The University of Bradford Institutional Repository

Citation: Li J, Pike RH and Haniffa R (2008) Intellectual capital disclosure and corporate governance structure in UK firms. Accounting and Business Research. 38(2): 137-159.

Intellectual capital disclosure and corporate governance structure in UK firms

Jing Li, Richard Pike, Roszaini Haniffa

University of Bradford, School of Management

ABSTRACT

This paper investigates the relationship between intellectual capital disclosure and corporate governance variables, controlling for other firm-specific characteristics, for a sample of 100 UK listed firms. Intellectual capital disclosure is measured by a disclosure index score, supported by word count and percentage of word count metrics to assess the variety, volume and focus of intellectual capital disclosure respectively. The independent variables comprise various forms of corporate governance structure: board composition, ownership structure, audit committee size and frequency of audit committee meetings, and CEO role duality. Results of the analysis based on the three measures of intellectual capital disclosure indicate significant association with all the governance factors except for role duality. The influence of corporate governance mechanisms on human, structural and relational capital disclosure, based on all three metrics, is also explored.

Keywords: Intellectual Capital Disclosure; Corporate Governance; Content Analysis; Annual Report

Intellectual capital disclosure and corporate governance structure in UK firms

1. Introduction

The purpose of this paper is to investigate the influence of corporate governance on intellectual capital disclosure in corporate annual reports, controlling for other firm characteristics. Intellectual capital is increasingly recognised as having much greater significance in creating and maintaining competitive advantage and shareholder value (Tayles et al., 2007). Definitions of intellectual capital vary (for example, Stewart, 1997; Mouritsen, 1998). One of the most comprehensive definitions of intellectual capital is offered by CIMA (2001): '…the possession of knowledge and experience, professional knowledge and skill, good relationships, and technological capacities, which when applied will give organisations competitive advantage.' Sveiby (1997) suggests that the concept of intellectual capital can be categorised into human, structural and organisational capital, while Guthrie and Petty (2000) offer an alternative categorisation: internal structure, external structure and human capital. The various forms of intellectual capital disclosure are valuable information for investors as they help reduce uncertainty about future prospects and facilitate a more precise valuation of the company (Bukh, 2003). However, financial reports fail to reflect such a wide range of value-creating intangible assets (Lev and Zarowin, 1999), giving rise to increasing information asymmetry between firms and users (Barth et al., 2001), and creating inefficiencies in the resource allocation process within capital markets.

A number of research reports (e.g. FASB, 2001; ASB, 2007) and academic studies (e.g. Lev, 2001; Mouritsen et al., 2001) have called for greater disclosure of non-financial indicators of investment in intangible assets. Cañibano et al. (2000) argue that the cost associated with a radical change in the accounting system to make it more value relevant for intellectual capital intensive firms is unaffordable and that the sensible approach towards the enhancement of financial reports is to encourage voluntary disclosure of intellectual capital information.

Keenan and Aggestam (2001) argue that responsibility for the prudent investment of intellectual capital resides with corporate governance, and that, depending on the firm's characteristics and orientation, the governance of publicly-owned firms may need to develop new structures and processes in annual reports for communicating information about the value created for stakeholders through the firm's intellectual capital. However, as discussed in a later section, the empirical evidence from prior studies is limited, with small sample sizes prohibiting more rigorous statistical analysis and external validity. For example, we know very little about the main determinants of the variation in levels of intellectual capital disclosure in annual reports across firms, including the effects of good governance mechanisms.

This paper examines the influence of corporate governance factors on intellectual capital disclosure, and the subcategories comprising it, using various disclosure measures. We hypothesise that significant relationships exist between intellectual capital disclosure in annual reports and board structure, role duality, ownership concentration, audit committee size and frequency of audit committee meetings, controlling for listing age, firm size and profitability. Using content analysis and regressing the three forms of intellectual capital disclosure measures on the explanatory variables, we find support for all hypotheses with the exception of role duality.

The remainder of this paper is organised as follows: the next section reviews the empirical literature on intellectual capital disclosure. The hypothesis development is outlined in Section 3, followed by the research design in Section 4. Section 5 presents findings on intellectual capital disclosure practices from multiple regression analyses, and examines the working hypotheses. Finally, Section 6 discusses the findings, implications and limitations of the study.

2. Literature on intellectual capital disclosure studies

Information on intellectual capital is important to stakeholders in their decision making. Within an agency context, Jensen and Meckling (1976) argue that greater disclosure reduces the uncertainty facing investors and thus reduces a firm's cost of capital. Managers should therefore be willing to disclose intellectual capital information in order to enhance the firm's value by providing investors with a better assessment of the financial position of the firm and help reduce the volatility of stock returns. Barth et al. (2001) observe that analyst coverage is greater for firms investing more heavily in research and development and advertising, while empirical studies suggest a positive share price impact arises from specific intellectual capital indicators such as research and development expenditure (Amir and Lev, 1996), capitalisation of software development expenditure (Aboody and Lev, 1998), and customer satisfaction (Ittner and Larker, 1998).

Gibbins et al. (1990) explore the voluntary disclosure process giving rise to disclosure outputs in response to internal and external stimuli. They argue that a company's readiness to disclose is a function of its general disclosure position (for example, an uncritical adherence to information disclosure norms or to use disclosure as opportunity to gain advantage or boost stock price), antecedents (for example, corporate history, corporate strategy, and market factors), structure, and the use of consultants and advisors. While corporate governance mechanisms are not specifically identified, they have relevance to all these independent variables, particularly to structure, where governance involves the establishing of clear policies.

Abeysekera (2006) observes that the development of a theoretical framework underlying intellectual capital disclosure is in its infancy, with few studies providing a strong theoretical basis for interpreting their findings. However, the literature offers a few theoretical perspectives that may help explain the variation of intellectual capital disclosure. These include arguments based on legitimacy and stakeholders (Abeysekera and Guthrie, 2005), signalling (Garcia-Meca and Martinez, 2005), media agenda setting (Sujan and Abeysekera, 2007), agency (Patelli and Prencipe, 2007), and information asymmetry (Amir and Lev, 1996).

In a review of the current state of financial and external reporting research, Parker (2007) identified intellectual capital accounting as a major area for further research. Most intellectual capital disclosure studies are cross-sectional and country specific. Examples include studies in Australia (e.g. Guthrie and Petty, 2000; Sujan and Abeysekera, 2007), Ireland (Brennan, 2001), Italy (e.g. Bozzolan et al., 2003), Malaysia (Goh and Lim, 2004), UK (e.g. Williams, 2001), and Canada (Bontis, 2003). Relatively few longitudinal studies have been reported (e.g. Abeysekera and Guthrie, 2005). Some studies focus on specific aspects of intellectual capital disclosure, such as human capital reporting (e.g. Subbarao and Zeghal, 1997), while others conduct international comparative studies (e.g. Vergauwen and Alem, 2005; Cerbioni and Parbonetti, 2007). Some intellectual capital disclosure studies have looked beyond annual reports to examine other communication channels such as analyst presentations (Garcia-Meca et al., 2005).

Most intellectual capital disclosure studies employ content analysis as the research method, but some use questionnaire surveys (e.g. Bontis, 1998). Guthrie and Petty's (2000) analysis of intellectual capital reporting practices suggests that disclosure has been expressed in discursive rather than numerical terms and that little attempt has been made to translate the rhetoric into measures that enable performance of various forms of intellectual capital to be evaluated.

Studies have also been conducted to explore intellectual capital related issues from the firm's perspective. Chaminade and Roberts (2003) investigate the implementation of intellectual capital reporting systems in Norway and Spain. Habersam and Piper (2003) employ case studies to explore the relevance and awareness of intellectual capital in hospitals. Studies that looked at possible determinants of voluntary intellectual capital disclosure include Garcia-Meca et al. (2005) and Cerbioni and Parbonetti (2007). Based on analyst presentation reports of listed Spanish companies, Garcia-Meca et al. (2005) found significant association between intellectual capital disclosure and size and type of disclosure meeting but not ownership diffusion, international listing status, industry type and profitability. Based on analysis of European Biotechnology companies over a period of three years, Cerbioni and Parbonetti (2007) found governance related variables to strongly influence voluntary intellectual capital disclosure.

In the UK, there has been a limited number of intellectual capital disclosure studies compared to its European counterparts. Williams (2001) conducted a cross-sectional study of 31 companies while Beattie et al. (2002) undertook a study of 11 companies in the food sector. The small sample sizes restrict generalisation and meaningful interpretation of intellectual capital disclosure. Roslender and Fincham (2004) explore intellectual capital awareness among UK firms, and the reasons and motives underlying such interest.

The foregoing discussion suggests that the literature on the determinants of intellectual capital disclosure is limited and inconclusive. Our study builds on the previous literature of intellectual capital disclosure practice within a UK context and examines its relationship with corporate governance structures, listing age, profitability and size.

3. Determinants of intellectual capital disclosure and development of hypotheses

Corporate governance mechanisms

Corporate governance is a framework of legal, institutional, and cultural factors shaping the patterns of influence that stakeholders exert on managerial decision-making (Weimer and Pape, 1999). The justification for considering corporate governance is that the board of directors manages information disclosure in annual reports and therefore constituents of boards may be important. Holland (2006a: 147) found that boards of directors are at the heart of corporate financial communications, having active roles in the disclosure process related to 1) the provision of primary information regarding the corporate value-creation process, and their contribution towards it; 2) the provision of information about themselves in terms of their skills in managing the business; 3) the manner in which they are organised to conduct financial communications; 4) their reputation for disclosure honesty; and 5) information about how their own pay and wealth is tied to company fortunes.

Agency theory provides a framework for linking voluntary disclosure behaviour to corporate governance, whereby control mechanisms are designed to reduce the agency problem arising from the separation between ownership and management (Welker, 1995). This argument can be extended to intellectual capital disclosure, whereby management can determine the level of disclosure and thereby reduce investor uncertainty relating to the impact of intellectual capital on the firm's value. High intellectual capital disclosure is therefore expected to provide a more intensive monitoring package for a firm to reduce opportunistic behaviour and information asymmetry.

