

# **THE EFFECT OF AUDIT COMMITTEE CHARACTERISTICS ON INTELLECTUAL CAPITAL DISCLOSURE**

## **ABSTRACT**

This paper, using data from 100 UK listed firms, investigates the relationship between audit committee characteristics and intellectual capital (IC) disclosure. We find that IC disclosure is positively associated with audit committee characteristics of size and frequency of meetings, and negatively associated with audit committee directors' shareholding. We find no significant relationship between IC disclosure and audit committee independence and financial expertise. We also observe variations in the association between audit committee characteristics and IC disclosure at its component level, which suggest that the underlying factors that drive various forms of IC disclosure, i.e. human capital, structural capital and relational capital, are different. These results have important implications for policy-makers who have a responsibility to ensure that shareholders are protected by prescribing appropriate corporate governance structures and accounting regulations/ guidelines.

Key words:

Corporate governance, audit committee characteristics, corporate reporting, intellectual capital disclosure

## 1 Introduction

It is generally agreed that audit committees play an important role in corporate governance, particularly in enhancing the board of directors' effectiveness in monitoring management (Klein, 2002; Smith Report, 2003; Spira, 2003). In this respect, the literature has emphasised the enhancement of the financial reporting processes as the distinctive contribution that an effective audit committee can make (e.g. Forker, 1992; Smith Report, 2003; Mangena & Pike, 2005), thus reducing information asymmetries between management and stakeholders (Mangena & Pike, 2005; Rainsbury, Bradbury, & Cahan, 2008). Previous studies have examined the effect of audit committee presence on financial reporting (Forker, 1992; Beasley, 1996; Peasnell, Pope, & Young, 2001) and earnings management (Peasnell, Pope, & Young, 2005). Other studies, mainly US-based, have examined the association between audit committee characteristics such as independence, shareholding, financial expertise and size (as measures of its effectiveness) and the firm's quality of financial disclosures (e.g. Mangena & Pike, 2005; Karamanou & Vafeas, 2005), external auditor dismissal after issuing a going-concern report (Carcello & Neal, 2003), internet reporting (Kelton & Yang, 2008) and earnings management (e.g. Klein, 2002; Bédard, Chtourou, & Courteau, 2004).<sup>1</sup> In general, the findings of these studies indicate that audit committees are important in the financial reporting processes. However, it is not clear whether the results of prior research, particularly those on financial disclosures, extend to intellectual capital (IC) disclosure practices.

In a review of the state of financial and external reporting research, Parker (2007) identified IC accounting research as a major area for further research, particularly given that previous studies show that IC is critical in the value creation processes of the firm (e.g. Chaminade & Roberts, 2003; Habersam & Piber, 2003; Aboody & Lev, 2000) and the

<sup>1</sup> With the exception of Mangena and Pike (2005), the few UK studies examining audit committees have focused on the presence/absence of the audit committee (e.g. Forker, 1992; Peasnell et al, 2005). However, given that the practice of establishing audit committees in UK firms is now prevalent (Spira, 2003; Mangena & Pike, 2005), it is now possible to investigate the impact of audit committee characteristics. We note that the results of US-based studies might not be applicable in the UK context given that the US corporate governance system is more prescriptive than the UK. Nevertheless, Peasnell, Pope, and Young (2003) and Peasnell et al. (2005) note that although the two corporate governance systems are different, the UK approach shares many of the key features of the US system.

increased demand for information about IC assets by the capital markets in firm valuation (Lev, 2001; Holland, 2003; 2006 a, b). Therefore, the aim of this study is to investigate whether corporate governance mechanisms influence the firm's IC disclosure practice. Specifically, the study examines the relationship between audit committee characteristics (size, frequency of meetings, independence, committee directors' shareholding, and financial expertise)<sup>2</sup> and IC disclosure by UK listed IC-intensive firms. Additionally, the study examines the relationship between the audit committee characteristics and the extent of IC disclosure in the individual IC components: human capital, structural capital and relational capital. It is possible that different audit committee characteristics may be related to different components of IC disclosure.

We believe that the UK provides an appropriate environment to examine the issue because there are no stringent corporate governance and disclosure requirements, as existing for example in the US system (Peasnell et al., 2003). The 'comply or explain' approach to corporate governance adopted in the UK implies that there is a likelihood of greater variation in both corporate governance structures and disclosure which is important for a study of this nature. In addition, we use only IC-intensive firms because such firms are more likely to be heavily reliant on IC than non-IC-intensive sectors (Amir & Lev, 1996; Barth, Kasznik, & McNichols, 2001). Given that the literature argues that financial reporting model is largely not suited for IC-intensive sectors (Amir & Lev, 1996; Francis & Schipper, 1999), disclosure of IC information is more critical in these sectors and, therefore, it would be more interesting to investigate the role of corporate governance in IC disclosure practices of these sectors.

IC is recognised in the literature as an integral part of a firm's value-creating processes (e.g. Chaminade & Roberts, 2003; Habersam & Piber, 2003) and is the key to building competitive advantage and creating significant shareholder value (e.g. Bukh, 2003; Holland, 2003). Indeed, firms make significant investments in IC related assets such as R&D, brand

<sup>2</sup> These characteristics have been suggested in the literature (Smith Report, 2003) as important in enhancing the effectiveness of audit committee.

development, human development and advertising. However, because the existing GAAP allows IC investments to be expensed immediately or to be amortised arbitrarily, financial reports fail to reflect adequately such value-creating intangible assets (Lev & Zarowin, 1999). This deficiency in the reporting of IC-related information gives rise to increasing information asymmetry between firms and users of financial reports (Barth et al., 2001) and between informed and uninformed investors (Singh & Van der Zahn, 2008). This creates increased opportunities for moral hazard, adverse selection and other opportunistic behaviour by managers (Aboody & Lev, 2000). Consequently, this has evoked calls for external IC information communication from academics and regulators alike (e.g. FASB, 2001; Beattie, McInnes, & Fearnley, 2004) because IC disclosure helps reduce investor uncertainty about future prospects and facilitates a more precise valuation of the company (Bukh, 2003; Barth et al., 2001; Holland, 2003). In this context, it is reasonable to expect that the audit committee will play a critical role in enhancing IC disclosure to support investors' valuation processes of the firm and supporting the monitoring role of the board of directors (Fama & Jensen, 1983).

A number of studies examine the extent of IC disclosure (Brennan, 2001; Beattie et al., 2004; Beattie & Thomson, 2007; Li, Pike, & Haniffa, 2008; Striukova, Unerman, & Guthrie, 2008). These studies generally show that although IC disclosure is still low, there has been an increase in IC disclosure over the years. There are also studies investigating the relation between IC disclosure and company-specific characteristics (such as firm size, industry) (e.g. Bozzolan, Favotto, & Ricceri, 2003; Striukova et al., 2008) and corporate governance (e.g. Cerbioni & Parbonetti, 2007; White, Lee, & Tower, 2007; Li et al., 2008; Singh & Van der Zahn, 2008). The studies on the link between corporate governance and IC disclosure have mostly focused on board independence and ownership structure with limited systematic investigation being directed towards the role of the audit committee in IC disclosure.<sup>3</sup> This is

<sup>3</sup> Only Li et al. (2008) examine the effect of audit committee characteristics on IC disclosure, but focused only on two audit committee characteristics of size and frequency of meetings.

surprising because of the perceived critical role that the audit committee plays in overseeing the corporate reporting process (see Smith Report, 2003). The audit committee has specific responsibility, as delegated by the board, of monitoring the corporate reporting processes of the firm, including communicating with the external auditor (Carcello & Neal, 2003; Spira, 2003). It provides advice to CEOs on financial and non-financial information communication strategy (Jeanjean & Stolowy, 2009), and is involved in the assurance of social and environmental reporting (Jones & Solomon, 2010).

The present study, therefore, makes some important contributions to the literature. First, it provides the first evidence on the relationship between audit committee characteristics and IC disclosure. At the overall IC disclosure level, the results show that IC disclosure is greater for firms with larger audit committees and audit committees that meet more frequently, but lower for firms whose audit committee members have large shareholdings. However, there is no significant relationship between IC disclosure and audit committee independence and financial expertise. These findings suggest that firms with audit committees that are larger, meeting more frequently, and whose members' shareholding is lower are more likely to provide greater overall IC disclosure. Second, the study provides evidence on the relationship between audit committee characteristics and each of the three IC disclosure components: human capital, structural capital and relational capital. The results show that audit committee size is associated with all three IC disclosure components, whilst the frequency of audit committee meetings is related to structural and relational capital disclosure. Audit committee directors' shareholding is only related to structural capital disclosure. These results appear to suggest that the underlying factors that drive various forms of IC disclosure, i.e. human, structural and relational, are different.

