	13.989	22.933	10.557
Leverage	0.629	0.557	0.629	0.650	0.662
Ownership structure	0.706	0.814	0.480	0.916	0.721
Profitability	0.037	0.050	0.025	0.058	0.008
Capital investment intensity	0.417	0.423	0.482	0.361	0.371
Media exposure	8.836	1.357	13.810	10.143	2.023
Number of stock exchange listings	2.556	1.140	3.040	3.071	1.837
Systematic risk	0.715	0.342	1.100	0.487	0.635
Stock price volatility	0.026	0.020	0.025	0.027	0.032
Market-to-book	2.531	2.291	2.753	2.525	2.264
Negative earnings	0.167	0.140	0.210	0.107	0.209
Earnings variability	2.857	7.973	1.757	1.404	3.141

Notes: This table contains mean statistics for the dependent and independent variables across the sample firms; ^a numbers in millions of euro

	Firm value	IC disclosure	Analyst following
<i>Panel A: Total IC disclosure</i>			
Intercept	5.545 ***	4.712	- 43.594 ***
Total IC disclosure	0.009 *		
Analyst following	0.030 **	0.648 ***	
Firm value		7.891 **	2.653
Analysts' forecast dispersion	- 0.021		
Size	- 0.217 ***		2.261 ***
Leverage	0.260	- 4.442	
Ownership structure	- 0.053		- 1.021
Profitability	3.060 ***	- 30.121 *	
Capital investment intensity		5.852	
Media exposure		0.110 **	
Number of stock exchange listings			0.906 ***
Systematic risk			3.510 ***
Industry dummies	Included		
Country dummies	Included		
R ² (%)	37.8	12.2	41.9
<i>Panel B: Customer value disclosure</i>			
Intercept	5.118 ***	2.026	- 43.510 ***
Customer value disclosure	0.022 **		
Analyst following	0.029 **	0.146	
Firm value		6.248 ***	2.794
Analysts' forecast dispersion	- 0.019		
Size	- 0.197 ***		2.239 ***
Leverage	0.252	- 3.221	
Ownership structure	- 0.061		- 0.713
Profitability	3.264 ***	- 31.561 **	
Capital investment intensity		2.280	
Media exposure		0.049 **	
Number of stock exchange listings			0.968 ***
Systematic risk			3.323 ***
Industry dummies	Included		
Country dummies	Included		
R ² (%)	34.9	8.6	42.1
<i>Panel C: Human capital disclosure</i>			
Intercept	6.194	1.433	- 44.575 ***
Human capital disclosure	0.017		
Analyst following	0.039 ***	0.300 ***	
Firm value		- 0.740	2.925
Analysts' forecast dispersion	- 0.029		
Size	- 0.245 ***		2.294 ***
Leverage	0.195	4.201	
Ownership structure	- 0.047		- 0.982
Profitability	2.781 ***	9.072	
Capital investment intensity		0.550	
Media exposure		0.016	
Number of stock exchange listings			0.929 ***
Systematic risk			3.258 ***
Industry dummies	Included		
Country dummies	Included		
R ² (%)	36.1	6.3	42.1

(continued)

Table III.
3SLS regression results
between firm value, IC
disclosure and analyst
following

MD
47,10

1546

	Firm value	IC disclosure	Analyst following
<i>Panel D: Internal capital disclosure</i>			
Intercept	5.500	0.935	-40.014***
Internal capital disclosure	0.032*		
Analyst following	0.029**	0.213	
Firm value		2.438***	2.196
Analysts' forecast dispersion	-0.023		
Size	-0.216***		2.133***
Leverage	0.439**	-5.336**	
Ownership structure	-0.054***		-1.343
Profitability	3.092	-7.800**	
Capital investment intensity		3.205	
Media exposure		0.029**	
Number of stock exchange listings			0.963***
Systematic risk			3.454***
Industry dummies	Included		
Country dummies	Included		
R ² (%)	38.2	13.6	41.5

Notes: This table reports the beta coefficients; ***, **, * indicates statistical significance at the 1 per cent, 5 per cent and 10 per cent levels respectively; $n = 216$

Table III.