Adoption of internal control devices, such as audit committees and non-executive directors, and separation of the roles of chairman and chief executive, may enhance monitoring quality in critical decisions about intellectual capital investment and performance (Keenan and Aggestam, 2001). This is likely to reduce the scope for managerial opportunism and reduce benefits from withholding information, and, as a consequence, intellectual capital disclosure in annual reports should be improved.

Board composition - proportion of independent non-executive directors (INED)

The board of directors is an internal control mechanism intended to take decisions on behalf of the shareholders and to ensure that management behaviour is consistent with owners' interests. Based on resource dependence theory, Haniffa and Cooke (2005) argue for more non-executive directors on the board as they can provide wider expertise, prestige and contacts, and play a key role in influencing disclosure. Extending this argument, and that of Gibbins et al. (1990), to intellectual capital, we suggest that the wider expertise and experience of non-executive directors on the board will encourage management to take a disclosure position beyond a ritualistic, uncritical adherence to prescribed norms, to a more proactive position reflecting the value relevance of intellectual capital to stakeholders.

Findings from prior voluntary disclosure studies that considered board composition as a possible determinant of voluntary disclosure are mixed; some find that the proportion of non-executive directors is positively related with the board's ability to influence voluntary disclosure decisions (e.g. Beasley, 1996; Chen and Jaggi, 2000), others find no relationship (Ho and Wong, 2001; Brammer and Pavelin, 2006), and yet others observe a negative relationship (Eng and Mak, 2003; Haniffa and Cooke, 2005). One reason may be that non-executive directors are not necessarily independent. Independent non-executive directors are typically individuals with relevant expertise and professional reputations to defend, with no management role or links with the company[1]. Cotter and Silvester (2003) argue that independent non-executive directors are in a better position to monitor executive management. In one of the few studies capturing *independent* non-executive directors, Patelli and Prencipe (2007) found a positive correlation with the amount of voluntary information disclosed by companies in their annual reports. We also capture independent non-executive directors (INED) and argue that:

H1: There is a positive relationship between the level of intellectual capital disclosure and the proportion of independent non-executive directors to the total number of directors on the board, ceteris paribus.

Role duality (RDUAL)

Another way to examine independence of the board is to consider role duality, a board leadership structure in which the same person undertakes both the roles of chief

[1] The revised Combined Code (2006) recommends that at least half of the board, excluding the chairman, should comprise non-executive directors determined by the board to be independent as defined by criteria in the Code, in order that non-executive directors are able to discharge their responsibilities in an objective manner, without interference, bias or favouritism. For example, a director should not have been an employee of the group within the last five years, had a material business relationship with the company within the last three years, received additional remuneration from the company apart from a director's fee, participate in the company's share option or a performance-related pay scheme, close family ties with any of the company's advisers, directors or senior employees, hold cross-directorships or significant links with directors, or serviced on the board for more than nine years.

executive and chairman.[2] There is widespread acknowledgement that a dominant personality commanding a firm may be detrimental to the interests of shareholders, and this phenomenon has been found to be associated with poor disclosure (Forker, 1992) and CEO entrenchment, resulting in ineffective monitoring of managerial opportunistic behaviour (Haniffa and Cooke, 2002). Concentration of decision-making power resulting from role duality could impair the board's oversight and governance roles, including disclosure policies. Separation of the two roles provides the essential checks and balances on management behaviour (Blackburn, 1994), as recommended in the revised Combined Code (2006).[3] Employing similar arguments for role duality as for independent non-executives, we hypothesise that:

H2: There is a negative relationship between the level of intellectual capital disclosure and role duality, ceteris paribus.

Ownership structure – share concentration (SCON)

The power of stakeholders to influence management is a function of the resources they control that are essential to the corporation (Smith et al., 2005). Ownership structure therefore will influence the level of monitoring and thereby the level of voluntary disclosure (Eng and Mak, 2003). Agency theory argues that with greater ownership diffusion, firms are more likely to experience pressure from shareholders for greater disclosure to reduce agency costs and information asymmetry (Raffournier, 1995). In contrast, firms with closely-held ownership are expected to have less information asymmetry between management and dominant shareholders who typically have access

[2] Role duality is not common among listed companies since the majority comply with the recommended code of corporate governance.

[3] However, in voluntary disclosure studies, Haniffa and Cooke (2002) and Ho and Wong (2001) failed to find any relationship between the extent of voluntary disclosure and role duality.

to the information they need and can provide an active governance system that is difficult for smaller, more passive and less-informed investors (Cormier et al., 2005).[4] This is particularly relevant to intellectual capital disclosure because fund managers have access to such information via private communication channels (Holland, 2006b). Hence, we hypothesise that:

H3: There is a negative relationship between the level of intellectual capital disclosure and concentrated share ownership, ceteris paribus.

Audit committee size (SAC) and frequency of meetings (MAC)

Board monitoring is a function of not only the structure and composition of the board, but also of the board's subcommittees where much of the important processes and decisions are monitored and taken (Cotter and Silvester, 2003). The role of audit committees has developed over the years to meet the challenges of changing business, social and economic environments. The Smith Report (2003) in the UK identifies the role of audit committees as ensuring that the interests of shareholders are properly protected in relation to financial reporting and internal control. It further recommends audit committees to review the significant financial reporting issues and judgments made in connection with the preparation of the company's financial statements, interim reports, preliminary announcements and related formal statements, such as the operating and financial review and the release of price sensitive information. As such, audit committees can be expected to have a significant impact on value-relevant information disclosure, of which intellectual capital forms a large element in many firms.

[4] However, prior disclosure studies provide mixed evidence. Cormier et al. (2005) and Brammer and Pavelin (2006) find significant negative associations between ownership concentration and engagement in environmental reporting practices. Patelli and Prencipe (2007) find a positive relationship between share ownership diffusion and voluntary disclosure. However, Eng and Mak (2003) fail to find any significant association between blockholder ownership and voluntary disclosure.

Effective audit committees should improve internal control and act as a means of attenuating agency costs (Ho and Wong, 2001), and as a powerful monitoring device for improving value-relevant intellectual capital disclosure. The presence of an audit committee has been found to be associated with more reliable financial reporting (McMullen, 1996), enhanced quality and increased disclosure (Ho and Wong, 2001). However, Mangena and Pike (2005) find no relationship between audit committee size and the extent of voluntary disclosure in interim reports. Inactive audit committees are unlikely to monitor management effectively and adequate meeting time should be devoted to the consideration of major issues (Olson, 1999). Price Waterhouse (1993) recommended that audit committees should hold a minimum of three or four meetings a year and special meetings when necessary.

Given the increasing importance of intellectual capital, we expect larger audit committees, meeting more frequently, to have greater influence in overseeing intellectual capital disclosure practice. Therefore, our next two hypotheses are as follows:

H4: There is a positive relationship between the level of intellectual capital disclosure and audit committee size, ceteris paribus.

H5: There is a positive relationship between the level of intellectual capital disclosure and frequency of audit committee meetings, ceteris paribus.

Control variables

The length of time a company has been listed on a capital market (AGE) may be relevant in explaining the variation of disclosures. Younger listed companies without an established shareholder base are expected to be more reliant on external fund raising than more mature companies (Barnes and Walker, 2006) and have greater need to reduce scepticism and boost investor confidence (Haniffa and Cooke, 2002). Hence, we expect a negative relationship between age of listed firms and level of intellectual capital disclosure. Profitability (ROA) may be the result of continuous investment in intellectual capital and firms may engage in higher disclosure of such information to signal the significance of their decision in investing in it for long-term growth in the value of the firm. We therefore expect a positive relationship between profitability and level of intellectual capital disclosure. Large firms are more visible and more likely to meet investors' demand for information and we expect a positive relationship between size of company (SA) and level of intellectual capital disclosure.

4. Research method

4.1. Sampling design

This study examines intellectual capital disclosure in corporate annual reports of UK fully listed companies on the London Stock Exchange (LSE) for financial year-ends between March 2004 and February 2005. Firms in seven industry sectors containing high intellectual capital companies (Pharmaceuticals & Biotechnology, IT, Telecommunications, Business Support Services, Media & Publishing, Banking & Insurance, and Food Production & Beverage) were selected[5]. This provided us with a population size of 319 companies, from which a sample size of 100 was selected (31%). As the number of companies in each industry group is not the same, proportionate stratified sampling was applied (Moser and Kalton, 1996).

[5] Given the bias towards high intellectual capital industry sectors, the sample cannot claim to represent the intellectual capital disclosure practice of all LSE listed UK firms.

4.2. Development of the research instrument

Content analysis was used to collect the necessary data. An essential element of content analysis is the selection and development of categories into which content units can be classified. Various authors (e.g. Sveiby, 1997; Meritum, 2002) suggest that intellectual capital can be grouped into in three subcategories: (1) Human capital, for example, staff education, training, experience, knowledge and skills, (2) Structural capital, covering internal structures such as R&D, patents, management processes, and (3) Relational capital, covering external relationships such as customer relations, brands and reputation. These forms of intellectual capital can be leveraged to create competitive advantage and value for stakeholders. However, Beattie and Thomson (2007) observe that there is no consensus or precise definition of the constituents of such categories, giving rise to difficulties for annual report preparers and researchers seeking to quantify intellectual capital disclosure. Habersam and Piper (2003) argue for a comprehensive representation of intellectual capital, including metric and non-metric forms, in order to better discern its different dimensions and degrees of transparency. They further suggest a fourth intellectual capital category, namely 'Connectivity Capital' linking the other three forms.