On the whole, the findings show the importance of a well resourced audit committee (in terms of size and frequency of meetings) and an independent audit committee (in terms of

shareholdings) in corporate reporting, particularly the disclosure of IC information to the stock market. In line with the world-wide efforts to improve the effectiveness of audit committees in the financial reporting process (see Blue Ribbon Committee, 1999; Smith Committee, 2003), our results are of interest to policy makers. The results are consistent with audit committee characteristics being associated with the disclosure of IC information, which is important for the valuation of shares by investors. Additionally, our results are of interest to investors and analysts as they provide a useful basis for assessing the information provided in annual reports. Finally, the results extend academic research attempting to enhance our understanding of the role of audit committees in the different aspects of corporate reporting.

The remainder of this paper is organised as follows. The next section discusses the motivations for IC disclosure and the hypotheses development is outlined in Section 3. Section 4 discusses the research methods used in the study. The empirical results are presented in Section 5 and, Section 6 concludes the study.

## **2 Motivations for IC disclosure**

The importance of IC information to stock market participants' investment decision-making processes is well documented in the literature. For example, Holland (2003; 2006a, b) find that analysts and fund managers demand and use IC information in their investment decisions and valuation of firms. Orens and Lybaert (2007) show that financial analysts who use more forward-looking and more internal-structure information (non-financial information), offer more accurate forecasts. García-Meca and Martínez (2007) find that analyst reports provide varying amounts of IC related information whilst Barth et al. (2001) observe that analyst coverage is significantly greater for firms with intensive R&D and advertising expenses relative to their industry. Other studies show that specific IC indicators, such as capitalisation of R&D costs (Aboody & Lev, 2000; Kimbrough, 2007), customer satisfaction (Ittner & Larcker, 1998), market penetration (e.g. Amir & Lev, 1996), and technological innovation

conditions (e.g. Matolcsy & Wyatt, 2008) have an impact on share prices and market values, suggesting that investors find them relevant for share valuation.

In the context of the importance of IC, managers should have incentives to provide greater IC disclosure to support the stock market. Fama and Jensen (1983) argue that the separation of ownership and control in the modern firm creates information asymmetries between the managers and the outside investors. Consequently, this increases agency costs such as reduced liquidity of the company's shares, management reputation, and higher cost of capital (Healy & Palepu, 2001). Healy and Palepu (2001) suggest that increased disclosure reduces information asymmetry and therefore reducing the agency costs. Aboody and Lev (2000) argue that the information asymmetry between managers and investors is more acute for investments in IC than for investments in physical and financial assets because IC is unique to specific firms and cannot be inferred by looking at other firms. Additionally, unlike investments in physical and financial assets, IC reporting is largely unregulated. Francis and Schipper (1999) argue that the absence of regulation is compounded by the fact that accounting measurement and reporting rules mandate that most investments in IC are immediately expensed in the period in which they are incurred. Consequently, whilst investors are regularly informed about changes in physical and financial assets via mandated annual and interim reports, there is relatively scarce public information about IC investments. This creates a problem for investors when undertaking share valuation because they have little or no information about the productivity and value changes of IC investments. In this context, enhancing IC disclosures can be seen as an attempt by managers to reduce information asymmetry. This should reduce the uncertainty facing investors, thus increasing liquidity of the firm's shares and reducing the cost of capital (Healy & Palepu, 2001; Botosan, 2006). Recent empirical studies (e.g. Kristandl & Bontis, 2007; Mangena, Pike, & Li, 2010) provide evidence suggesting that firms engaging in greater IC disclosure have a lower cost of capital. Consistent with this, Beattie and Thomson (2010)

find, in a survey, that firms are motivated to report IC information by market-related incentives, in particular the opportunity to increase transparency and help reduce undervaluation of the firm's share price.

There are, however, potential costs of disclosure that may prevent managers from disclosing IC information, such as the danger of being unable to keep up with the standard set up and the reduced level of management flexibility (e.g. Habersam & Piber, 2003) and proprietary costs such as releasing valuable information to competitors. Beattie and Thomson (2010) find that managers considered releasing of information that might harm competitive position and setting disclosure precedence as key disincentives of voluntary IC disclosure. To the extent that the benefits of IC disclosure outweigh the costs, managers are more likely to have incentives to enhance disclosure. Nevertheless, managers may still have incentives to withhold IC information because lack of information hinders the ability of the capital and labour markets to monitor managers effectively (Karamanou & Vafeas, 2005). In this study we focus on the role of corporate governance, in particular the audit committee, in enhancing the extent of IC information disclosure.

### **3. Hypotheses Development**

Cerbioni and Parbonetti (2007) and Li et al. (2008) suggest that corporate governance mechanisms are important in shaping IC disclosure strategies of the firm. They argue that given the role of corporate governance in resolving agency problems created by the separation of ownership and control, effective corporate governance structures, particularly board structures, would have a positive effect on the level of IC disclosure. The rationale for this argument is supported by Keenan and Aggestam (2001) who argue that the responsibility for prudent investment in IC resides with the board. Therefore, it is the responsibility of the board to develop new structures and processes for information communication about the value created for shareholders via the firm's IC. Indeed, Holland (2006a) finds that boards of directors have



active roles in the disclosure processes related to the provision of information regarding the corporate value-creation process. Corporate reporting, including IC disclosure, is also emphasised in the UK Corporate Governance Code (UK Code, 2010) as a key responsibility of the board of directors. In this case, the UK Code (2010) recommends that the board has the responsibility to present a balanced and understandable assessment of the company's financial performance, financial position and prospects. This assessment 'should include in the annual report an explanation of the basis on which the company generates or preserves value over the longer term (the business model) and the strategy for delivering the objectives of the company' (UK Code, 2010: 18). This implies that not only is the board responsible for reporting financial information, but also IC information and other non-financial information that helps investors understand how the firm creates and preserves value. This understanding is only possible when more information about IC is available to investors, particularly given the critical role IC plays in the value creating processes of firms (Holland, 2003).

The extant literature suggests the board's responsibility for corporate reporting is actuated through the audit committee (Smith Report, 2003; Mangena & Pike, 2005; Peasnell et al., 2005). The role of the audit committee in monitoring reporting process has been widely discussed in the literature (e.g. Klein, 2002; Mangena & Pike, 2005; Rainsbury et al., 2008). Audit committees are viewed as a monitoring mechanism that reduces information asymmetries between a firm's management and outside board members (Rainsbury, et al., 2008). This improves the board's role of monitoring management (Peasnell et al., 2005) and consequently the alignment of management's interests with those of shareholders. The expectations about the role of audit committees in an increasingly complex global business environment have increased dramatically over the years (e.g. Smith Report, 2003). The UK Code (2010) recommends that audit committees should review the significant financial reporting issues and judgments made in connection with the preparation of the firm's financial

statements, interim reports, preliminary announcements and related formal statements. This responsibility extends to such statements as the Operating and Financial Review (OFR), which is a highly IC related document. Consistent with this, recent evidence shows that the audit committee plays an important role in the assurance of social and environmental reporting (Jones & Solomon, 2010), which overlaps with IC disclosure (see e.g. Cordazzo, 2005). Beattie, Fearnley, and Hines (2008) report on the increasing focus on intangible asset issues by the audit committee chairman, thus stressing the increasing importance of IC and its related information at the board and audit committee levels.

### **3.1 Audit Committee Characteristics**

It has been argued that the effectiveness of the audit committee is enhanced when the audit committee is well resourced, independent and has members with financial expertise (see Smith Report, 2003; Mangena & Pike, 2005; Karamanou & Vafeas, 2005). In this section, we develop hypotheses regarding the effect of five audit committee characteristics (size, frequency of meetings, independence, audit committee directors' shareholding, and financial expertise) on IC disclosure practices.