We observe that firm value is positively associated with IC disclosure, hence supporting *H1*. This suggests that firms are able to improve firm value by disclosing more about their IC resources. Some control variables show the expected effect: firm value increases in profitability and in analyst following, and decreases in firm size. The results further show that the extent of IC disclosure is positively associated with analyst following, firm value and media exposure. Less profitable firms disclose more IC information as well. Consistent with expectations, we find that analyst following is increasing in firm size, the number of stock exchange listings and systematic risk. Substituting the aggregate score on IC information with the disclosure scores on the three IC information categories, we find that firm value enhances with an increase in the reporting of customer value information and internal capital information. Firm value is unrelated with human capital disclosure (Table III, Panel B-D). Generally, the control variables show similar associations as discussed previously, with exception of the 3SLS regression results related to human capital disclosure.

We present the multivariate regression results of the association between firm's cost of finance and the extent of IC disclosure in Table IV.

Panel A of Table IV indicates that trading volume increases and bid-ask spread decreases when firms provide more IC information. These results support *H2*. With regard to the control variables, we observe that both trading volume and bid-ask spread are positively associated with stock price volatility. Firms with dispersed shareholdings experience a higher trading volume and a lower bid-ask spread. Bid-ask spread is also negatively related with size. Table IV (Panel A) illustrates a significant negative association between the implied cost of equity capital and extent of IC disclosure. Cross-sectional differences in the cost of debt capital are negatively related with the extent of IC disclosure as well. These findings allow us to confirm *H2*. Several control variables show the expected association. The implied cost of equity capital is increasing with the dispersion in the analysts' earnings forecasts, with larger

	Trading volume (<i>n</i> = 212)	Bid-ask spread (<i>n</i> = 208)	Implied cost of equity capital (<i>n</i> = 223)	Cost of debt capital (<i>n</i> = 228)
<i>Panel A: Total IC disclosure</i>				
Intercept	-2.886 ***	2.505 ***	15.549 **	10.768 ***
Total IC disclosure	0.080 ***	-0.030 ***	-0.231 **	-0.067 **
Size	0.119	-0.081 **	-0.116	-0.136
Leverage	0.257	0.262	-0.322	-0.023
Number of stock exchange listing	-0.084	-0.012	-0.176	
Stock price volatility	58.009 ***	16.124 ***		
Ownership structure	-1.402	0.158		
Analysts' forecast dispersion			0.817 **	0.035
Market-to-book			-3.748 ***	1.131
Negative earnings			5.722 ***	-0.197
Earnings variability			0.088	0.765 **
Systematic risk			5.749 ***	
Industry dummies	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included
<i>R</i> ² (%)	27.6	34.5	42.0	5.7
<i>F</i> -value	6.305	8.134	7.769	1.898 *
<i>Panel B: Customer value disclosure</i>				
Intercept	-5.084 ***	3.271 ***	23.578	12.741 ***
Customer value disclosure	0.165 ***	-0.059 ***	-0.262 *	-0.146 **
Size	0.233 ***	-0.123	-0.571 **	-0.218 *
Leverage	-0.161	0.472	2.127	0.185
Number of stock exchange listing	-0.090	-0.013	-0.112	
Stock price volatility	61.686 ***	15.417 ***		
Ownership structure	-1.673	0.243		
Analysts' forecast dispersion			0.820 **	0.058
Market-to-book			-4.930 ***	0.826
Negative earnings			5.700 ***	-0.202
Earnings variability			-0.162	0.704
Systematic risk			5.459 ***	
Industry dummies	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included
<i>R</i> ² (%)	37.1	26.9	45.0	5.6
<i>F</i> -value	9.031 ***	6.860	8.798 ***	1.867 *

(continued)

Table IV.
2SLS regression results
between cost of finance
and IC disclosure

Table IV.