The categories and items in our research instrument were drawn from previous literature on intellectual capital definition and classification. The majority of previous intellectual capital disclosure studies have adopted or adapted Sveiby's (1997) intellectual capital framework, which typically contains 22-25 items (Beattie and Thomson, 2007). The problem with too few coding categories is that it potentially increases the likelihood of random agreement in coding decisions and subsequently results in an overestimation of reliability (Milne and Adler, 1999). Similarly, higher numbers of items in the instrument increase the complexity (Beattie and Thomson, 2007) and may potentially increase coding errors (i.e. reliability) (Milne and Adler, 1999). However, in order to achieve greater variation and better understanding of intellectual capital disclosure, we devised a more detailed checklist covering items relating to the three themes: human capital (HIC), structural capital (SIC) and relational capital (RIC), capturing information in the forms of text, numerical and graphical/pictorial. While Guthrie and Petty (2000) highlight the difficulty in seeking to quantify the qualitative aspects of intellectual capital, evidence from Habersam and Piper (2003) questions this view. All items in the designed research instrument were considered equally applicable and therefore equally capable of disclosure across all sample firms in all three formats.

The initial draft of the research instrument with 150 items was pilot tested by one researcher, using a sample of annual reports (not included in the final sample). Based on feedback from the pilot test and discussion with two other researchers, the instrument was further modified to ensure that it captured the necessary and desired information for which it was designed. The research instrument was reduced to 61 intellectual capital items in three forms. The operational definitions and coding rules (see Appendix 1) were defined by one researcher and checked and agreed by the other two researchers.

Measurement of dependent variables

Beattie and Thomson (2007) argue that many of the content analysis research methods adopted in prior studies for intellectual capital disclosure measurement lack transparency, specificity, uniformity and rigour, and that these deficiencies may give rise to misleading evidence. In this study, scoring of the research instrument was performed manually covering the whole annual report[6].

The dependent variable, intellectual capital disclosure, is measured using three different metrics: disclosure index (ICDI) to indicate the variety; word count (ICWC) to represent the volume; and word count as a percentage of annual report total word count (ICWC%) to indicate focus in the annual report. Our approach in scoring the items in the research instrument for the purpose of the disclosure index is essentially dichotomous in that an item scores one if disclosed and zero, if it is not.[7]. The intellectual capital disclosure index $ICDI_j$ for each company is calculated based on the disclosure index score formula used in Haniffa and Cooke (2005) as follows:

$$ICDI_j = \frac{\sum_{t=1}^{n_j} X_{ij}}{n_j}$$

where n_j = number of items for j^{th} firm, n_j = 183 (i.e. 61 items in three formats),

X_{ij} = 1 if i^{th} item disclosed, 0 if i^{th} item not disclosed,

so that $0 \leq ICDI_j \leq 1$.

The use of a dichotomous procedure in scoring the instrument for the disclosure index can be criticised because it treats disclosure of one item (regardless of its form or content) as being equal, and does not indicate how much emphasis is given to a particular content category. To capture the volume of intellectual capital content and to partly overcome the

[6] Three coders independently coded the same four annual reports and Krippendorff's (1980) alpha was used to test for reliability as it can account for chance agreement among multiple coders. The independent scores were all above the minimum 80% threshold for content analysis to be considered reliable (Riffe et al., 2005) and this was achieved after a second round of independently coding another four annual reports. Only one researcher completed the coding for the remaining ninety-two annual reports. To aid consistency of scoring, the research instrument was completed by one researcher, and to increase reliability of measurement, rescoring was done on a random selection of 10 firms three months after initial analysis, which confirmed over 90 percent consistent identification of content in the annual reports.

[7] Many prior intellectual capital disclosure studies have adopted the dichotomous (0:1) coding scheme in measuring intellectual capital disclosure, which is mainly for examining the presence/absence of intellectual capital items (e.g. Guthrie and Petty, 2000; Brennan, 2001). Some intellectual capital disclosure studies used weighted coding schemes, which give uneven scores for quantitative and qualitative information (e.g. Bozzolan, et al., 2003; Sujan and Abeysekera, 2007). Consistent with Cooke (1989), items were not weighted because of potential scoring bias and scaling problems.

problem of using an index score, this study introduces another form of measure, namely intellectual capital word count (ICWC). Words are the smallest unit of measurement for analysis and can be expected to provide the maximum robustness to the study in assessing the quantity of disclosure (Zeghal and Ahmed, 1990). Using the same research instrument, and taking 'phrases', or what Beattie and Thomson (2007) term 'pieces of information' as the basis of coding, the number of words relating to each intellectual capital item in the checklist was counted and added together to arrive at ICWC for each company. Graphical and pictorial messages were excluded from the word count measure[8].

Coding under 'phrases' and word count avoids the problem of coding sentences in terms of decisions over dominant themes, and the 'phrases' remain meaningful in their own right, while enabling the measuring of the amount of information provided. Coding annual reports into 'phrases' is a three-stage process involving 1) selection of sentences containing intellectual capital information; 2) splitting such sentences into 'phrases' and selecting only those relating to intellectual capital; and 3) coding 'phrases' under each relevant item(s) in the research instrument. Where a 'phrase' relates to more than one item in the checklist and cannot be split, it is then coded under all the related items and the word count is evenly distributed across all the items coded. An example is shown as follows,

"The trust and confidence of all our stakeholders, together with our reputation, are among our most valuable assets." (AstraZeneca plc 2004 Annual report).

The sentence was split into three 'phrases': (1) The trust and confidence of all our stakeholders, (2) together with our reputation, (3) are among our most valuable asset.

[8] Beattie and Thomson (2007) identify the problems with word count (such as print size, colour, font variations and disclosures in graphs/pictures format), and propose a measure addressing the differentiation in length and number of sentences used in expressing similar meanings encountered by coding sentences.

Phrase 1 was coded under ‘relationship with stakeholders’, phrase 2 was coded under ‘company reputation’ and phrase 3 was equally distributed between the two items.

Krippendorff (1980) further notes that words are a preferred measure when it is intended to measure the amount of total space devoted to a topic and to ascertain the importance of that topic. Although word count is not assumed to be representative of the quality of disclosure, it is assumed to be indicative of the overall responsiveness by corporate management[9]. The greater the number of words related to intellectual capital being disclosed in relation to the total number of words in the annual reports, the greater the emphasis given by management on intellectual capital information. Hence, we introduced a third measure, ICWC%, which is the proportion of intellectual capital word count to the total word count of the whole annual report. This measure captures the intellectual capital focus in the annual report. For example, a firm with a short annual report may have a low ICDI and ICWC but a high ICWC%, conveying to the reader the importance placed by management on intellectual capital information.

Measurement of independent variables

The independent variables are categorised into two groups: corporate governance and control variables. Data are drawn from corporate annual reports and Thomson Research. Table 1 summarises the operationalisation of both independent and dependent variables.

[Table 1 insert here]

4.3. Data analysis

Multiple regression is used to test the relationship between intellectual capital

[9] This assumption is based on the belief that management has editorial control of content when a large number of demands for inclusion of information are likely to exist. Annual reports are time consuming and costly to produce, and management must rationalise the competing demands for space. As a result space must be allocated on the basis of some perception of the importance of information to report users.

disclosure (based on each of the three measures) and the various corporate governance and control variables. To identify potential multicollinearity problems, the correlations between independent variables were reviewed and the variance inflation factors (VIF) computed. In addition, tests were conducted for normality (based on skewness and kurtosis) and Kolmogorov-Smirnov Lilliefors (for goodness of fit) for all dependent and continuous independent variables and when normality was a problem, the data was transformed[10]. An analysis of residuals, plots of the studentised residuals against predicted values as well as the Q-Q plot were conducted to test for homoscedasticity, linearity and normality assumptions. The regression equation is as follows:

$$ICD = \beta_0 + \beta_1 INED_i + \beta_2 RDUAL_i + \beta_3 SqSCON_i + \beta_4 SAC_i + \beta_5 MAC_i + \beta_6 LnAGE_i + \beta_7 ROA_i + \beta_8 LnSA_i + \varepsilon_i$$

Where, *ICD* = Intellectual Capital Disclosure index (ICDI), Log of Intellectual Capital Disclosure word count (LnICWC), or Intellectual Capital Disclosure word count percentage (ICWC%);

INED = Proportion of independent non-executive directors on board (proxy for board composition, %);

RDUAL = 1 if the roles of chairman and CEO are held by the same person; 0 if otherwise;

SqSCON = Square root of cumulative shareholding by significant shareholders (i.e. shareholders holding more than 3% of total shares outstanding to total shares outstanding (%);

SAC = Audit committee size (total number of directors on the audit committee) (proxy for internal auditing function);

MAC = Frequency of audit committee meetings (total number of audit

[10] The standard tests for skewness and kurtosis revealed that share concentration, listing age and firm size were not normally distributed. Appropriate transformations were conducted to ensure data normality. Listing age and firm size were transformed using logarithmic transformation, whereas square root transformation was more effective for share concentration.

committee meetings held within the year to its financial year end) (proxy for internal auditing function);

AGE = Log of length of listing on LSE (listing age)

ROA = Return on assets (proxy for firm performance: profitability)

LnSA = Log of sales (proxy for firm size);

β = parameters;

ε_i = error term; and

i = the *i*th observation

Table 2 presents the correlation and partial correlation matrices (controlling for log of sales, a proxy for size)[11].

[Table 2 insert here]

It can be seen from both panel A and B of Table 2 that all variables showed significance for at least one intellectual capital disclosure measure. Table 2 panel A reveals that, with the exception of log of firm size, independent variable associations are all below 0.30. The VIFs for each independent variable (shown in Table 6) are all less than 2, suggesting that multicollinearity is not a problem[12]. Panel B of Table 2 reveals no multicollinearity among explanatory variables after controlling for size. It can also be seen from panel B of Table 2 that board composition (INED) shows significant association with all measures of intellectual capital disclosure. Size of audit committee (SAC), frequency of audit committee meetings (MAC), and share concentration (SqSCON), show highly significant (1% and 5% levels) association with ICDI and log of ICWC, but not with ICWC%. Return on assets (ROA) and log of listing age (LnAGE)

[11] Due to the significant effect of size on disclosure, the partial correlation (controlling for size) was considered to be more appropriate for identifying the marginal effects of other factors that were significantly correlated to level of intellectual capital disclosure.

[12] Previous authors suggest multicollinearity becomes a serious problem where correlations exceed 0.8 or VIFs exceed 10 (Haniffa and Cooke, 2005). Further, the condition indexes, using eigenvalues of the independent variables correlation matrix, were also acceptable with all being below 20.

show significant correlation with ICDI and ICWC% respectively, at the 5% level.