#### ***3.1.1 Size of Audit Committee (SAC)***

In order to perform their role effectively, audit committees should have adequate resources and authority to discharge their increasing responsibilities (DeFond & Francis, 2005; Mangena & Pike, 2005; FRC, 2008). Bédard et al. (2004) argue that the larger the audit committee, the more likely it is to uncover and resolve potential problems in the financial reporting process, because it is likely to provide the necessary strength and diversity of views and expertise to ensure effective monitoring. This suggests that audit committee size is an integral factor for firms in delivering meaningful corporate reporting (Klein, 2002). However, it can also be argued that as the number of audit committee members increases, each may be comforted by the presence of others and free riders emerge (Klein, 2002; Karamanou & Vafeas, 2005). In

addition, larger audit committees are also likely to suffer from process losses and diffusion of responsibility (Karamanou & Vafeas, 2005).

The Smith Report (2003) recommends a minimum of three non-executive directors. Empirically, the evidence is mixed. Some studies find audit committee size to be associated with lower earnings management (e.g. Yang & Krishnan, 2005; Cornett, McNutt, & Tehranian, 2009), whilst others fail to find a significant relationship with financial reporting issues (e.g. Bédard et al., 2004) and voluntary disclosure in interim reports (Mangena & Pike, 2005). Given the mixed results, we do not predict a direction and hypothesise that:

*H1: There is a relationship between the level of IC disclosure and audit committee size, ceteris paribus.*

### **3.1.2 Frequency of Audit Committee Meetings (MAC)**

Karamanou and Vafeas (2005) argue that audit committees that meet more frequently means they have more time to perform the role of monitoring the corporate reporting process more efficiently. Yang and Krishnan (2005) opine that inactive audit committees are unlikely to monitor management effectively because it may be difficult for a small group of outsiders to detect fraud or accounting irregularities in a large, complex corporation in such a short time. In this case, adequate meeting time by the audit committee should be devoted to the consideration of major issues (e.g. Smith Report, 2003; Raghunandan & Rama, 2007) and this also sends a signal of the committee's intention to remain informed and vigilant (McMullen & Raghunandan, 1996). For this reason, the FRC (2008: 6) states that 'Sufficient time should be allowed to enable the audit committee to undertake as full a discussion as may be required' and that 'Formal meetings of the audit committee are the heart of its work'. The FRC (2008) recommends that audit committees should hold a minimum of three or four meetings a year.

Prior studies find an impact of frequency of audit committee meetings on financial reporting issues such as earnings restatement (e.g. McMullen & Raghunandan, 1996), earnings

management (e.g. Cornett et al., 2009) and internet financial reporting (Kelton & Yang, 2008). We also expect that audit committees that meet more frequently have greater influence in overseeing IC disclosure practice, and therefore hypothesise that:

*H2: There is a positive relationship between the level of IC disclosure and frequency of audit committee meetings, ceteris paribus.*

### **3.1.3 Audit Committee Independence (INED\_AC)**

The notion that audit committee independence is important for its effectiveness draws from the widely accepted notion that independent directors are more likely to be effective monitors of management actions (e.g. Fama & Jensen, 1983). According to Carcello and Neal (2003) and Mangena and Pike (2005), independent audit committees are more likely to be free from management influence. Hence, they will ensure the quality and credibility of the reporting process, thus reducing information asymmetry. Since IC information plays an important role in the share valuation activities of the stock market (see Holland, 2003; Aboody & Lev, 2000), an independent audit committee would enhance the provision of such information for the benefit of the investors. The UK Code (2010) recommends that an audit committee should be comprised of at least three (or in the case of smaller companies, two) members, who should all be independent non-executive directors.

On the empirical front, evidence is mixed. Some studies find the degree of audit committee independence to be positively associated with financial reporting quality (e.g. Mangena & Tauringana, 2007). Others find that firms with audit committees composed solely of outside directors are less likely to have financial reporting problems (e.g. McMullen & Raghunandan, 1996). Yet others fail to find a significant effect of audit committee independence (e.g. Yang & Krishnan, 2005; Agrawal & Chadha, 2005; Bassett, Koh, & Tuticci, 2007). In spite of the mixed results, we expect a positive relationship between audit committee independence and IC disclosure. Our rationale for this is that unlike other disclosures that are regulated, IC reporting

is largely unregulated. This creates greater information asymmetry about IC information (Aboody & Lev, 2000; Holland, 2003) and opportunities for increased moral hazard, adverse selection and other opportunistic behaviour by managers (Aboody & Lev, 2000). To the extent that independent directors monitor managers effectively, we expect the independent audit committees to influence disclosure positively. Therefore, we hypothesise that:

*H3: There is a positive relationship between the level of IC disclosure and the independence of audit committees, ceteris paribus.*

### **3.1.4 Audit Committee Directors' Shareholding (ADISH)**

The arguments on the effect of stock ownership by audit committee members are twofold. On the one hand, in line with agency theory, directors with high stock ownership should have interests that are more aligned with shareholders and may have stronger incentives to monitor the management (e.g. Karamanou & Vafeas, 2005; Mangena & Pike, 2005; Sun, Cahan, & Emanuel, 2009).<sup>4</sup> On the other hand, excessive director shareholding could lead to entrenchment. In this case, high shareholdings by audit committee members may weaken their independence and oversight ability; cause them to act in their own interest at the expense of other shareholders; and hence affect their effectiveness (e.g. Mangena & Pike, 2005).

Yang and Krishnan (2005) find a positive association between stock ownership by independent audit committee directors and quarterly earnings management. Mangena and Pike (2005) report a significant negative relationship between disclosure in interim reports and audit committee directors' shareholding. Cullinan, Du, and Wright (2008) find that companies with independent directors that do not receive stock options are less likely to misstate revenues. Other studies find a relation between audit committee directors' shareholding and auditor dismissal (e.g. Bronson, Carcello, Hollingsworth, & Neal, 2009). These results suggest that higher share ownership by audit committee members is detrimental to its effective monitoring.

<sup>4</sup> Sun et al. (2009) find that CEO stock option grants generate higher future operating income if directors who sit on the compensation committee hold more shares of that firm. Klein (2002) documents a negative association between earnings management and the proportion of blockholders on the audit committee. Others find that the greater the proportion of share ownership held by independent directors, the less likely firms will commit fraud (Beasley, 1996).

The recommendation by the UK Code (2010: 22) that ‘Remuneration for non-executive directors should not include share options or other performance-related elements. ... Holding of share options could be relevant to the determination of a non-executive directors’ independence’ also suggests that greater share ownership may compromise the independence of the audit committee. We therefore hypothesise the following:

*H4: There is a negative relationship between the level of IC disclosure and the level of audit committee directors’ shareholding, ceteris paribus.*

### **3.1.5 Audit Committee Financial Expertise (FEXP\_AC)**

The need for the audit committee to be composed of members with financial expertise was emphasised in the Smith Report (2003). Consequently, the UK Code (2010) has recommended that the audit committee should comprise members with knowledge of the business environment, and, at least one audit committee member should have recent and relevant financial experience. The rationale for this is that financial expertise will support the audit committee members to better understand auditor judgements and discern the substance of disagreements between management and external auditors (Mangena & Pike, 2005; Raghunandan & Rama, 2007). In addition, it will improve audit committee effectiveness in identifying and asking questions that ‘make management think harder and auditors dig deeper’ (Levitt, 2000). Knapp (1987) contends that if the audit committee does not possess the expertise to understand technical auditing and corporate reporting issues, its oversight role is likely to be discounted by the auditor and management. This would undermine the effectiveness of the audit committee in the financial reporting process.