	Trading volume (<i>n</i> = 212)	Bid-risk spread (<i>n</i> = 208)	Implied cost of equity capital (<i>n</i> = 223)	Cost of debt capital (<i>n</i> = 228)
<i>Panel C: Human capital disclosure</i>				
Intercept	3.614	-0.506	7.402	7.443
Human capital disclosure	0.344**	-0.153**	-0.738**	-0.258**
Size	-0.207	0.079	0.271	0.003
Leverage	0.166	0.149	2.583	0.808
Number of stock exchange listing	0.022	-0.051*	-0.389*	
Stock price volatility	35.179**	25.976**		
Ownership structure	-1.156**	0.073		
Analysts' forecast dispersion			1.050**	0.029
Market-to-book			-4.150***	1.168
Negative earnings			5.485***	-0.208**
Earnings variability			0.172	0.818
Systematic risk			6.699***	
Industry dummies	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included
<i>R</i> ² (%)	20.0	12.7	31.6	4.7
<i>F</i> -value	3.830***	2.172***	4.957***	1.543*
<i>Panel D: Internal capital disclosure</i>				
Intercept	-4.463**	3.167***	14.088*	11.091***
Internal capital disclosure	0.270***	-0.095***	-0.975**	-0.182**
Size	0.200**	-0.115***	-0.094	-0.179
Leverage	0.946	0.015	-5.956	-0.565
Number of stock exchange listing	-0.156**	0.013	0.085	
Stock price volatility	70.726***	10.873**		
Ownership structure	-1.200***	0.088		
Analysts' forecast dispersion			0.480	-0.002
Market-to-book			-1.365	1.297
Negative earnings			5.742***	-0.232**
Earnings variability			0.437	0.802
Systematic risk			4.932***	
Industry dummies	Included	Included	Included	Included
Country dummies	Included	Included	Included	Included
<i>R</i> ² (%)	33.4	29.2	35.6	5.1
<i>F</i> -value	7.680***	6.151***	5.944***	1.710*

Notes: This table reports the beta coefficients; ***, **, * indicates statistical significance at the 1 per cent, 5 per cent and 10 per cent levels respectively

systematic risk and with negative earnings. The level of growth opportunities is negatively correlated with the implied cost of equity capital.

Our results further indicate that cost of debt capital is positively influenced by earnings variability. Breaking down the IC disclosure category into the three components, the results in Table IV (Panel B to D) exhibit significant associations between the proxies for the firm's cost of finance and all three IC disclosure components.

In order to quantify the potential reduction effect of increased IC disclosure on the cost of equity capital we replicate the cost of equity regressions from Table IV using an OLS routine. The coefficient for total IC disclosure has the value of 0.04 which indicates that a 1 per cent increase in the extent of IC disclosure is associated with a reduction in the firm's cost of equity capital of 0.04 per cent. This suggests that, holding other parameters constant, a firm improving its disclosures with 10 per cent points is related with a decrease in their cost of equity capital with 0.4 per cent points. With a market capitalization of \$100 million, this result implies a reduction in the required return of \$0.4 million.

5. Conclusion

This paper studies the economic benefits of a web-based IC disclosure strategy for a sample of large continental European listed firms. We extend existing evidence by focusing on the corporate websites as a medium to disclose IC information and by examining whether firm value and cost of finance are associated with the extent of IC disclosure. We observe that a continental European firm with better IC disclosure enjoys a larger firm value and a lower cost of finance. These findings suggest that better IC disclosure increases investors' willingness to commit financial resources.

Our research findings have practical implications. The current paper provides evidence that firms tend to benefit from greater IC disclosure. Our results support the idea that financial analysts and investors use corporate IC disclosure to support their investment decisions. The significant association between IC disclosure and all proxies for the cost of finance in continental Europe suggests that voluntary IC disclosure is useful to inform investors and financial analysts. Capital market participants in continental Europe need IC information to add value to financial statement information in order to assess firm value and future profitability.

One limitation of our study deals with our choice to use a self-created disclosure index. However, the reliability test is satisfactorily. In addition, we do not take into account differences in regulation on the measurement of interest expenses and debt financing when computing cost of debt capital. A longitudinal study of the association between the cost of finance and the extent of IC disclosure is also required in order to take into account changes in the IC reporting strategy. Future studies could also focus on the benefits that firms receive from other stakeholders such as suppliers, customers or employees with an increase in the extent of IC disclosure. Firms may attain better trading conditions by reducing the uncertainty for these stakeholders. Our results document the valuation relevance of improved IC disclosure, but a trade-off has to be made between the costs of disclosure, such as collection or dissemination costs and proprietary costs and the economic benefits. This is a topic for further research.