5. Results

5.1 Descriptive analysis of intellectual capital disclosure

Table 3 presents the results of the descriptive analysis of intellectual capital disclosure by each of the 61 items in the checklist under three categories in various formats. The most frequently disclosed human capital items in text form are number of employees, employee motivation, work-related competence, and other employee features. Other commonly disclosed human capital items include employee relationship, entrepreneurial spirit, development and training, work-related knowledge, employee age, equality, relation, skills, and commitment. Human capital items least disclosed are vocational qualifications, employee productivity and flexibility. In all three formats, the most disclosed structural capital items are business process, technology, research & development, management philosophy, overall infrastructure and distribution network. The strategic importance of customer and supply chain relationships in intellectual capital disclosure is evidenced by the most disclosed items being customers, relationship with suppliers and stakeholders, market presence, customer relationships and market leadership, with over 90% of sampled firms having disclosures of such items.

[Table 3 insert here]

5.2 Descriptive statistics

Descriptive statistics of each measure of intellectual capital disclosure, at both overall and subcategory levels, and the independent variables for the sample companies are shown in Table 4.

[Table 4 insert here]

The mean index (ICDI) is 0.36 with slight variation in the extent of human, structural and relational capital disclosure, and the mean aggregate word count (ICWC) is 10,488 words, accounting for 26.3% of the overall annual report word count (ICWC%). ICDI ranges from 0.16 to 0.56; ICWC ranges from 1,234 to 51,430 words and ICWC% ranges from 8.9% to 42.6%.[13]

The rankings of means for human, structural and relational capital disclosure change according to the disclosure measure employed. Structural capital ranks highest (37%) for the disclosure index score, relational capital ranks highest in terms of word count, while structural and relational are joint highest for focus, each forming 9% of the total annual report word count. In all cases, human capital is in third place, although not far behind the other two. The relational-structural-human ranking for word count (38%, 34% and 28% of total intellectual capital respectively) is consistent with findings from prior intellectual capital disclosure studies (e.g. Guthrie and Petty, 2000; Bozzolan et al., 2003; Goh and Lim, 2004; Vandemaele et al., 2005), demonstrating systematic differences in the level of reporting on intellectual capital elements. If firms focus on the disclosure of those intellectual capital elements that are most value and stakeholder relevant (Vergauwen et al., 2007), relational capital would seem to be most important in this regard.

The means of corporate governance variables for sample firms indicate that less than half of the board in our sample consists of independent non-executive directors (INED). The mean for the cumulative significant shareholdings (excluding significant directors' shareholding) is 30%. The majority (86%) have three or more directors in the audit committee, suggesting compliance with recommended best practice. In addition, the median for the audit committee meeting frequency is four times per year, with 83% of

[13] Given that previous studies have adopted different research instruments, it is not possible to make meaningful comparison.

sample companies meeting three or more times during the financial year, in line with the Price Waterhouse (1993) recommendation.

The results for intellectual capital disclosure by the three formats (text, number, graph/picture) are shown in Table 5. It can be seen that human, structural and relational capitals are disclosed in all three forms in the sample annual reports. Only for structural capital in text form do we observe all possible items disclosed. On average, 43 (70%) of the 61 intellectual capital items in the research instrument have text disclosures. This falls to 29% disclosure in numerical form, and 8% in graph/picture form, although one firm had one-third of its intellectual capital disclosure in graph/picture form.

[Table 5 insert here]

Our results confirm that intellectual capital disclosures are still mainly in text form, in line with previous studies (e.g. Guthrie and Petty, 2000; Brennan, 2001). The extensive use of numerical information in intellectual capital disclosure identified in the study is encouraging, supporting the finding of Sujan and Abeysekera (2007).

5.3 Regression results

Table 6 summarises the multiple regression results for all three intellectual capital disclosure measures.

[Table 6 insert here]

The first panel reports the multiple regression results for the ICDI model, producing an adjusted R^2 of 62%. With the exception of role duality (RDUAL), all corporate governance factors examined are significant: size of audit committee (SAC) at the 1% level, and board composition (INED), frequency of audit committee meetings (MAC) and square root of share concentration (SqSCON) at the 5% level. Firm size (LnSA) is significant at the 1% level. Results also show positive relationship between ROA and ICDI, while log of listing age (LnAGE) is negatively associated, both significant at the 5% level.

The second panel reveals that the log of ICWC (LnICWC) regression model, with an adjusted R^2 of 67%, yields even stronger associations than the ICDI model. Results show highly significant (1% level) relationships between LnICWC and four of the five corporate governance factors examined, i.e. INED, SAC, MAC and SqSCON. However, unlike the ICDI model, ROA and LnAGE are not significant. LnSA is still significant at the 1% level.

The explanatory power of the ICWC% model is weaker (adjusted R^2 of 11.2%), as shown in the third panel. INED and LnAGE show significant associations at the 5% level, with SqSCON showing a weak relationship (10% level). All other corporate governance factors are insignificant, but in the direction predicted. Neither LnSA nor ROA is related to ICWC%.

Table 7 presents a summary of multiple regression results for each of the three intellectual capital subcategories based on the word count metric: LnHICWC (log of human intellectual capital word count); LnSICWC (log of structural intellectual capital word count); and LnRICWC (log of relational intellectual capital word count)[14].

[Table 7 insert here]

We observe that the two audit committee variables (SAC and MAC) are significantly associated with all three intellectual capital subcategories, confirming our hypothesis of

[14] The ICDI models for each of the three intellectual capital subcategories reveals broadly similar associations and are not therefore presented.

the role these committees play in influencing the level of intellectual capital disclosure in its various forms. In addition, relational capital disclosures are significantly associated with independent non-executive directors (INED) and share concentration (SqSCON); structural capital disclosures are significantly associated with INED, while human capital disclosures are associated with role duality (RDUAL), all in the direction hypothesised.

5.4 Examination of hypotheses

Table 8 summarises the associations between the independent variables and intellectual capital disclosure measures, namely, variety (ICDI), volume (ICWC) and focus (ICWC%).

[Table 8 insert here]

Board composition was expected to be one of the major corporate governance determinants for intellectual capital disclosure. The significant positive results of all three measures of intellectual capital disclosure, especially for variety (5% level) and volume (1% level), support our hypothesis (H1) that the greater the presence of independent non-executive directors on the board, the greater the intellectual capital disclosure. Detailed analysis at item level (not included) reveals that firms with more independent non-executive directors disclose significantly more human capital items (e.g. employee relations and work-related competence, but not diversity or equality), structural capital items (e.g. management philosophy, corporate culture, innovation, knowledge-based infrastructure, and quality management and improvement), and relational capital items (e.g. market presence, relationships with suppliers, business agreements, and marketing issues). They offer support to arguments based on both agency and resource dependence theories.

Role duality was not found to influence intellectual capital and our hypothesis (H2) was rejected. Share ownership concentration showed significant negative associations with all three measures of intellectual capital disclosure as hypothesised, especially by variety (5% level) and volume (1% level). The finding supports our hypothesis (H3) that companies with more concentrated share ownership are less responsive to investors' information costs, since the dominant shareholders typically have regular access to the information they require and hence there is less pressure for intellectual capital disclosure in annual reports. Analysis at intellectual capital subcategory level reveals that the impact of block shareholders is mainly on the volume of relational capital disclosure (e.g. customers, market presence and leadership, customer relationship and acquisition, company awards, public relation, distribution channel, relationship with suppliers and stakeholders, business collaboration and marketing).

Audit committee size is found to be positively associated with ICDI and LnICWC, supporting our hypothesis (H4) that larger audit committees tend to provide greater intellectual capital disclosure in their annual reports. This is in line with the recommendations of the Smith Report (2003) that audit committees have responsibility to oversee documents such as the operating financial review. This document typically has a strong intellectual capital disclosure emphasis. Results support hypothesis (H5) that a positive relationship exists between level of intellectual capital disclosure and frequency of audit committee meetings. This suggests that audit committee activity is an important factor in monitoring management behaviour with regard to reducing information asymmetry through intellectual capital disclosure.

6. Summary and conclusions

Results based on multiple regression models for the three intellectual capital disclosure measures indicate that, with the exception of role duality, all corporate governance variables together with firm size, profitability and listing age are associated with one or more of the intellectual capital disclosure measures. This is consistent with Keenan and Aggestam's (2001) argument, previously untested, that corporate governance impacts on efficient intellectual capital management, including its communication to stakeholders. The significant positive association for board composition provides evidence for independent directors' function as a monitoring mechanism, which enhances the effectiveness of the board and reduces both agency costs and information asymmetries between principals and agents. Moreover, their breadth of expertise and knowledge heighten the board's awareness of the importance of intellectual capital disclosure, especially structural and relational capital. We also find confirmation of our share concentration, audit committee size and frequency of audit committee meetings hypotheses, underpinned by agency theory arguments. Where share ownership is highly concentrated, smaller shareholders' interests in relation to intellectual capital need to be protected via corporate governance mechanisms, such as greater independence of the board and larger, more active audit committees for better intellectual capital communication.

We argue that, as well as the variety and volume of disclosure, it is meaningful to measure each firm's disclosure focus (ICWC%) to examine the proportion of annual reports devoted to intellectual capital. On average, 26 per cent of annual report disclosures were devoted to intellectual capital; this focus is not size dependent and is greater where firms have a higher proportion of independent non-executive directors and shareholdings are more widely spread.

Our findings indicate that, in the absence of mandatory disclosure, effective corporate governance mechanisms impact positively on the variety, volume (word count) and format (text, numbers, graphs/pictures) of intellectual capital disclosure. Future research could usefully explore the relationships identified in the study in greater depth through organisational case studies.

There are several limitations in this study. Firstly, the disclosure scoring sheet is self developed, which causes difficulty for comparison with prior studies. Secondly, the study focuses only on corporate annual reports and future studies may consider other media. Thirdly, there will be other factors that affect companies' intellectual capital disclosure practices that have not been examined in this study[15]. Finally, the study has not attempted to include corporate culture. For example, companies that choose to have good disclosure policies may also choose to operate good corporate governance practices.