We argue that in the context of IC disclosure, the audit committee with financial expertise is likely to be in a better position to understand the capital market implications of providing quality IC disclosures, particularly in helping investors’ share valuation processes. Such understanding by the audit committee should lead to improvement in IC disclosure in order to communicate information on firms’ value creating processes. As Beattie and Thomson (2010)

document, the incentive for directors in disclosing IC information is to support the valuation activities of the stock market participants. Prior empirical studies indicate a negative relation between financial expertise and financial statements fraud (e.g. Abbott, Park, & Parker, 2000), earnings management (Klein, 2002), dismissal of auditors after issuing a going-concern report (Carcello & Neal, 2003), and a positive relationship with disclosure (e.g. Mangena & Pike, 2005; Mangena & Taurigana, 2007). This leads us to the following hypothesis:

*H5: There is a positive relationship between the level of IC disclosure and financial expertise on the audit committee, ceteris paribus.*

### **3.2 Control Variables**

To test the hypotheses, we control for a number of other variables. First, Klein (2002) argues that audit committee independence and effectiveness are embedded within the larger board, and it is important to control for overall board independence. As Beasley (1996) documents, the presence of the audit committee does not affect the likelihood of fraud, but the proportion of non-executive directors has a significant negative effect. Board independence is found to be negatively associated with earnings management (e.g. Klein, 2002; Cornett et al., 2009) and positively associated with corporate disclosures (e.g. Cheng & Courtenay, 2006; Patelli & Prencipe, 2007). Previous studies examining IC disclosure (e.g. Cerbioni & Parbonetti, 2007; White et al., 2007; Li et al., 2008) have found a positive relationship between board independence and IC disclosure. Thus, we predict a positive relationship. Second, the agency theory suggests that large outside blockholders have greater incentives to monitor managers (Agrawal & Chadha, 2005) and firms with closely-held ownership are expected to have less information asymmetry between management and dominant shareholders who have access to the information they need, especially IC information (Cormier, Magnan, & Van Velthoven, 2005; Holland, 2006b). We therefore expect a negative relationship between IC disclosure and share ownership concentration. Third, we also control for firm size, which has consistently

been found to be associated with disclosure (see Mangena & Pike, 2005; Li et al., 2008). Fourth, listing age (period of listing) has also been found to be associated with disclosure (Li et al., 2008). The rationale for this is that the information asymmetry is likely to be higher for younger (or newly) listed firms (Singh & Van der Zahn, 2008) leading to higher agency costs (Jurkus, Park, & Woodard, 2011). Thus, our expectation is that younger listed firms will provide greater levels of IC disclosure to reduce the scepticism and boost confidence of investors who may perceive them as more risky (Haniffa & Cooke, 2002; Bozzolan et al., 2003). Finally, profitability may be the result of continuous investment in IC and firms may engage in higher disclosure of such information to signal the quality of their decisions in investing for long-term growth in the value of the firm. We therefore expect a positive relationship between profitability and the level of IC disclosure.

## **4 Research Design**

### ***4.1 Sample Selection***

The sample of this study is limited to UK IC-intensive sector companies that are fully listed on the London Stock Exchange (LSE). The sectors considered to be IC-intensive are pharmaceuticals & biotechnology, IT, media & publishing, business services providers, telecommunications, banking & insurance, and food production & beverage (see also Guthrie, Petty, & Ricceri, 2007; Striukova et al., 2008; Mangena et al., 2010). The choice of these sectors derives from the fact that the existing financial reporting model is not suited for IC-intensive sectors (Amir & Lev, 1996; Francis & Schipper, 1999) and therefore, the role of IC information in the valuation processes of stock market participants is particularly critical for companies in these sectors. Consequently, we expect the role of the audit committee in enhancing IC disclosure to be much more important in these firms in order to address the critical information asymmetries caused by the weaknesses in the financial reporting model. The population size for the seven IC-intensive sectors on the LSE was 319 companies, from



which a sample of 100 was selected.<sup>5</sup> The sample was considered appropriate for the regression model which contains 10 independent variables (see Section 4.3). Stevens (1996) suggests that for each independent variable, there must be a minimum of 10 observations.

To select the sample, we apply proportionate stratified sampling (Moser & Kalton, 1996) to ensure that we build a sample that is representative of the sectors selected and the size of the firms.<sup>6</sup> We considered that as the number of firms in each industry group is not the same (see Table 1, column A), simple random sampling will not be able to ensure this objective. The number of companies required from each of the seven sectors was computed and is shown in Table 1, column C.

[Table 1 insert here]

To ensure that our sample includes both large and small firms, we first ranked companies in each sector by market capitalisation. We then systematically select one firm from every three firms in each industry grouping.

## 4.2 IC Disclosure Measures

The IC disclosure measures were developed from the annual reports published in the financial year-ends ranging from March 2004 to February 2005. The choice for this period was driven by the desire to eliminate the possible disclosure effects of the OFR requirements, which were to become effective early 2005.<sup>7</sup> We took the view that using annual reports published prior to,

In determining the sample of 100 firms, we apply the formula suggested in Moser and Kalton (1996), i.e.  $n = \pi(1-\pi)/[S.E. (p)]^2$ , where  $n$  = required sample size;  $\pi$  = proportion of the particular attribute in the population (estimated at 50/50); and  $S.E. (p)$  = the standard error that is allowed for the study (set at 5%). If the variability in the population (proportion with particular attribute in the population) is estimated at 50%, a value that is always assumed to be the maximum variance, with standard error of 5%, the sample size is 100. The sample size was considered appropriate for the number of variables included in the regression model.

Based on stratified sampling, the population is divided into two or more relevant and significant strata based on one or a number of attributes (Moser & Kalton, 1996). A sample is then selected from each stratum separately, producing a stratified sample. The two main reasons for stratified sampling design are 1) to ensure that particular groups within a population are adequately represented in the sample, and 2) to improve efficiency by gaining greater control on the composition of the sample and greater precision can be achieved. The sample size is usually proportionate to the relative size of the strata.

The statutory requirement for quoted companies to publish an OFR for financial years beginning on or after 1 April 2005 was repealed in January 2006. Requirements of OFR cover some of the issues relevant to IC, particularly human and relational capital. Although OFR requirements were repealed, companies are now required to include Business Review in the Director's Report, which is a reduced version of OFR. It requires quoted companies to include information about 'environmental matters, the company's employees, and social and community issues' (Companies Act, 2006, 417, 5b) and analysis using financial and other key performance indicators (KPI) (Companies Act, 2006, 417, 6a&b). However, both the EU AMD (2003) and Companies Act (2006) do not stipulate any particular KPIs and issues related to employee, environment and social and community, that companies have to include in the business review. Hence, the selection of KPIs and issues to be discussed in the review are at the discretion of the directors (Taurigana & Mangena, 2009).

instead of after the mandatory OFR, allows a clearer determination of voluntary IC disclosure and would result in greater variations in the IC disclosure measure. Variation is necessary in regressions examining disclosure (Gietzmann & Ireland, 2005). We do not believe the use of this data would in any way effect the significance of the subsequent findings, because our focus is to investigate the effect of audit committee characteristics on IC reporting instead of how much IC information is disclosed in the annual reports.

Although there are various other communication channels, such as the corporate website and analyst presentations, the use of the annual report to measure corporate disclosure is widely adopted and well justified in the literature. For example, annual reports are regularly and consistently produced and widely distributed by listed firms, given their mandatory nature (Gray, Kouhy, & Lavers, 1995) and are the main channel by which firms communicate with investors and other stakeholders (Bozzolan et al., 2003). Moreover, the majority of previous studies have taken the view that the annual report offers a relevant and useful proxy for the level of corporate disclosure provided by a firm along all disclosure avenues (Lang & Lundholm, 1993).

To measure IC disclosure, we employ content analysis, a method that has been applied by prior studies in measuring IC disclosure (Beattie & Thomson, 2007; Li et al., 2008). We apply the 61-item IC disclosure checklist developed by Li et al. (2008), which was also for a sample of UK companies. All the items in the checklist were voluntary for the period covered by this study. Compared to other studies (Brennan, 2001; Guthrie et al., 2007), Li et al. (2008) provides the most comprehensive checklist divided into human, structural and relational items (see Appendix A). The scoring of the IC research instruments was performed manually covering the whole annual report. Our scoring approach is such that each IC item is scored based on three presentational formats (i.e. text, numerical and graphical/pictorial), and receives

a maximum of three points.<sup>8</sup> This means that a firm can score a maximum of 183 points (i.e. 61 IC items x 3 formats). All items are equally weighted because weighting does not influence the results of regression analysis (see Haniffa & Cooke, 2002; Mangena & Pike, 2005). After scoring all the 61 IC items in the three presentational formats, the IC disclosure score(s) for each company are computed as an index by dividing the sum of items disclosed (adding all the 1s) by the total number of items expected (total count of all the 1s and 0s) (see also Haniffa & Cooke, 2002). For each company, we created four disclosure indices to capture the overall IC (ICDI), human capital (HIC), structural capital (SIC) and relational capital (RIC) disclosure.