References

- Abdolmohammadi, M. (2005), "Intellectual capital disclosure and market capitalization", *Journal of Intellectual Capital*, Vol. 6 No. 3, pp. 397-416.
- Ackert, L. and Athanassakos, G. (2003), "A simultaneous equations analysis of analysts' forecast bias, analyst following and institutional ownership", *Journal of Business, Finance & Accounting*, Vol. 30 Nos 7-8, pp. 1017-41.
- Anderson, E., Fornell, C. and Mazvancheryl, S. (2004), "Customer satisfaction and shareholder value", *Journal of Marketing*, Vol. 68 No. 4, pp. 172-85.
- Baker, H., Nofsinger, J. and Weaver, D. (2002), "International cross-listing and visibility", *Journal of Finance and Quantitative Analysis*, Vol. 37 No. 3, pp. 495-521.
- Barry, C. and Brown, S. (1985), "Differential information and security market equilibrium", *Journal of Financial and Quantitative Analysis*, Vol. 20 No. 4, pp. 407-22.
- Barth, M. and Clinch, G. (1998), "Revalued financial, tangible, and intangible assets: associations with share prices and non-market based value estimates", *Journal of Accounting Research*, Vol. 36 No. 3, pp. 199-233.
- Bhushan, R. (1989), "Firm characteristics and analyst following", *Journal of Accounting and Economics*, Vol. 11 Nos 2/3, pp. 255-74.
- Bollen, L., Hassink, H. and Bozic, G. (2006), "Measuring and explaining the quality of Internet investor relations activities: a multinational empirical analysis", *International Journal of Accounting Information Systems*, Vol. 7 No. 4, pp. 273-98.
- Botosan, C. (1997), "Disclosure level and the cost of equity capital", *Accounting Review*, Vol. 72 No. 3, pp. 323-50.
- Botosan, C. and Plumlee, M. (2002), "A re-examination of disclosure level and the expected cost of equity capital", *Journal of Accounting Research*, Vol. 40 No. 1, pp. 21-40.
- Bozzolan, S., Favotto, F. and Ricceri, F. (2003), "Italian annual intellectual capital disclosure: an empirical analysis", *Journal of Intellectual Capital*, Vol. 4 No. 4, pp. 543-58.
- Brennan, N. (2001), "Reporting intellectual capital in annual reports: evidence from Ireland", *Journal of Intellectual Capital*, Vol. 14 No. 4, pp. 423-36.
- Brown, L. (2001), "A temporal analysis of earnings surprises: profits versus losses", *Journal of Accounting Research*, Vol. 39 No. 2, pp. 221-41.
- Brown, S., Hillegeist, S. and Lo, K. (2004), "Conference calls and information asymmetry", *Journal of Accounting and Economics*, Vol. 37 No. 3, pp. 343-66.
- Cerbioni, F. and Parbonetti, A. (2007), "Exploring the effects of corporate governance on intellectual capital disclosure: an analysis of European biotechnology companies", *European Accounting Review*, Vol. 16 No. 4, pp. 791-826.
- Chen, C. and Steiner, T. (2000), "Tobin's q, managerial ownership, and analyst coverage", *Journal of Economics and Business*, Vol. 52 No. 4, pp. 365-82.
- Chen, C., Guo, W. and Mande, V. (2006), "Corporate value, managerial stockholdings and investments of Japanese firms", *Journal of International Financial Management and Accounting*, Vol. 17 No. 1, pp. 29-51.
- Cheng, C.S., Collins, D. and Huang, H. (2006), "Shareholder rights, financial disclosure and the cost of equity capital", *Review of Quantitative Finance and Accounting*, Vol. 27 No. 2, pp. 175-204.
- Chung, K. and Jo, H. (1996), "The impact of security analysts' monitoring and marketing functions on the market value of firms", *Journal of Financial and Quantitative Analysis*, Vol. 31 No. 4, pp. 493-512.
- Clarkson, P., Guedes, J. and Thompson, R. (1996), "On the diversification, observability, and measurement of estimation risk", *Journal of Financial and Quantitative Analysis*, Vol. 31 No. 1, pp. 69-84.