References

Abeysekera, I. (2006). "The Project of Intellectual Capital Disclosure: Researching the Research", *Journal of Intellectual Capital,* 7 (1): 61-77.

Abeysekera, I., and Guthrie, J. (2005). "An Empirical Investigation of Annual Reporting Trends of Intellectual Capital in Sri Lanka", *Critical Perspectives in Accounting,* 16 (3): 151-163.

Aboody, D. and Lev, B. (1998). "The Value relevance of Intangibles: The Case of Software Capitalization", *Journal of Accounting Research,* 36 (Supplement): 161-191.

Accounting Standards Board (ASB) (2007). *A Review of Narrative Reporting by UK Listed Companies in 2006,* FRC. URL: http://www.frc.org.uk/asb/press/pub1228.html, accessed 15/01/2007.

Amir, E., and Lev, B. (1996). "Value-Relevance of Nonfinancial Information: The Wireless Communication Industry", *Journal of Accounting and Economics,* 22 (1-3): 3-30.

Barnes, E., and Walker, M. (2006). "The Seasoned-Equity Issues of UK Firms: Market Reaction and Issuance Method Choice", *Journal of Business Finance and Accounting,* 33 (1/2): 45-78.

[15] As with any disclosure study, the problem of endogeneity may exist where corporate governance variables are themselves included in intellectual capital disclosure. For example, increasing the number of independent non-executive directors in relation to executive directors could increase the amount of information on current positions held outside the company by directors available for disclosure. However, this is compensated by the expectation of a reduction in the amount of information about employee relationships (executive directors' years of service), employee development (career path of executive directors in the company), and management capability (executive directors' leadership abilities). As shown in Table 7, by breaking intellectual capital disclosure down to its subcategories, board composition does not have significant effect on the volume of human capital disclosure, while there are significant effects on the volume of relational and structural capital disclosures. The problem of endogeneity in this study is not considered significant.

Barth, M.E., Kasznik, R., and McNichols, M. (2001). “Analyst Coverage and Intangible Assets”, *Journal of Accounting Research*, 39 (1): 1-34.
Beasley, M. (1996). “An Empirical Analysis of the Relation between the Board of Director Composition and Financial Statement Fraud”, *Accounting Review*, 71 (4): 443-465.
Beattie, V., and Thomson, S. J. (2007). “Lifting the Lid on the Use of Content Analysis to Investigate Intellectual Capital Disclosures”, *Accounting Forum*, 31 (2): 129-163.
Beattie, V., McInnes, B., and Fearnley, S. (2002). *Through the Eyes of Management: A Study of Narrative Disclosures*, Institute of Chartered Accountants in England and Wales, Milton Keynes.
Blackburn, V. (1994). “The Effectiveness of Corporate Control in the US Corporations”, *Corporate Governance: An International Review*, 2: 196.
Bontis, N. (1998). “Intellectual Capital: An Exploratory Study that Develops Measures and Models”, *Management Decision*, 36 (2): 63-76.
Bontis, N. (2003). “Intellectual Capital Disclosure in Canadian Corporations”, *Journal of Human Resource Costing and Accounting*, 7 (1/2): 9-20.
Bozzolan, S., Favotto, F., and Ricceri, F. (2003). “Italian Annual Intellectual Capital Disclosure: An Empirical Analysis”, *Journal of Intellectual Capital*, 4 (4): 543-558.
Brammer, S., and Pavelin, S. (2006). “Voluntary Environmental Disclosures by Large UK Companies”, *Journal of Business Finance and Accounting*, 33 (7/8): 1168-1188.
Brennan, N. (2001). “Reporting Intellectual Capital in Annual Reports: Evidence from Ireland”, *Accounting, Auditing & Accountability Journal*, 14 (4): 423-436.
Brooking, A. (1996). *Intellectual Capital, Core Assets for the Third Millennium Enterprise*, International Thomson Business Press, London.
Bukh, P. N. (2003). “Commentary: The Relevance of Intellectual capital Disclosure: A Paradox?”, *Accounting, Auditing & Accountability Journal*, 16 (1): 49-56.
Cañibano, L., Garcia-Ayuso, M., and Sanchez, P. (2000). “Accounting for Intangibles: A Literature Review”, *Journal of Accounting Literature*, 19: 102-130.
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*, 16 (4): 791-826.
Chaminade, C., and Roberts, H. (2003). “What It Means Is What It Does: A Comparative Analysis of Implementing Intellectual Capital in Norway and Spain”, *European Accounting Review*, 12 (4): 733-751.
Chen, C. J. P., and Jaggi, B. (2000). “Association between Independent Non-Executive Directors, Family Control and Financial Disclosure in Hong Kong”, *Journal of Accounting and Public Policy*, 19 (4-5): 285-310.
CIMA (2001). *Managing the Intellectual Capital within Today's Knowledge-based Organisations*, September, Technical Briefing.
Cooke, T. E. (1989). “Voluntary Corporate Disclosure by Swedish Companies”, *Journal of International Financial Management and Accounting*, 1 (2): 1-25.
Cormier, D., Magnan, M., and van Velthoven, B. (2005). “Environmental Disclosure Quality in Large German Companies: Economic Incentives, Public Pressures or Institutional Conditions?” *European Accounting Review*, 14 (1): 3-39.
Cotter, J., and Silvester, M. (2003). “Board and Monitoring Committee Independence”, *Abacus*, 39 (2): 211-232.
Eng, L. L., and Mak, Y. T. (2003). “Corporate Governance and Voluntary Disclosure”, *Journal of Accounting and Public Policy*, 22 (4): 325-345.
Financial Accounting Standards Board (FASB) (2001). *Improving Business Reporting: Insights into Enhancing Voluntary Disclosure*, Business Reporting Research Project, Steering Committee Report, Financial Accounting Standards Board.
Forker, J. J. (1992). “Corporate Governance and Disclosure Quality”, *Accounting and Business Research*, 22 (86): 111-124.
Garcia-Meca, E., and Martinez, I. (2005). “Assessing the Quality of Disclosure on Intangibles in the Spanish Capital Market”, *European Business Review*, 17 (4): 305-313.
Garcia-Meca, E., Larran, M., and Martinez, I. (2005). “The Explanatory Factors of Intellectual Capital Disclosure to Financial Analysts”, *European Accounting Review*, 14 (1): 63-94.

Gibbins, M., Richardson, A., and Waterhouse, J. (1990). "The Management of Corporate Financial Disclosure: Opportunism, Ritualism, Policies and Processes", *Journal of Accounting Research,* 28 (1): 121-143.
Goh, P. C., and Lim K. P. (2004). "Disclosing Intellectual Capital in Company Annual Reports: Evidence from Malaysia", *Journal of Intellectual Capital,* 5 (3): 500-510.
Guthrie, J., and Petty, R. (2000). "Intellectual Capital: Australian Annual Reporting Practices", *Journal of Intellectual Capital,* 1 (3): 241-251.
Habersam, M., and Piper, M. (2003). "Exploring Intellectual Capital in Hospitals: Two Qualitative Case Studies in Italy and Austria", *European Accounting Review*, 12 (4): 753-779.
Haniffa, M. R., and Cooke, T. E. (2002). "Culture, Corporate Governance and Disclosure in Malaysian Corporations", *Abacus,* 38 (3): 317-349.
Haniffa, M. R., and Cooke, T. E. (2005). "The Impact of Culture and Governance on Corporate Social Reporting", *Journal of Accounting and Public Policy,* 24: 391-430.
Ho, S. S. M., and Wong, K. S. (2001). "A Study of the Relationship Between Corporate Governance Structures and the Extent of Voluntary Disclosure", *Journal of International Accounting, Auditing and Taxation,* 10 (2): 139-156.
Holland, J. (2006a). *A Model of Corporate Financial Communication,* Institute of Chartered Accountants of Scotland (ICAS): Edinburgh.
Holland, J. (2006b). "Fund Management, Intellectual Capital, Intangibles and Private Disclosure", *Managerial Finance,* 32 (4): 277-316.
Ittner, C. and Larcker, D. (1998). "Are Non-Financial Measures Leading Indicators of Financial Performance? An Analyst Satisfaction Survey", *Journal of Accounting Research*, 36 (Supplement): 1-35.
Jensen, M. C., and Meckling, W. H. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure", *Journal of Financial Economics,* 3: 305-360.
Keenan, J., and Aggestam, M. (2001). "Corporate Governance and Intellectual Capital: Some Conceptualisations", *Corporate Governance*, 9 (4): 259-275.
Krippendorff, K. (1980). *Content Analysis: An Introduction to Its Methodology,* Beverly Hills, CA: Sage.
Lev, B. (2001). *Intangibles: Management, Measurement and Reporting,* Washington: The Brookings Institution.
Lev, B., and Zarowin, P. (1999). "The Boundaries of Financial Reporting and How to Extend Them", *Journal of Accounting Research,* 37 (2): 353-386.
Mangena, M., and Pike, R. (2005). "The Effect of Audit Committee Shareholding, Financial Expertise and Size on Interim Financial Disclosures", *Accounting and Business Research,* 35 (4): 327-349.
McMullen, D. A. (1996). "Audit Committee Performance: An Investigation of the Consequences Associated with Audit Committees", *Auditing: A Journal of Practice and Theory*, 15 (1): 87-103.
Meritum (2002). *Guidelines for Managing and Reporting on Intangibles,* Madrid.
Milne, M., and Adler, R. (1999). "Exploring the Reliability of Social and Environmental Disclosures Content Analysis", *Accounting, Auditing and Accountability Journal*, 12 (2): 237-256.
Moser, C. A., and Kalton, G. (1996). *Survey Methods in Social Investigation,* Great Yarmouth: Galliard Printers.
Mouritsen, J. (1998). "Driving Growth: Economic Value versus Intellectual Capital", *Management Accounting Research*, 9 (4): 461-482.
Mouritsen, J., Larsen, H. T., and Bukh, P. N. D. (2001). "Intellectual Capital and the 'Capable Firm': Narrating, Visualising and Numbering for Managing Knowledge", *Accounting, Organisation and Society*, 26.
Olson, J. (1999). "How to Make Audit Committees More Effective", *Business Lawyer*, 54: 1097-1113.
Parker, L. D. (2007). "Financial and External Reporting Research: The Broadening Corporate Governance Challenge", *Accounting and Business Research*, 37 (1): 39-54.
Patelli, L., and Prencipe, A. (2007). "The Relationship between Voluntary Disclosure and Independent Directors in the Presence of A Dominant Shareholder", *European Accounting Review*, 16 (1): 5-33.
Price Waterhouse (1993). *Improving Audit Committee Performance: What Works Best.* Altamonte Springs, FL: Institute of Internal Auditors Research Foundation.
Raffournier, B. (1995). "The Determinants of Voluntary Financial Disclosure by Swiss Listed Companies", *European Accounting Review,* 4 (2): 261-280.