The scoring process was mainly completed by one researcher interacting with the document. This raises questions about reliability of the scores in that they may only reflect that person's conception of reality (Gray et al., 1995), rather than any potential objective reality that exists in relation to IC disclosure (Beattie & Thomson, 2007). Therefore, eight annual reports were randomly selected and recoded by another two independent coders. Krippendorff's (1980) alpha was computed to test for reliability because it can account for chance agreement among multiple coders. The independent scores (not tabulated) are all above the minimum 80% threshold considered reliable for content analysis (Riffe, Lacy, & Fico, 2005).

### **4.3 Models**

Multiple regression analysis is used to test the relationship between IC disclosure and the audit committee characteristics and control variables. We run the following regression model separately for the overall IC disclosure (ICDI), human capital disclosure (HICDI), structural capital disclosure (SICDI) and relational capital disclosure (RICDI) indices.

$$\begin{aligned}
 \text{IC Disclosure} &= \beta_0 + \beta_1 \text{SAC} + \beta_2 \text{MAC}_i + \beta_3 \text{INED\_AC} + \beta_4 \text{LnADISH} + \beta_5 \text{FEXPAC} + \\
 &\quad \beta_6 \text{INED} + \beta_7 \text{SqSCON} + \beta_8 \text{LnAGE} + \beta_9 \text{ROA} + \beta_{10} \text{LnSA} + \varepsilon_i
 \end{aligned}$$

The approach we adopt in scoring is essentially dichotomous in that an item (i.e. each of the three presentational formats of an IC item) scores 1 if disclosed and 0 if it is not.

All variables are as defined in Table 2.

[Table 2 insert here]

## 5 Empirical Results

### 5.1 Descriptive analysis

Table 3, Panel A presents the descriptive statistics of IC disclosure indices, at the overall, component and industry sector level.<sup>9</sup> Consistent with prior studies (e.g. Brennan, 2001; Bozzolan et al., 2003; Striukova et al., 2008) the level of IC disclosure is low. The mean index for overall IC disclosure is 0.36 (ranging from 0.16 to 0.56) (i.e. 36% of 183 format items were disclosed). As for the components of IC, firms appear to provide slightly greater structural capital information at 37.1% than both relational capital and human capital disclosures at 36.5% and 35.5%, respectively. At the industry sector level, we observe that the banking and insurance sector provides the highest level of IC disclosure whilst the IT sector provides the lowest. However, the Kruskal-Wallis test shows no significant difference in IC disclosure scores among the seven sectors indicating that for our sample of firms, the industry sector does not influence the level of IC disclosure.<sup>10</sup>

[Table 3 insert here]

In Panel B, the summary descriptive statistics for the independent variables are presented. Focusing on the audit committee, the mean of audit committee size is approximately three members, consistent with the recommendations of the UK Code (2010). We observe that audit committees meet, on the average, about four times per year. The average proportion of independent audit committees is 85%, suggesting that audit committees in the majority of firms are comprised of members who are independent. In terms of share ownership, the mean audit

For industry, we only provide the descriptive statistics for the overall IC disclosure for easy and clear presentational purposes. Later in our regression analysis, we also include the industry dummy variables in the model, and find that none of the industries are significant. Our main results are not significantly affected.

committee shareholding is 1.6%, ranging from a minimum of 0% to a maximum of 51.4%.<sup>11</sup> On the whole, we observe that 59% of the sample firms have audit committees comprised solely by independent non-executive directors.

In terms of the control variables, the statistics show that the mean for the significant shareholding is 29.6% and board independence is 47.5% suggesting non-compliance with the recommendation of the UK code (2010) for at least half of the board to be independent non-executive directors.<sup>12</sup> The mean size of the firm is £4,036.7 million and the average listing age is 17 years, whilst the average profitability is 4.4%.

## **5.2 Multiple Regression Results**

Prior to running the multiple regression analysis, we first examine our data to detect violations of normality and also examine whether multicollinearity was a problem among independent variables. We find that, whilst all the dependent variables are normally distributed, based on both standard tests on skewness and kurtosis and Kolmogorov-Smirnov (K-S) Lilliefors test,<sup>13</sup> some of the independent variables (i.e. audit committee directors' shareholding, share ownership concentration, listing age and firm size) are not. These were transformed using the natural log and square root transformations.<sup>14</sup> For multicollinearity, we examine the correlations among the independent variables. In Table 4, we present the correlation and partial correlation (controlling for firm size) matrices between the dependent and independent variables. It can be seen from Panel A of Table 4 that independent variable associations are all below 0.70.<sup>15</sup> Table 4 Panel B reveals no multicollinearity among independent variables after controlling for firm size, with all independent variable associations below 0.35. We also

<sup>11</sup> There are six firms in which the chairman of the board, who also sits on the audit committee, has a significant amount of shareholding. An extreme case is where the chairman held 45.8% of the firm's shares. In these firms, the audit committee shareholding ranges between 3% and 51.4%. These firms appear to be smaller firms. If we exclude these firms, the mean audit committee shareholding is about 0.3%.

<sup>12</sup> However, smaller firms can have at least two independent non-executive directors.

<sup>13</sup> K-S Lilliefors with significance of  $>0.05$  indicate normality (Belsley, Kuh, & Welsch, 1980).

<sup>14</sup> Audit committee directors' shareholding, listing age and firm size are transformed using natural log transformation (i.e. LnADISH, LnAGE, LnSA), whereas square root transformation is more effective for share concentration (SqSCON). The transformed variables all indicate normality of distribution (not tabulated).

<sup>15</sup> The 'rule of thumb' for checking problems of multicollinearity using a correlation matrix is when the correlation is  $>0.80$  (Belsley et al., 1980). The correlation coefficient of -0.663 between LnSA and LnADISH is the highest amongst all, which is still within the threshold. Audit committee directors' shareholding is considered to be an important characteristic that could affect the effective functioning of the committee, and hence is included in the analysis.

examine the variation inflation factors (VIF) and find that they are all less than 3 (see Table 5), suggesting that multicollinearity is not a problem.<sup>16</sup>

[Table 4 insert here]

In Table 5, the regression results of the relationship between the audit committee characteristics and IC disclosure are presented (Models 1-4). Model 1 presents the results of the overall IC disclosure (ICDI) model, whilst Models 2, 3 and 4 present the results for the individual components of IC disclosure, that is, human capital (HICDI), structural capital (SICDI) and relational capital (RICDI) disclosure, respectively. All the models have significant explanatory power. The adjusted R<sup>2</sup>s range from a lower of 40.8% for human capital disclosure to the highest of 63.1% for the overall IC disclosure.

[Table 5 insert here]

In respect to our main variables, the results show that audit committee size (SAC) is significantly and positively associated with the overall IC disclosure and all three IC disclosure components at the 5% level. Thus our hypothesis H1 is supported. This is consistent with findings from Yang and Krishnan (2005) and Cornett et al. (2009) on earnings management, but contradict Bédard et al. (2004) and Mangena and Pike (2005) on financial reporting quality. Nonetheless, these findings support the argument that when audit committees are well resourced, their effectiveness is enhanced (DeFond & Francis, 2005; FRC, 2008). In this case, we argue that larger audit committee means the ability to effectively oversee the information provided in documents such as the OFR (Smith Report, 2003), which typically has a strong IC disclosure emphasis, is improved.

The frequency of audit committee meetings (MAC) is positively associated with overall IC disclosure and structural capital and relational capital disclosure at the 5% level, thus supporting hypothesis H2. The frequency of audit committee meetings has also been found to

<sup>16</sup> Previous authors suggest multicollinearity becomes a serious problem where VIFs exceed 10 (Belsley et al., 1980). Further, the condition indexes, using eigenvalues of the independent variables correlation matrix, were also acceptable with all being below 30.

be associated with more management earnings forecasts (Karamanou & Vafeas, 2005), less earnings management (Cornett et al., 2009) and earnings restatement (McMullen & Raghunandan, 1996). The results imply that audit committee activity is an important factor in enhancing IC disclosure in order to reduce information asymmetry. These results are consistent with corporate governance recommendations (e.g. UK Code, 2010) that the audit committee should meet more frequently. More frequent meeting would mean high-level oversight of all corporate reporting issues, including IC disclosure. However, we do not find a significant relationship between human capital disclosure and frequency of audit committee meetings. This is puzzling, but it is possible that structural and relational capital related issues require more time for discussion than human capital related issues.