-
- Cormier, D. and Magnan, M. (2003), "Environmental reporting management: a continental European approach", *Journal of Accounting and Public Policy*, Vol. 22 No. 1, pp. 43-62.
- Depoers, F. (2000), "A cost-benefit study of voluntary disclosure: some empirical evidence from French listed firms", *European Accounting Review*, Vol. 9 No. 2, pp. 245-63.
- Diamond, D. (1985), "Optimal release of information by firms", *Journal of Finance*, Vol. 40 No. 4, pp. 1071-94.
- Diamond, D. and Verrecchia, R. (1991), "Disclosure, liquidity, and the cost of capital", *Journal of Finance*, Vol. 66 No. 4, pp. 1325-55.
- Dong, M. and Antonakis, J. (2007), "Correctly estimating models in international accounting contexts: combining firm and country-level effects", paper presented at the 30th European Accounting Association Congress, 25-27 April, Lisbon.
- Easley, D. and O'Hara, M. (2004), "Information and the cost of capital", *The Journal of Finance*, Vol. 56 No. 4, pp. 1553-79.
- Easton, P. (2004), "PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital", *Accounting Review*, Vol. 79 No. 4, pp. 73-95.
- Eccles, R., Herz, R., Keegan, E. and Phillips, D. (2001), *The Value Reporting Revolution: Moving Beyond the Earnings Game*, John Wiley & Sons, New York, NY.
- Edvinsson, L. and Malone, M. (1997), *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, Harper Collins, New York, NY.
- Ettredge, M., Richardson, V. and Scholz, S. (2001), "The presentation of financial information at corporate web sites", *International Journal of Accounting Information Systems*, Vol. 2 No. 3, pp. 149-68.
- Geerings, J., Bollen, I. and Hassink, H. (2003), "Investor relations on the internet: a survey of the Euronext zone", *European Accounting Review*, Vol. 12 No. 3, pp. 567-79.
- Ghosh, S. (2007), "Leverage, managerial monitoring and firm valuation: a simultaneous equation approach", *Research in Economics*, Vol. 61 No. 2, pp. 84-98.
- Gibbins, M., Richardson, A. and Waterhouse, J. (1990), "The management of financial disclosure: opportunism, ritualism, policies and processes", *Journal of Accounting Research*, Vol. 28 No. 1, pp. 121-43.
- Glosten, L. and Milgrom, P. (1985), "Bid, ask, and transaction prices in a specialist market with heterogeneously informed traders", *Journal of Financial Economics*, Vol. 14 No. 1, pp. 71-100.
- Graham, J., Harvey, C. and Rajgopal, S. (2005), "The economic implications of corporate financial reporting", *Journal of Accounting and Economics*, Vol. 40 Nos 1-3, pp. 3-73.
- Guthrie, J. and Petty, R. (2000), "Intellectual capital: Australian annual reporting practices", *Journal of Intellectual Capital*, Vol. 1 No. 3, pp. 241-51.
- Hail, L. (2002), "The impact of voluntary corporate disclosures on the ex ante cost of capital for Swiss firms", *European Accounting Review*, Vol. 11 No. 4, pp. 741-72.
- Handa, P. and Linn, S. (1993), "Arbitrage pricing with estimation risk", *Journal of Financial Economics*, Vol. 28 No. 1, pp. 81-100.
- Hassan, O., Romilly, P., Giorgioni, G. and Power, D. (2009), "The value relevance of disclosure: evidence from the emerging capital market of Egypt", *International Journal of Accounting*, Vol. 44 No. 1, pp. 79-102.
- Healy, P. and Palepu, K. (1993), "The effect of firms' financial disclosure strategies on stock prices", *Accounting Horizons*, Vol. 7 No. 1, pp. 1-11.
- Healy, P., Hutton, A. and Palepu, K. (1999), "Stock performance and intermediation changes surrounding sustained increases in disclosure", *Contemporary Accounting Research*, Vol. 16 No. 3, pp. 485-520.