Riffe, D., Lacy, S., and Fico, F.G. (2005). A*nalyzing Media Messages: Using Quantitative Content Analysis in Research*, 2nd ed., Mahwah, NJ: Lawrence Erlbaum.
Rodgers, W. (2003). "Measurement and Reporting of Knowledge-based Assets", *Journal of Intellectual Capital*, 4 (2): 181-190.
Roslender, R., and Fincham, R. (2004). "Intellectual Capital Accounting in the UK: A Field Study Perspective", *Accounting, Auditing and Accountability Journal*, 17 (2): 178-209.
Smith, J. L., Adhihari, A., and Tondkar, R. H. (2005). "Exploring Differences in Social Disclosures Internationally: A Stakeholder Perspective", *Journal of Accounting and Public Policy*, 24 (2): 123-151.
Stewart, T. A. (1997). *Intellectual Capital - The New Wealth of Organizations*, London: Nicholas Brealey.
Subbarao, A. V., and Zeghal, D. (1997). "Human Resources Information Disclosure in Annual Reports: An International Comparison", *Journal of Human Resource Costing and Accounting*, 2 (2): 53-73.
Sujan, A. & Abeysekera, I. (2007). "Intellectual Capital Reporting Practices of the Top Australian Firms", *Australian Accounting Review*, 17 (2): 71-83.
Sveiby, K. E. (1997). *The New Organisational Wealth: Managing and Measuring Knowledge-based Assets*, San Francisco, CA: Berrett-Koehler Publishers.
Tayles, M., Pike, R., and Sofian, S. (2007) "Intellectual Capital, Management Accounting Practices and Corporate Performance: Perceptions of Managers", *Accounting, Auditing & Accountabil*ity Journal, 20(4): 522.
The Combined Code on Corporate Governance (2006). London: Financial Reporting Council Ltd.
The Smith Report (2003). *Audit Committees: Combined Code Guidance*, London: Financial Reporting Council. URL: www.frc.org.uk/publications.
Vandemaele, S. N., Vergauwen, P. G. M. C., and Smits A. J. (2005). "Intellectual Capital Disclosure in the Netherland, Sweden and the UK: A Longitudinal and Comparative Study", *Journal of Intellectual Capital*, 6 (3): 417-426.
Vergauwen, P. G. M. C., and van Alem, F. J. C. (2005). "Annual report IC disclosure in the Netherlands, France and Germany", *Journal of Intellectual Capital*, 6 (1): 89-104.
Vergauwen, P., Bollen, L, and Oirbans, E. (2007). "Intellectual Capital Disclosure and Intangible Value Drivers: An Empirical Study", *Journal of Intellectual Capital*, 45 (7): 1163-1180.
Weimer, J. and Pape, J. (1999). A Taxonomy of Systems of Corporate Governance, *Corporate Governanc*e*: An International Review*, 7 (2): 152-166.
Welker, M. (1995). "Disclosure Policy, Information Asymmetry and Liquidity in Equity Markets", *Contemporary Accounting Research*, 11: 801-828.
Williams, M. S. (2001). "Are Intellectual Capital Performance and Disclosure Practices Related?" *Journal of Intellectual Capital*, 2 (3): 192-203.
Zeghal, D., and Ahmed, S. (1990). "Comparison of Social Responsibility Information Disclosure Media Used by Canadian Firms", *Accounting, Auditing & Accountability Journal*, 3 (1): 38-53.

Table 1 Measurement of dependent and independent variables

	Variable	Proxy	Measurement
Dependent variables			
1	ICDI	Variety of intellectual capital disclosure	Number of items in the research instrument disclosed in the annual report divided by 183
2	ICWC	Volume of intellectual capital disclosure	Total number of words disclosed in relation to intellectual capital information in the annual report
3	ICWC%	Focus of intellectual capital disclosure	Intellectual capital disclosure word count divided by total word count of the annual report
Independent variables			
Corporate governance factors			
1	Board composition	Independent non-executive directors (INED)	Number of independent non-executive directors on board (specified in the annual reports) divided by total number of directors on board
2	Ownership structure	Share concentration (SCON)	Cumulative shareholdings by individuals or organisations classified as substantial shareholders (currently a 3% stake required by the Companies Act 1985), with exception of significant director's shareholding, to the total number of outstanding common shares
3	Internal auditing mechanism	Size of audit committee (SAC)	Number of directors on board in audit committee
4	Internal auditing mechanism	Frequency of audit committee meetings (MAC)	Number of audit committee meetings held within the financial year of the annual report
5	Role duality	Combined role of Chairman and CEO (RDUAL)	Dummy variable with a value of 1 if the roles of chairman and CEO are held by the same person
Control Variables			
6	Length of listing on LSE	Listing age (AGE)	Number of days listed scaled by 365 days a year
7	Performance: profitability	Return on assets (ROA)	Return / Total assets for the financial year of the annual report
8	Firm size	Sales (SA)	Sales revenue of financial year

Table 2 Correlation and partial correlation (controlling size effect- sales as a proxy) matrices

Panel A Correlation between dependent and independent variables											
	ICDI	LnICWC	ICWC%	INED	SAC	MAC	SqSCON	RDUAL	LnAGE	ROA	LnSA
ICDI	1.000										
LnICWC	0.856***	1.000									
ICWC%	0.500***	0.565***	1.000								
INED	0.340***	0.411***	0.24**	1.000							
SAC	0.511***	0.585***	0.175*	0.234**	1.000						
MAC	0.498***	0.528***	0.151	0.185*	0.283***	1.000					
SqSCON	-0.442***	-0.443***	-0.22**	-0.173*	-0.167*	-0.179*	1.000				
LnAGE	0.119	0.163	-0.164	0.121	0.265***	0.137	-0.118	0.037	1.000		
ROA	0.205**	0.146	0.101	-0.023	0.089	0.071	-0.134	-0.109	0.216**	1.000	
LnSA	0.704***	0.693***	0.104	0.206**	0.485***	0.510***	-0.399***	-0.182*	0.287***	0.082	1.000
Panel B Partial correlation between dependent and independent variables controlling for size effect											
ICDI	1.000										
LnICWC	0.719***	1.000									
ICWC%	0.603***	0.688***	1.000								
INED	0.281***	0.380***	0.225**	1.000							
SAC	0.273***	0.394***	0.143	0.157	1.000						
MAC	0.228**	0.281***	0.114	0.095	0.047	1.000					
SqSCON	-0.248**	-0.253**	-0.196*	-0.101	0.033	0.031	1.000				
LnAGE	-0.122	-0.052	-0.204**	0.066	0.15	-0.012	-0.004	0.095	1.000		
ROA	0.208**	0.123	0.093	-0.041	0.056	0.034	-0.111	-0.096	0.201**	1.000	

*** = significant at .01 level, ** = significant at .05 level, * = significant at .10 level

Table 3 Number of companies disclosing items in the checklist under three formats[16]

Human capital	**T**	**N**	**GP**	**Av. WC**	**Relational capital**	**T**	**N**	**GP**	**Av. WC**	**Structural capital**	**T**	**N**	**GP**	**Av. WC**
Number of employees	100	99	9	101	Customers	99	82	48	965	Intellectual property	58	38	5	215
Employee age	67	95	0	19	Market presence	92	71	26	382	Process	100	78	21	605
Employee diversity	44	13	3	18	Customer relationships	90	47	15	295	Management philosophy	100	21	14	422
Employee equality	92	1	0	79	Customer acquisition	78	42	6	116	Corporate culture	58	1	2	32
Employee relationship	99	45	6	307	Customer retention	65	25	4	45	Organization flexibility	40	0	0	17
Employee education	51	0	0	15	Customer training & education	17	1	1	9	Organization structure	89	43	9	465
Skills/know-how	92	14	5	114	Customer involvement	18	2	1	7	Organization learning	33	0	0	26
Employee work-related competences	100	53	0	417	Company image/reputation	65	6	12	46	Research & development	94	63	11	382
Employee work-related knowledge	91	24	0	142	Company awards	39	2	13	47	Innovation	71	15	15	108
Employee attitudes/ behaviour	72	15	15	63	Public relation	69	63	11	168	Technology	98	46	21	220
Employee commitments	88	59	0	114	Diffusion & networking	47	12	3	47	Financial dealings	100	80	5	386
Employee motivation	100	100	12	605	Brands	69	19	18	153	Customer support function	53	21	3	68
Employee productivity	17	5	0	3	Distribution channels	50	20	5	76	Knowledge-based infrastructure	69	14	0	65
Employee training	78	9	1	45	Relationship with suppliers	96	81	2	116	Quality management and improvement	82	13	7	87
Vocational qualifications	10	2	0	3	Business collaboration	78	49	14	212	Accreditation (certificate)	51	7	4	57
Employee development	95	24	4	404	Business agreements	59	34	5	198	Overall infrastructure/capability	97	62	13	272
Employee flexibility	24	9	0	8	Favourite contract	64	45	17	237	Networking	63	4	0	23
Entrepreneurial spirit	96	8	1	125	Research collaboration	22	6	0	26	Distribution network	65	36	12	111
Employee capabilities	74	2	1	31	Marketing	50	21	9	73					
Employee teamwork	51	3	9	22	Relationship with stakeholders	94	42	23	623					
Employee involvement with community	46	19	3	34	Market leadership	91	35	8	154					
Other employee features	100	2	85	290										

[16] T, N, and GP represents the number of firms providing disclosure in text, numbers and graphs/pictures respectively; and Av. WC represents the average number of words disclosed by the sample firms.