We observe that audit committee independence (INED\_AC) is not significantly associated with any of the IC disclosure indices. These results are inconsistent with our prior expectations in hypothesis H3 and contradict other previous studies (e.g. Mangena and Taurigana, 2007), showing a positive relationship between audit committee independence and corporate compliance with non-mandatory best practice statements. However, the results support the findings of Yang and Krishnan (2005), Agrawal and Chadha (2005), and Bassett et al. (2007), who also fail to detect a significant relationship. These findings suggest that audit committee independence does not affect IC disclosure. We observe that although not significant, the direction of the relationship is negative for overall IC disclosure, structural and relational capital disclosure, but positive for human capital disclosure. One possible explanation is that independent audit committees may be more mindful of avoiding releasing proprietary information to competitors.<sup>17</sup>

The results for audit committee directors' shareholding (LnADISH) are negative and

<sup>17</sup> For example, information relating to structural capital (such as intellectual property, research and development) and relational capital (such as customers, distribution channels, favourite contracts) may be used by competitors. However, for human capital, independent audit committee members may encourage disclosure as a public relation tool in order to attract quality employees as well as retaining existing employees.

significant at the 5% level, but only for the overall IC disclosure and structural capital disclosure, thus hypothesis H4 is supported for these two indices.<sup>18</sup> The relationship between human and relational capital disclosure indices and audit committee shareholding is not significant. The negative results, for overall IC disclosure and structural capital disclosure, are consistent with previous studies (e.g. Mangena & Pike, 2005; Yang & Krishnan, 2005) and suggest that greater IC disclosure is less likely when audit committee members hold greater shareholding. This means that share ownership compromises the audit committee's independence and therefore their motivation to effectively monitor the reporting processes. The implication of this is that greater share ownership by audit committee directors is undesirable, thus supporting the UK Code (2010) recommendation that remuneration for non-executive directors should not include share options or other performance-related elements. We suggest that in measuring the independence of the audit committee, it is important to consider the level of shareholding of the audit committee members than merely considering the proportion of independent non-executive directors on the audit committee.

Finally, the relationship between audit committee financial expertise (FEXP\_AC) and IC disclosure is negative and significant at the 10% level, but only for structural capital disclosure. Hence, hypothesis H4 is not supported. These results are surprising and do not support previous studies showing a negative relationship with earnings management (Klein, 2002) and dismissal of auditors after issuing a going-concern report (Carcello & Neal, 2003), and a positive relationship with disclosure (e.g. Mangena & Pike, 2005; Mangena & Taurigana, 2007). The findings also do not support the Smith Report (2003) and UK Code's (2010) recommendations that the audit committee should have members with financial expertise. It is possible that financial expertise is relevant for financial related issues than for IC reporting issues.

<sup>18</sup> We re-run the regression with a reduced number of firms by excluding six firms in which the audit committee share ownership is too high, i.e. firms with individual audit committee members holding > 3% of ordinary shares. The results are maintained.



In terms of the control variables, we find that board independence (INED) is positively associated with structural capital disclosure at the 5% level, and only at the 10% level with overall IC and relational capital disclosure. No significant relationship is detected for human capital disclosure. The positive association is generally consistent with the previous findings on IC disclosures (e.g. Cerbioni & Parbonetti, 2007; White et al., 2007), suggesting the presence of independent non-executive directors on the board improves the monitoring of management actions. Share ownership concentration (SqSCON) shows a significant negative association with overall IC disclosure and structural capital disclosure at the 5% level, but no significant relationship with relational and human capital disclosure. The negative coefficients suggest that enhanced IC disclosure is less likely in firms with higher share ownership concentration. The results are consistent with prior studies (e.g. Cormier et al., 2005; Patelli & Prencipe, 2007). A possible reason is that large shareholders obtain the information in private meetings (see Holland, 2003) and therefore would not demand firms to enhance public disclosure of the information. We also find that listing age (LnAGE) is negatively and significantly associated with overall IC disclosure, human capital disclosure and relational capital disclosure at the 5% level. This provides evidence for signalling theory in that younger listed firms are more inclined to provide IC disclosure to help reduce uncertainty and lower the cost of capital (see Singh & Van der Zahn, 2008). Profitability (ROA) shows a significant positive association with overall IC disclosure and relational capital disclosure at the 5% level and with structural capital disclosure at the 10% level. The finding adds to the literature on profitability effect on IC disclosure (e.g. García-Meca & Martínez, 2005; Cerbioni & Parbonetti, 2007). Finally, as would be expected, firm size (LnSA) shows a significant positive relationship with all IC disclosure indices, except structural capital, at the 1% level.

### **5.3 Sensitivity Analysis**

Taken overall, our results suggest that audit committee characteristics of size, frequency of

meetings and committee directors' shareholding are related to IC disclosure, but audit committee independence and financial expertise are not significantly related to IC disclosure. We conduct additional analyses to check the robustness of our results. However, we run these robustness tests on overall IC disclosure only. The results of the additional analyses are presented in Table 6.

[Table 6 insert here]

In Model 5, we conduct the analysis by introducing an alternative measure of audit committee independence, measured as a dummy variable taking the value of 1 if the committee is comprised solely of independent non-executive directors and 0 otherwise (INED\_AC\_Dum) (e.g. Bédard et al., 2004). DeFond and Francis (2005) argue that the extant literature does not address whether 100% independent audit committees improve governance beyond simply having a high proportion of independent members, while Bronson et al. (2009) argue that the benefits of audit committee independence are consistently achieved only when the audit committees are completely independent. Using the alternative dummy measure does not alter our results.<sup>19</sup> In Model 6, we introduce an additional variable, company chairman on audit committee (CHAC), in the regression analysis. The Smith Report (2003: para. 3.2) recommends that 'the chairman of the company should not be an audit committee member'.<sup>20</sup> We expect that the presence of the company chairman on an audit committee dilutes its independence and effectiveness. We measure CHAC as a dummy variable taking the value of 1 if chairman of the board sits on the audit committee and 0 otherwise. The introduction of CHAC does not alter the original results and CHAC shows no significant association with IC disclosure. We also include board size (BSZ) in the model (see Model 7). Cerbioni and Parbonetti (2007) find board size to be negatively associated with IC disclosures. We do not

<sup>19</sup> We also split the sample by the mean score of audit committee independence (i.e. 0.848). A firm scores 1 if 84.8% or more of their audit committee members are independent and 0 otherwise. The regression results for this measure are the same to that of INED\_AC\_Dum.

<sup>20</sup> This recommendation was later amended in the Combined Code (2008) to allow chairmen of smaller listed firms to be members of the audit committee if they were considered independent on appointment.

find a significant relationship between board size and IC disclosure and our original results are also not affected by the introduction of board size in the regression model. Finally, we introduce both BSZ and CHAC in one model (see Model 8) and our results remain largely the same. These additional analyses suggest that our results are robust to alternative measures and to the inclusion of additional variables.

## **6 Summary and Conclusions**

The audit committee is a sub-committee of the board with the key responsibility for monitoring the corporate reporting processes in order to support the overall board's monitoring role of management actions. In this respect, the audit committee's role is not only about the financial reporting process, but it extends to the reporting of non-financial information including IC information. To the extent that IC information is important for the valuation of the firm's shares, we argue that the audit committee would influence its disclosure to the stock market to reduce the acute information asymmetry associated with the value creation capabilities of IC assets. Consequently, in this paper we examine the role of the audit committee in enhancing the disclosure of IC information in the annual reports of UK listed IC-intensive firms. Specifically, we investigate the relationship between audit committee characteristics and IC disclosure. We find audit committee size and frequency of audit committee meetings to be positively related to IC disclosure. We also find that audit committee directors' shareholding is negatively related to the level of IC disclosure. Except for audit committee size, the results are mixed for the components of IC disclosure: human capital, structural capital and relational capital disclosure. Surprisingly, we find no significant relationship between IC disclosure and audit committee independence and financial expertise. However, on the whole the results are consistent with the notion that the role of audit committees in monitoring the corporate reporting processes extends to non-financial information such as IC disclosure. Additionally, the effectiveness of the audit committee is dependent on its resources in terms of size and frequency of meetings and the level of committee members' share ownership. Higher share ownership by audit

committee members could be detrimental to the monitoring of the corporate reporting processes by the audit committee.