- Holland, J. (2003), "Intellectual capital and the capital market – organisation and competence", *Accounting, Auditing and Accountability Journal*, Vol. 16 No. 1, pp. 39-47.
- Huang, Y.C. (2004), "The components of bid-ask spread and their determinants: TAIFEX versus SGX-DT", *Journal of Futures Markets*, Vol. 24 No. 9, pp. 835-60.
- Imhoff, E. and Lobo, G. (1992), "The effect of ex ante earnings uncertainty on earnings response coefficients", *Accounting Review*, Vol. 67 No. 2, pp. 427-39.
- Inchausti, B. (1997), "The influence of company characteristics and accounting regulation on information disclosed by Spanish firms", *European Accounting Review*, Vol. 6 No. 1, pp. 45-68.
- Ittner, C. and Larcker, D. (1998), "Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction", *Journal of Accounting Research*, Vol. 36 No. 3, pp. 1-35.
- Jaggi, B. and Jain, R. (1998), "An evaluation of financial analysts' earnings forecasts for Hong Kong firm", *Journal of International Financial Management and Accounting*, Vol. 9 No. 3, pp. 177-200.
- Kallapur, S. and Kwan, S. (2004), "The value relevance and reliability of brand assets recognized by UK firms", *Accounting Review*, Vol. 79 No. 1, pp. 151-72.
- Kaplan, R. and Norton, D. (1996), *The Balanced Scorecard: Translating Strategy into Actions*, Harvard Business School Press, Boston, MA.
- Kaplan, R. and Norton, D. (2004), "Measuring the strategic readiness of intangible assets", *Harvard Business Review*, Vol. 82 No. 2, pp. 52-63.
- Khurana, I. and Raman, K. (2004), "Litigation risk and the financial reporting credibility of Big 4 versus non-Big 4 audits: evidence from Anglo-American countries", *Accounting Review*, Vol. 79 No. 2, pp. 473-95.
- Klein, P., Shapiro, D. and Young, J. (2005), "Corporate governance, family ownership and firm value: the Canadian evidence", *Corporate Governance*, Vol. 13 No. 6, pp. 769-84.
- Lang, M. and Lundholm, R. (1996), "Corporate disclosure policy and analyst behavior", *Accounting Review*, Vol. 71 No. 4, pp. 467-92.
- Lang, M., Lins, K. and Miller, D. (2003), "ADR's, analysts and the accuracy: does cross listing in the United States improve a firm's information environment and increase market value?", *Journal of Accounting Research*, Vol. 41 No. 2, pp. 317-45.
- Lang, M., Lins, K. and Miller, D. (2004), "Concentrated control, analyst following and valuation: do analysts matter most when investors are protected least?", *Journal of Accounting Research*, Vol. 42 No. 3, pp. 589-623.
- La Porta, R., Lopez-de-Salines, F., Shleifer, A. and Vishny, R. (1998), "Law and finance", *Journal of Political Economy*, Vol. 106 No. 6, pp. 1113-55.
- Leuz, C. and Verrecchia, R. (2000), "The economic consequences of increased disclosure", *Journal of Accounting Research*, Vol. 38 No. 3, pp. 1-124.
- Leuz, C., Nanda, D. and Wysocki, P. (2003), "Earnings management and investor protection: an international comparison", *Journal of Financial Economics*, Vol. 69 No. 3, pp. 505-27.
- Lev, B. and Zambon, S. (2003), "Intangibles and intellectual capital: an introduction to a special issue", *European Accounting Review*, Vol. 12 No. 4, pp. 597-603.
- Lin, G. and Lin, J. (2006), "Ethical customer value creation: drivers and barriers", *Journal of Business Ethics*, Vol. 67 No. 1, pp. 93-105.
- Lundholm, R. and Van Winkle, R. (2006), "Motives for disclosure and non-disclosure: a framework and review of the evidence", *Accounting and Business Research*, Vol. 36, Special issue, pp. 43-8.
- Lymer, A. (1999), "The internet and the future of corporate reporting in Europe", *European Accounting Review*, Vol. 8 No. 2, pp. 289-301.