Table 4 Descriptive statistics for dependent and independent variables (untransformed)

	Mean	Median	Min	Max	SD	z-test Skewness	z-test Kurtosis	K-S Lilliefors[17]
Dependent variables								
ICDI	0.36	0.36	0.16	0.56	0.08	0.90	-0.99	0.08
ICWC	10488	8551	1234	51430	8901.2	9.46	12.87	0.19*
ICWC%	0.263	0.259	0.089	0.426	0.072	0.79	-1.06	0.05
HICDI	0.355	0.348	0.212	0.561	0.073	1.50	-0.31	0.07
SICDI	0.371	0.370	0.130	0.574	0.092	0.07	-0.89	0.07
RICDI	0.365	0.349	0.111	0.667	0.122	0.79	-1.14	0.08
HICWC	2945	2558	545	8507	1598.2	3.43	0.98	0.12*
SICWC	3551	2526	466	23648	3467.6	13.32	28.83	0.19*
RICWC	3992	2689	223	29993	4634.6	11.99	23.27	0.24*
HICWC%	0.083	0.080	0.033	0.174	0.026	2.28	0.61	0.08
SICWC%	0.090	0.084	0.026	0.281	0.039	7.27	11.32	0.12*
RICWC%	0.090	0.083	0.020	0.266	0.047	3.42	2.03	0.09
Independent variables								
Corporate governance factors								
Board composition (%) (INED)	0.47	0.50	0.18	0.75	0.13	-0.11	-0.93	0.09
Ownership concentration (%) (SCON)	29.63	26.05	0[18]	79.2	19.55	2.19	-1.43	0.12*
Audit committee size (Number) (SAC)	3.46	3	1	7	1.06	-	-	-
Audit committee meeting (Number) (MAC)	3.70	4	1	9	1.41	-	-	-
Role duality (RDUAL)	0.09	0	0	1	0.29	-	-	-
Firm-specific factor								
Listing age (AGE) (Years)	17.15	10.69	0.45	71.87	16.71	5.99	2.58	0.19*
Profitability (ROA) (%)	4.38	3.66	-9.53	18.67	5.79	0.03	0.54	0.09
Firm Size (SA) £m	4036.7	383.1	0.00[19]	39792.2	8782.4	11.15	13.76	0.35*

[17] * significant at the 1% level.

[18] Two companies reported that they had not been notified in accordance with sections 198 to 208 of the Companies Act 1985 of any member who had a notifiable interest (≥3%) in the share capital of the Company. One company only has one significant shareholder, who sits on the board of directors, hence has no significant outside shareholding.

[19] The company is an active trading company focusing on Research and Development. Although there were no sales recorded during 2004 financial year, contracts were signed.

Table 5 Descriptive statistics for IC disclosure by category under three formats

Intellectual capital categories	Format	Min	Max	Max possible	Mean	%	SD
Human capital	Text	9	20	22	15.87	72	2.44
	Numbers	3	12	22	6	27	2.11
	Graphs/ pictures	0	8	22	1.54	7	1.33
	All	14	37	66	23.41	35	4.82
Structural capital	Text	5	18	18	13.21	73	2.49
	Numbers	1	12	18	5.42	30	2.30
	Graphs/ pictures	0	6	18	1.42	8	1.49
	All	7	31	54	20.05	37	4.99
Relational capital	Text	3	20	21	13.52	64	3.33
	Numbers	1	15	21	7.05	34	3.35
	Graphs/ pictures	0	10	21	2.41	11	2.43
	All	7	42	63	22.98	36	7.67
Intellectual capital	Text	19	57	61	42.6	70	7.07
	Numbers	7	38	61	17.44	29	6.95
	Graphs/ pictures	0	20	61	4.91	8	5.00
	All	29	103	183	66.44	36	15.52

Table 6 Multiple regression results for ICDI, LnICWC and ICWC%

		ICDI					LnICWC					ICWC%				
		Unstandardized coefficients		Standardized coefficients			Unstandardized coefficients		Standardized coefficients			Unstandardized coefficients		Standardized coefficients		
	VIF	B	Std. error	Beta	t	Sig.	B	Std. error	Beta	t	Sig.	B	Std. error	Beta	t	Sig.
(Constant)		0.181	0.034		5.402	0.000	7.155	0.275		26.053	0.000	0.234	0.045		5.254	0.000
SAC	1.381	0.016	0.006	0.205	2.805	0.006	0.200	0.047	0.291	4.275	0.000	0.011	0.008	0.162	1.460	0.148
MAC	1.374	0.009	0.004	0.156	2.142	0.035	0.101	0.035	0.195	2.883	0.005	0.005	0.006	0.098	0.882	0.380
INED	1.104	0.106	0.043	0.160	2.456	0.016	1.225	0.354	0.211	3.465	0.001	0.115	0.057	0.200	2.010	0.047
SqSCON	1.242	-0.007	0.003	-0.162	-2.343	0.021	-0.063	0.024	-0.170	-2.633	0.010	-0.007	0.004	-0.180	-1.702	0.092
RDUAL	1.084	-0.013	0.019	-0.045	-0.702	0.484	-0.229	0.152	-0.090	-1.501	0.137	-0.010	0.025	-0.040	-0.407	0.685
LnAGE	1.183	-0.012	0.005	-0.155	-2.295	0.024	-0.064	0.041	-0.098	-1.552	0.124	-0.017	0.007	-0.268	-2.602	0.011
ROA	1.084	0.002	0.001	0.149	2.309	0.023	0.009	0.008	0.071	1.171	0.245	0.002	0.001	0.119	1.212	0.229
LnSA	1.916	0.015	0.003	0.451	5.245	0.000	0.105	0.024	0.347	4.340	0.000	-0.002	0.004	-0.077	-0.590	0.556
R^2		0.649					0.696					0.184				
Adj. R^2		0.618					0.669					0.112				
Std. Error		0.051					0.418					0.068				
F Value		21.033					26.005					2.568				
Sig. F		0.000					0.000					0.014				

Table 7 Multiple regression results for human, structural and relational capital disclosure based on word count

		LnHICWC		LnSICWC		LnRICWC	
	VIF	t	Sig.	t	Sig.	t	Sig.
(Constant)		28.717	0.000	16.177	0.000	14.041	0.000
SAC	1.381	5.121	0.000	2.924	0.004	3.437	0.001
MAC	1.374	2.497	0.014	2.482	0.015	2.326	0.022
INED	1.104	1.538	0.128	3.239	0.002	2.785	0.007
SqSCON	1.242	-1.299	0.197	-1.647	0.103	-3.272	0.002
RDUAL	1.084	-2.030	0.045	-0.787	0.433	-1.067	0.289
LnAGE	1.183	-2.111	0.038	-0.116	0.908	-2.045	0.044
ROA	1.084	0.502	0.617	0.939	0.350	1.532	0.129
LnSA	1.916	5.040	0.000	2.449	0.016	3.728	0.000
R^2		0.685		0.536		0.633	
Adjusted R^2		0.657		0.495		0.601	
Std error		0.339		0.554		0.631	
F value		24.733		13.153		19.625	
Sig. F		0.000		0.000		0.000	

Table 8 Summary of multiple regression results

Hypotheses	Predicted sign	Actual sign	Hypothesis support		
			ICDI (Variety)	LnICWC (Volume)	ICWC % (Focus)
Board composition (H1)	+	+	Moderate	Strong	Moderate
Role duality (H2)	-	-	None	None	None
Share concentration (H3)	-	-	Moderate	Strong	Weak
Audit committee size (H4)	+	+	Strong	Strong	None
Frequency of audit committee meetings (H5)	+	+	Moderate	Strong	None
Listing age (H6)	-	-	Moderate	None	Moderate
ROA (H7)	+	+	Moderate	None	None
Sales (H8)	+	+	Strong	Strong	None

Strong = significant at .01 level, Moderate = significant at .05 level, Weak = significant at .10 level