Our study makes important contributions to the literature. First, we contribute to the limited UK evidence on factors that affect IC disclosure, and in particular we offer the first evidence in the UK on a systematic review of the effect of audit committee characteristics on IC disclosure. Second, we offer evidence on the effect of audit committee characteristics on IC disclosure at the IC component level. The findings of our study have important implications for policy-makers who have a responsibility to ensure that shareholders are protected by prescribing appropriate corporate governance structures and accounting regulations/guidelines. They confirm the recommendations of the codes of corporate governance in different countries that audit committees have a critical role in monitoring corporate reporting and therefore reducing information asymmetries. In addition, they confirm the importance of providing adequate resources to the audit committee and to ensure its independence in executing its key responsibility of overseeing the corporate reporting processes.

The findings must be interpreted in the context of a number of limitations. First of all, the study measures IC disclosure in annual reports, yet there are other media in which information is disclosed. It would be interesting to consider different media such as the website, analyst presentations, etc. to provide wide coverage of IC information. Second, the study examines a limited number of factors, and there may be other factors that affect IC disclosure practices that have not been examined in this study. For example, the engagement between the audit committee and external auditors can be an important factor that affects disclosure. Future studies could usefully explore this avenue. Third, the study suffers from the usual limitations of similar studies in that they do not address issues relating to the processes by which the board or audit committee influences disclosure decisions. Future studies could interview board members to understand how they influence corporate reporting practices. Finally, the study

focuses on industry sectors considered to be IC-intensive only, which does not reflect the practice of all LSE-listed UK firms.

Table 1 Number of Samples by Industry Sector

	<b>Industry Category</b>	<b>Population of Firms</b>	<b>% of total population</b>	<b>Sample</b>
1	Biotechnology & Pharmaceutical (BPH)	40	12.5%	13
2	Information Technology (IT)	60	18.8%	19
3	Media & Publishing (M&P)	45	14.1%	14
4	Business Services Providers (BSP)	83	26.0%	26
5	Telecommunication Services (Telecom)	18	5.6%	6
6	Banks & Insurance (B&I)	51	16.0%	15
7	Food Production & Beverage (F&Bev)	22	6.9%	7
<b>Total</b>		<b>319</b>	<b>100%</b>	<b>100</b>

Table 2 Dependent and Independent Variables, Measurement and Source of Information

Variable		Operationalisation	Source	Acronym
<b>Panel A Dependent Variables</b>				
<b>IC disclosure index</b>	IC Disclosure in three presentational formats	The 61 IC items in the research instrument are scored in three presentational formats, i.e. text, numerical and graphical/pictorial, producing a total of 183 format items. The overall IC disclosure index (ICDI) is computed as the number of format items disclosed in the annual report divided by 183. The overall disclosure index is split into its three components: human capital disclosure (HICDI), structural capital disclosure (SICDI) and relational capital disclosure (RICDI).	Annual report (AR)	ICDI HICDI SICDI RICDI
<b>Panel B Independent Variables</b>				
<b>Audit committee characteristics</b>	Size of audit committee	Number of board directors on the audit committee as at the financial year end.	AR	SAC
	Frequency of audit committee meetings	Number of audit committee meetings held during the financial year of study.	AR	MAC
	Audit committee independence	Number of independent non-executive directors on the audit committee (specified in the annual report) divided by the total number of directors on the audit committee at the end of the financial year. (%)	AR	INED AC
	Audit committee directors' shareholding	Percentage cumulative shareholdings by audit committee directors to total number of outstanding ordinary shares at the financial year end. (%)	AR	ADISH
	Audit committee financial expertise	Dummy variable with a value of 1 if one or more audit committee members have financial expertise and 0 otherwise.	AR	FEXP AC
<b>Control variables</b>	Share ownership concentration	Percentage cumulative shareholdings by individuals or organizations classified as substantial shareholders (i.e. owning 3% or more of the firm's share capital), excluding significant directors' shareholdings, to the total number of outstanding ordinary shares at the financial year end. (%)	AR	SCON
	Board independence	Number of independent non-executive directors on board (specified in the annual reports) divided by total number of directors on board at the financial year end. (%)	AR	INED
	Listing age (length of listing on LSE)	Number of days listed scaled by 365 days a year.	LSE website	AGE
	Profitability	Return/ total assets for the financial year of study.	AR	ROA
	Firm size (sales)	Sales revenue of the financial year of study.	AR	SA

Table 3 Descriptive Statistics for Dependent and Independent Variables

		<i>Mean</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>	<i>SD</i>
<b>Panel A - Dependent variables</b>						
Overall IC Disclosure (ICDI)		0.36	0.36	0.16	0.56	0.08
Human Capital Disclosure (HICDI)		0.355	0.348	0.212	0.561	0.073
Structural Capital Disclosure (SICDI)		0.371	0.370	0.130	0.574	0.092
Relational Capital Disclosure (RICDI)		0.365	0.349	0.111	0.667	0.122
Overall IC Disclosure (ICDI) by industry sectors <sup>21</sup>	BPH	0.351	0.310	0.250	0.480	0.076
	IT	0.334	0.330	0.160	0.430	0.064
	M&P	0.372	0.390	0.210	0.550	0.085
	BSP	0.344	0.353	0.220	0.530	0.085
	Telecom	0.389	0.399	0.246	0.508	0.096
	B&I	0.410	0.437	0.273	0.563	0.089
	F&Bev	0.368	0.410	0.257	0.454	0.078
<b>Panel B - Independent variables</b>						
<i>Audit committee characteristics</i>						
Size of audit committee (number) (SAC)		3.46	3	J <sup>22</sup>	7	1.058
Frequency of audit committee meetings (number) (MAC)		3.70	4	1	9	1.411
Audit committee independence (INED_AC) (%)		0.848	1	0	1	0.219
Audit committee directors' shareholding (%) (ADISH)		0.016	0.00033	0.00	0.514	0.068
<i>Other corporate governance factors</i>						
Share ownership concentration (%) (SCON)		0.296	0.261	0	0.792	0.196
Board independence (%) (INED)		0.475	0.500	0.180	0.750	0.125
<i>Firm-specific factors</i>						
Listing age (Years) (AGE)		17.150	10.693	0.449	71.874	16.706
Profitability (%) (ROA)		0.044	0.037	-0.095	0.187	0.058
Firm size (£m) (Sales - SA)		4036.7	383.1	0.00 <sup>23</sup>	39792.2	8782.4

Kruskal-Wallis test was conducted. The Chi-square result is 8.63 ( $p=0.195$ ) suggesting there are no significance differences in IC disclosure among the seven industrial sectors.

One company was recorded to have one member in the audit committee. The company had three members in the audit committee at the beginning of the financial year studied. However, only one member served the full financial year. The member is not an internal auditor, as the company did not have an internal audit function at the time.

The company is an active trading company focusing on R&D. Although there were no sales recorded during 2004 financial year, contracts were signed. The company had a market capitalisation of £46 million in November 2004. Further analysis was conducted by excluding the company; the results (not tabulated) are consistent with those reported in the report.



Table 4 Correlation and Partial Correlation (Controlling for Firm Size) Matrices: Dependent and Non-categorical Independent Variables

	ICDI	HICDI	SICDI	RICDI	SAC	MAC	INEDAC	LnADISH	INED	SqSCON	LnAGE	ROA	LnSA
<b>Panel A – Correlations</b>													
SAC	.511***	.477***	.408***	.480***	1								
MAC	.498***	.336***	.445***	.474***	.283***	1							
INEDAC	.216**	.186*	.231**	.182*	.208**	.223**	1						
LnADISH	-.604***	-.404***	-.544***	-.541***	-.305***	-.437***	-.296***	1					
INED	.340***	.154	.367***	.313***	.234**	.185*	.112	-.337***	1				
SqSCON	.442***	-.297***	-.437***	-.383***	-.167*	-.179*	-.254**	.238**	-.173*	1			
LnAGE	.119	.034	.195*	.089	.265***	.137	.101	-.072	.121	-.118	1		
ROA	.205***	.049	.191*	.209**	.089	.071	-.083	-.019	-.023	-.134	.216**	1	
LnSA	.704***	.621***	.568***	.642***	.485***	.510***	.259***	-.663***	.206**	-.399***	.287***	.082	1
<b>Panel B - Partial Correlations (Control Variable - LnSA)</b>													
SAC	.273***	.256**	.185*	.251**	1								
MAC	.228**	.028	.220**	.222**	.047	1							
INEDAC	.049	.034	.106	.022	.098	.109	1						
LnADISH	-.258***	.013	-.272***	-.201**	.025	-.154	-.0172*	1					
INED	.281***	.034	.310***	.241**	.157	.095	0.062	-.273***	1				
SqSCON	-.248**	-.068	-.279***	-.181*	.033	.031	-.0171*	-.039	-.101	1			
LnAGE	-.122	-.192*	.040	-.130	.150	-.012	0.029	.165	.066	-.004	1		
ROA	.208**	-.003	.176*	.205**	.056	.034	-.0108	.047	-.041	-.111	.201**	1	

\*\*\* Significance at the 1% level or better;    \*\* Significance at the 5% level or better;    \* Significance at the 10% level or better

**Variables**

SAC - size of audit committee; MAC - frequency of audit committee meetings; INED\_AC - audit committee independence; LnADISH - audit committee directors' shareholding (logarithmic transformed); INED - board independence; SqSCON - share ownership concentration (square root transformed); LnAGE - listing age (logarithmic transformed); ROA - return on assets (a proxy for profitability); LnSA - sales (a proxy for firm size) (logarithmic transformed).