-
- Meritum (2002), "Guidelines for managing and reporting on intangibles", available at: www.pnbukh.com/site/files/pdf_filer/MERITUM_Guidelines.pdf (accessed 25 March 2009).
- Merton, R. (1987), "A simple model of capital market equilibrium with incomplete information", *Journal of Finance*, Vol. 42 No. 3, pp. 483-510.
- Mikhail, M., Walther, B. and Willis, R. (2004), "Earnings surprises and the cost of equity capital", *Journal of Accounting, Auditing and Finance*, Vol. 19 No. 4, pp. 491-513.
- Mouritsen, J., Larsen, H. and Bukh, P. (2001), "Intellectual capital and the 'capable' firm: narrating, visualizing, and numbering for managing knowledge", *Accounting, Organizations and Society*, Vol. 26 Nos 7/8, pp. 735-62.
- Nikolaev, V. and van Lent, L. (2005), "The endogeneity bias in the relation between cost-of-debt capital and corporate disclosure policy", *European Accounting Review*, Vol. 14 No. 4, pp. 677-724.
- Nunnally, J. (1978), *Psychometric Theory*, McGraw Hill, New York, NY.
- Pagano, R., Roell, A. and Zechner, J. (2002), "The geography of equity listings: why do European companies list abroad", *Journal of Finance*, Vol. 57 No. 6, pp. 2651-94.
- Petty, R. and Guthrie, J. (2000), "Intellectual capital literature review: measurement, reporting and management", *Journal of Intellectual Capital*, Vol. 4 No. 1, pp. 61-81.
- Poshakwale, S. and Courtis, J. (2005), "Disclosure level and cost of equity capital: evidence from the banking industry", *Managerial and Decision Economics*, Vol. 26 No. 7, pp. 431-44.
- Reese, W. and Weisbach, M. (2002), "Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings", *Journal of Financial Economics*, Vol. 66 No. 1, pp. 65-104.
- Richardson, A. and Welker, M. (2001), "Social disclosure, financial disclosure and the cost of equity capital", *Accounting, Organizations and Society*, Vol. 26 No. 7, pp. 597-616.
- Robb, S., Single, L. and Zarzeski, M. (2001), "Nonfinancial disclosures across Anglo-American countries", *Journal of International Accounting, Auditing and Taxation*, Vol. 10 No. 1, pp. 71-83.
- Roulstone, D. (2003), "Analyst following and market liquidity", *Contemporary Accounting Research*, Vol. 20 No. 3, pp. 551-78.
- Said, A., Hassab Elbany, H. and Wier, B. (2003), "An empirical investigation of the performance consequences of nonfinancial measures", *Journal of Management Accounting Research*, Vol. 15 No. 1, pp. 193-223.
- Sengupta, P. (1998), "Corporate disclosure quality and the cost of debt", *Accounting Review*, Vol. 73 No. 4, pp. 459-74.
- Smith, R.R. and Wright, W. (2004), "Determinants of customer loyalty and financial performance", *Journal of Management Accounting Research*, Vol. 16 No. 1, pp. 183-205.
- Striukova, L., Unerman, J. and Guthrie, J. (2008), "Corporate reporting of intellectual capital: evidence from UK companies", *British Accounting Review*, Vol. 40 No. 4, pp. 297-313.
- Sveiby, K. (1997), *The New Organizational Wealth: Managing and Measuring Knowledge Based Assets*, Berrett Koehler, San Francisco, CA.
- Tkac, P. (1999), "Trading volume benchmark: theory and evidence", *Journal of Financial and Quantitative Analysis*, Vol. 34 No. 1, pp. 89-114.
- Upton, W. (2001), "Special report on business and financial reporting, challenges from the new economy", Financial Accounting Standards Board, Norwalk, CT.
- Vandemaale, S., Vergauwen, P. and Smits, A. (2005), "Intellectual capital disclosure in The Netherlands, Sweden and the UK: a longitudinal and comparative study", *Journal of Intellectual Capital*, Vol. 6 No. 3, pp. 1469-930.
- Watson, A., Shrive, P. and Martson, C. (2002), "Voluntary disclosure of accounting ratios in the UK", *British Accounting Review*, Vol. 34 No. 4, pp. 289-313.

Welker, M. (1995), "Disclosure policy, information asymmetry and liquidity in equity markets", *Contemporary Accounting Research*, Vol. 11 No. 3, pp. 801-28.

Wyatt, A. (2008), "What financial and non-financial information on intangibles is value relevant? A review of the evidence", *Accounting and Business Research*, Vol. 38 No. 3, pp. 217-56.

Xu, B., Magnan, M. and André, P. (2007), "The stock market valuation of R&D information in biotech firms", *Contemporary Accounting Research*, Vol. 24 No. 4, pp. 1291-318.

Zhang, L. and Ding, S. (2006), "The effect of increased disclosure on cost of capital: evidence from China", *Review of Quantitative Finance and Accounting*, Vol. 27 No. 4, pp. 383-401.

Appendix 1

Customer value	Human capital	Internal capital
Product description	Hiring/ new employees	Sales – new products
Quality/ up-to-date technology	Qualification/expertise	Market share – new products
Reliability: errors/return	Training	Awards
Price	Description of job requirements	Investments in R&D
Delivery time	Employee empowerment/ involvement	Description of products under development
Awards	Capacity to suggest and to implement changes	Product testing
Customer profile/market segment/ market share/number of customers	Teamwork	Awards
Pre sales support: information/ counsel/follow up	Performance assessment	Other – R&D
After sales service/insurance	Performance based compensation	Increase in sales/market shares
Customer satisfaction/complaints management	Earnings based compensation	Increase in investments
Customer loyalty	Career opportunities	
Awards	Award	
Internet service	Fringe benefits	
E-business sales	Employee satisfaction, survey	
E-business productivity (cost efficiency/speed)	Employee turnover	
Impact (award/ number of users or visitors)	Other	

Table AI.
List of IC information items

Corresponding author

Raf Orens can be contacted at: raf.orens@lessius.eu