Appendix 1 Definition and nature of information

Human Capital		
1	Number of employees	Employee count of a firm, employee breakdown by e.g. market (business operation or geographical segments), department and job function, and information about its changes and reasons for such changes.
2	Employee age	Biological age of employees in the firm. Includes qualitative description of age related advantages/strengths of a company's employees, and indicators such as average age of a company's employees and age distribution.
3	Employee diversity	Diversity is defined as the division of classes among a certain population. The item refers to the mix of e.g. ethnicity, gender, colour, and sexual orientation. Relevant disclosures include employee diversity policy, the mix and breakdown of employee by race, religion, and culture.
4	Employee equality	Equal treatment of people irrespective of social and cultural differences. Related disclosures include employee equality policy and initiatives taken for enforcement, senior management by gender, and percentage of disabled employees.
5	Employee relationship	The recognition of importance of employees, employee appreciation, dependence on key employees, and employee satisfaction, loyalty, Health & Safety and working environment. It also includes initiatives to build and improve employee relationship e.g. trade union activities, promotion in share ownership and employee contractual relationships.
6	Employee education	Education of directors as well as other employees. Employees' professional recognition is classified under employee work-related competences.
7	Skills/know-how	Disclosures can be description of knowledge, know-how, expertise or skills of directors and other employees. Matrixes could also be shown indicating number of employees with such skills, etc.
8	Employee work-related competences	The knowledge and skills that can be useful to accomplish jobs. It refers to e.g. current positions held outside the company by directors, professional recognition/qualification, awards won (external), and employee publications.
9	Employee work-related knowledge	What is acquired during the job in terms of tacit, explicit and implicit knowledge. It mainly relates to knowledge that employees have related to their current job description, including employee previous working experiences.
10	Employee attitudes/ behaviour	It reflects how employees are working. Relevant disclosures could be e.g. employee friendliness, welcoming, hard working, optimism, enthusiasm, and identification of individuals with company's goals.
11	Employee commitments	It refers to employees being bounds emotionally/intellectually to the organisation. It covers e.g. description of employee commitments, employee commitment matrix/index, and indicators such as attendance of meetings.
12	Employee motivation	Policies, initiatives and evidence of motivation of directors and other employees. It includes reward (internal) and incentives systems, e.g. employee explicit recognition, performance/psychometric/occupational assessment, and indicators of such as employee turnover[20], stability, absence, and seniority.
13	Employee productivity[21]	It is typically measured as output per employee or output per labour-hour, an output which could be measured in physical terms or in price terms. It shows the value added and efficiency of employees. Indicators include e.g. employee value added, revenue or customers per employee.
14	Employee training	It includes e.g. training policies, training programmes, training time, attendance, investment in training, number of employees trained per period, and training results/effectiveness/efficiency.
15	Vocational qualifications	It refers to education, managed and monitored by trade and professional organisations (Brooking, 1996), received by an employee for a particular vocation that proves the skill, knowledge and understanding he/she has to do a job well.
16	Employee development	Employee career development. Disclosures includes employee development policies and programmes (e.g. succession planning), recruitment policies (e.g. internal promotion). Indicators include change of employee seniority, and rate of internal promotion.
17	Employee flexibility[22]	Strategies used by employers to adapt the work of employees to their production/business cycles; and a method to enable workers to adjust working life and working hours to their own preferences. E.g. temporary/fixed-term contracts, relaxed hiring and firing regulations, adjustable working hours or schedules (e.g. part-time, flexible working hours/shifts, working time accounts, leaves, and over-time), outsourcing, job rotation, tele/home-workers, outworkers.
18	Entrepreneurial spirit	It refers to e.g. employee engagement (e.g. employee suggestion systems/consultations, rate of employee suggestions acceptance), empowerment (responsibility taking), creativity (e.g. valuing creativity, tolerance of

[20] Information about directors' retirement is not included as employee turnover.
[21] Directors' achievements based on incentive schemes are classified as employee motivation information rather than employee productivity. It is considered more appropriate to reflect on the motivational effectiveness of incentive schemes.
[22] Not formal qualifications as degrees.

		creative people), innovativeness, knowledge sharing, and employee proactive/reactive ability.
19	Employee capabilities	Other employee abilities apart from the above discussed, e.g. communication ability, interpersonal ability, sensitivity (e.g. thoughtful), reflexibility, and management quality.
20	Employee teamwork	Teamwork is the concept of people working together cooperatively. It covers information about culture of teamwork (expert teams and networks, teamwork capacity), programmes that enhance relationships between employees within/ across departments.
21	Employee involvement with community	Employee social competence can be reflected by their involvement with community. It is defined as providing employees opportunities for contact with an often concealed but significant part of the firm's stakeholders.
22	Other employee features	It refers to the special display or attraction of, or give special prominence to employees of the firm, e.g. photographs of employees, other employee profile information (e.g. positions held).
Structural Capital		
1	Intellectual property	It is a term that encompasses patents, copyrights, trademarks, trade secrets, licenses, commercial rights and other related fields. It covers the assets of a company which is protected by law.
2	Process	It normally refers to a company's management (sales tools, company co-operation forms, corporate specialisation, operational or administrative processes). It includes utilisation of organisation resources, processes/ procedures / routines, and documentations which enables the company or employees to follow. Indicators are e.g. efficiency, effectiveness, and productivity.
3	Management philosophy	"The way leaders in the firm think about the firm and its employees" (Brooking, 1996: 62), i.e. the way a firm's managed.
4	Corporate culture	The set of key values, beliefs, attitudes and understanding shared by people and groups in an organisation, which controls the way members of the organisation interact with each other and with other stakeholders. It covers information about e.g. description of the firm's corporate culture and value, stories and myths that build up about people, events and history conveying a message about what is valued within a firm.
5	Organization flexibility	A company's ability to face challenges and changes, such as specific processes firms use to alter their resource base.
6	Organization structure	Reporting lines, hierarchies, and the way that work flows through the business, including such as management structure, business models.
7	Organization learning	A characteristic of an adaptive organisation. It covers what firms learn from experience and incorporate the learning as feedback into their planning process.
8	Research & development (R&D)	It refers to future-oriented, longer-term activities in business practice, which can achieve higher levels of knowledge and improvement in business practice, allowing the organisation to exploit competitive advantages. It includes e.g. R&D policies, programmes, planning, progress, budgets, successful rate, rate of peer-reviewed publications.
9	Innovation	Defined as the successful implementation of creative ideas within a firm by introducing something new and useful (radical or incremental changes to products, processes or services).
10	Technology	A collection of techniques, which is the current state of humanity's knowledge of how to combine resources to produce desired products, to solve problems, fulfil needs, or satisfy wants. It includes such as machines, IT (e.g. computer hardware and software), IS (e.g. SAP, PeopleSoft, database), technical methods, and techniques.
11	Financial dealings	Defined as the favourable relationships the firm has with investors, banks and other financiers, financial ratings; financial facilities available; and listings.
12	Customer support function	Functions for customer support, such as customer support centres (e.g. call centres) and other related activities and programmes.
13	Knowledge-based infrastructure	It includes e.g. documented materials (e.g. shared database) that a firm shares amongst employees, facilities or centres (knowledge centres, laboratories) for training & learning, and knowledge management and sharing programmes/policies/facilities.
14	Quality management & improvement	Practices in maintaining and improving quality standards of products and services. Information considered relevant includes e.g. policies and objectives, programmes, control activities (e.g. TQM), description of quality performance, and existence of quality committee.
15	Accreditations (certificate)	A process in which certification of competency, authority, or credibility is presented. It has been broadly referred to quality certificates. "Investor in people" accreditation represents a firm's commitment to its employees; hence were classified under employee relationship.
16	Overall infrastructure/ capability	Infrastructure/capabilities of a firm that cannot be classified under the other 17 structural capital items. Where acquisitions are stated to add a firm's capability of products and services provision, such information is included under this item.
17	Networking	The systems available in a firm that allows interaction of people via a broad array of communication media

		and devices, e.g. voicemail, e-mail, voice or video conferencing, the internet, groupware and corporate intranets, personal digital assistants, and newsletters.
18	Distribution network	Internal networks of distribution, such as distribution centres. It is what a company owns and form a very essential part of the business supply chain.
Relational Capital		
1	Customers	General customer information, e.g. type of customers; customer names; reputation of customers; customer base; knowledge of markets/customers; and customer purchasing histories.
2	Market presence	It covers target markets of a firm, geographically or by market segmentation; percentage of sales represented by each market segment; and market share.
3	Customer relationships	It includes policies and programmes for building customer relationships (e.g. customer loyalty schemes, customer satisfaction survey and the initiatives taken for improvement, complaints management), current relationships with customers (e.g. customer satisfaction and loyalty, customer recommendation, recognition of dependence on key customers, customer perception [e.g. expressed by direct quotes], and various activities/indicators that enhance customer relationships, such as on-time deliveries, convenience of returning goods, value for money).
4	Customer acquisition	It refers to a company's new customers/contracts (unless identified as favourite contracts). It also includes a company's effort on acquiring new or more customers, such as investments/costs.
5	Customer retention	It focuses on retaining the existing customers. Relevant information includes e.g. the number of repeated customers/contracts, renewed contracts, backlog orders, and customer repurchase.
6	CTE	Customer training & education (CTE), such as presentation, road shows, exhibitions, etc.
7	Customer involvement	It focuses on customer consultation on product or services development, which could also include customer & the company connectivity.
8	Company Image/ reputation	It refers to the evaluation/perception of a firm by its stakeholders in terms of their affect, esteem, and knowledge, and what a company stand for.
9	Company awards	It includes awards to a company which is not specifically to other aspects, such as innovation or employees.
10	Public relation	It is the managing of outside communication of an organisation to create and maintain a positive image. Public relations involve e.g. popularising successes and downplaying failures.
11	Diffusion & networking	It includes relates to taking part in social events, courses, conferences, lectures, or other presentations or seminars.
12	Brands[23]	Information about e.g. brand names, brand images, brand awareness, brand loyalty (e.g. word of mouth advocacy), brand building strategies and activities, and brand related sales.
13	Distribution channels	Defined as appropriate mechanisms of getting products and services into the market (Brooking, 1996). It refers to various third party distribution channels, e.g. distributors, agents, dealers.
14	Relationship with suppliers	It includes e.g. knowledge of suppliers, relationships with them (such as reliance on key suppliers, bargaining power against suppliers, support of suppliers, and payment terms).
15	Business collaboration	Collaborations established with other business partners. It covers issues such as strategic alliances, joint venture and partnership for the purpose of working together to improve effectiveness and efficiency by combining each other's advantages.
16	Business agreements	It includes such as licensing and franchising agreements. However, the transactions are not within a consolidated group of companies.
17	Favourite contract	A contract obtained because of the unique market position held by the firm (Brooking, 1996). It includes description of the contract and the favourable relationships.
18	Research collaboration	Collaborations with scientific associations or institutions (e.g. schools and universities) for research or development purposes for the benefit of the company or the community.
19	Marketing	It includes e.g. marketing initiatives, investments, strategies, capabilities, and effects (e.g. awareness raised or sales created).
20	Relationship with stakeholders	A firm's relationship with stakeholders, which cannot be covered by relationship with customers, suppliers and shareholders, e.g. community, government, and competitors.
21	Market leadership	A firm's leadership in various markets or top positions. Market share supplementing market leadership statement is also included.

[23] Brands have been classified under relational capital in various studies (e.g. Bozzolan et al., 2003; Brennan, 2001; Guthrie and Petty, 2000). Although authors such as Rodgers (2003) consider brands as a structural capital item, it is considered in this study that brands themselves are not able to create value for firms and it is the attachment of the market and customers, and the positive perception consumers have relating to the brand that lead to purchase decisions and add value to the firm.