All variables are as defined in Table 2

Table 5 Multiple Regression Results: IC Disclosure at both Overall and Component Levels

		<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>
	<b>VIF</b>	<b>ICDI</b>	<b>HICDI</b>	<b>SICDI</b>	<b>RICDI</b>
(Constant)		0.186 (4.872***)	0.247 (6.122***)	0.189 (3.751***)	0.108 (1.705*)
SAC	1.480	0.019 (3.255***)	0.016 (2.588**)	0.015 (2.008**)	0.028 (2.907***)
MAC	1.427	0.009 (2.103**)	0.000 (0.099)	0.011 (2.005**)	0.015 (2.065**)
INED AC	1.195	-0.015 (-0.601)	0.002 (0.092)	-0.003 (-0.083)	-0.025 (-0.597)
LnADISH	2.141	-0.006 (-2.141**)	0.001 (0.536)	-0.008 (-2.425**)	-0.006 (-1.449)
FEXP AC	1.361	-0.020 (-1.218)	0.013 (0.726)	-0.037 (-1.686*)	-0.035 (-1.287)
INED	1.206	0.084 (1.888*)	0.003 (0.062)	0.122 (2.077**)	0.124 (1.679*)
SqSCON	1.374	-0.007 (-2.284**)	-0.003 (-0.867)	-0.009 (-2.342**)	-0.007 (-1.433)
LnAGE	1.294	-0.012 (-2.247**)	-0.012 (-2.13**)	-0.002 (-0.294)	-0.020 (-2.324**)
ROA	1.102	0.002 (2.389**)	0.000 (0.153)	0.002 (1.716*)	0.004 (2.339**)
LnSA	2.822	0.012 (3.49***)	0.015 (4.143***)	0.006 (1.21)	0.018 (2.998***)
R		0.817	0.684	0.727	0.759
R Square		0.668	0.468	0.529	0.576
Adj. R Square		0.631	0.408	0.476	0.528
S.E.		0.050	0.053	0.066	0.084
F		17.925	7.836	9.995	12.078
Sig.		0.000	0.000	0.000	0.000

Absolute value of t-statistics in parentheses.

\*\*\* Significant at the 1% level or better; \*\* Significant at the 5% level or better; \* Significant at the 10% level or better

#### **Variables**

*SAC* - size of audit committee; *MAC* - frequency of audit committee meetings; *INED\_AC* - audit committee independence; *LnADISH* - audit committee directors' shareholding (logarithmic transformed); *INED* - board independence; *SqSCON* - share ownership concentration (square root transformed); *LnAGE* - listing age (logarithmic transformed); *ROA* - return on assets (a proxy for profitability); *LnSA* - sales (a proxy for firm size) (logarithmic transformed).

All variables are as defined in Table 2

Table 6 Multiple Regression Results: Sensitivity Analysis of Audit Committee Independence (INED\_AC\_Dum), Chairman Sitting on Audit Committee (CHAC), and Board Size (BSZ)

	ICDI			
	Model 5	Model 6	Model 7	Model 8
(Constant)	0.180 (5.401***)	0.192 (4.248***)	0.197 (5.011***)	0.200 (4.38***)
SAC	0.018 (3.089***)	0.019 (3.248***)	0.015 (2.285**)	0.015 (2.274**)
MAC	0.009 (2.128**)	0.009 (2.072**)	0.008 (1.962*)	0.008 (1.941*)
INEDAC	-	-0.019 (-0.649)	-0.017 (-0.687)	-0.019 (-0.672)
INED_AC_Dum	-0.012 (-1.039)	-	-	-
LnADISH	-0.006 (-2.245**)	-0.005 (-2.027**)	-0.006 (-2.284**)	-0.006 (-2.181**)
FEXPAC	-0.019 (-1.159)	-0.020 (-1.227)	-0.020 (-1.203)	-0.020 (-1.204)
CHAC	-	-0.004 (-0.26)	-	-0.002 (-0.153)
INED	0.082 (1.855*)	0.085 (1.893*)	0.094 (2.088**)	0.095 (2.081**)
SqSCON	-0.007 (-2.376**)	-0.007 (-2.282**)	-0.007 (-2.286**)	-0.007 (-2.278**)
BSZ	-	-	0.018 (1.143)	0.018 (1.117)
LnAGE	-0.011 (-2.212**)	-0.012 (-2.222**)	-0.011 (-2.185**)	-0.011 (-2.166**)
ROA	0.002 (2.338**)	0.002 (2.354**)	0.002 (2.257**)	0.002 (2.232**)
LnSA	0.013 (3.603***)	0.012 (3.37***)	0.010 (2.723***)	0.010 (2.667***)
R	0.819	0.818	0.820	0.820
R Square	0.671	0.668	0.673	0.673
Adj. R Square	0.634	0.627	0.632	0.628
S.E.	0.050	0.050	0.050	0.050
F	18.141	16.131	16.470	14.932
Sig.	0.000	0.000	0.000	0.000

Absolute value of t-statistics in parentheses.

\*\*\* Significant at the 1% level or better; \*\* Significant at the 5% level or better; \* Significant at the 10% level or better

#### Variables

SAC - size of audit committee; MAC - frequency of audit committee meetings; INED\_AC - audit committee independence; LnADISH - audit committee directors' shareholding (logarithmic transformed); INED - board independence; SqSCON - share ownership concentration (square root transformed); LnAGE - listing age (logarithmic transformed); ROA - return on assets (a proxy for profitability); LnSA - sales (a proxy for firm size) (logarithmic transformed).

All variables are as defined in Table 2

Appendix A Research Instrument - IC Checklist

	<b>Human capital</b>		<b>Relational capital</b>		<b>Structural capital</b>
1	Number of employees	1	Customers	1	Intellectual property
2	Employee age	2	Market presence	2	Process
3	Employee diversity	3	Customer relationships	3	Management philosophy
4	Employee equality	4	Customer acquisition	4	Corporate culture
5	Employee relationship	5	Customer retention	5	Organization flexibility
6	Employee education	6	Customer training & education	6	Organization structure
7	Skills/know-how/expertise/knowledge	7	Customer involvement	7	Organization learning
8	Employee work related competences	8	Company image/reputation	8	Research & development
9	Employee work-related knowledge	9	Company awards	9	Innovation
10	Employee attitudes/behavior	10	Public relation	10	Technology
11	Employee commitments	11	Diffusion & networking	11	Financial dealings
12	Employee motivation	12	Brands	12	Customer support function
13	Employee productivity	13	Distribution channels	13	Knowledge-based infrastructure
14	Employee training	14	Relationship with suppliers	14	Quality management & improvement
15	Vocational qualifications	15	Business collaboration	15	Accreditations (certificate)
16	Employee development	16	Business agreements	16	overall infrastructure/capability
17	Employee flexibility	17	Favourite contract	17	Networking
18	Entrepreneurial spirit	18	Research collaboration	18	Distribution network
19	Employee capabilities	19	Marketing		
20	Employee teamwork	20	Relationship with stakeholders		
21	Employee involvement with community	21	Market leadership		
22	Other employee features				

Source: Li et al. (2008)

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