Influence of Intellectual Capital Investment, Risk, Industry Membership and Corporate Governance Mechanisms on the Voluntary Disclosure of Intellectual Capital by UK Listed Companies

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Abstract

This research examines the cross-sectional effect of intellectual capital investment, financial measures of market and company specific risk, industry membership and corporate governance on the extent of voluntary disclosure of intellectual capital (VDIC) in a sample of 443 FTSE All Share Index company annual reports for the year 2003/2004. The extent of disclosure is measured by a disclosure index (DI) based on intellectual capital (IC) attributes included in the narratives and illustrations of the annual reports. The research predicts that agency costs are mitigated by VDIC and that the benefits of signalling IC may outweigh competitive and proprietary costs that may be more prevalent in innovative and technological companies; furthermore, that effective corporate governance measures enhance VDIC particularly in those companies found to have a higher level of intangible assets (IA) in their resource base. The results suggest that companies associated with less financial risk, reduced debt, higher levels of liquidity and accompanied by growth are characterised with higher levels of VDIC. Although less significant, the results on market risk indicate a positive influence on VDIC. Furthermore, the extent of VDIC in annual reports is enhanced when large companies operating in high-tech and innovative industries are characterised by investments in employees; in contrast, companies associated with research and development processes tend to be more secretive with respect to VDIC. The results suggest that companies that are able to maintain adequate governance systems through segregation of executive and non-executive duties and to a less extent through the presence of experienced non-executive directors exhibit higher levels of disclosure.

Keywords: voluntary disclosure, intellectual capital, equity risk, industry, corporate governance

1. Introduction

1.1 Background

Intellectual capital (IC) has developed into an area of significant importance. Its influence on all financial decisions continues to grow due to its increasing value within the equity of companies. There appears to be a broad acceptance that IC resources applied to generate innovativeness in products and services are the key drivers of competitive advantage, growth and market value. Nevertheless, the process of development of IC and the realisation of increased returns and share price value as a result, is a lengthy and risky one. Companies' communication of these IC processes to the public has faced some hindrance; IC reporting has been mired by traditional financial statements not effectively reporting the identification and measurement of these intangible assets (IA). Compounding the issue as reported by Lev and Zarowin (1999) and Chen, Cheng, & Hwang (2005), book values in financial statements are largely unrepresentative of equity. Financial decisions made by stakeholders require an assessment of the value of organisational IC. The market selects which products, services, suppliers or service providers to employ based not only on price but also on other social issues including trade policies, environmental issues and general social responsibility programmes. Incentives exist therefore for companies to develop those characteristics that set themselves apart from their competitors and to signal their competitiveness. However, insufficient IC information may be problematic with respect to the market's identification, analysis, valuation and therefore differentiation of superior and inferior market participants. The onus is therefore on companies to make this information available. Some may expect standard setters and

regulators to take a leading role in encouraging voluntary disclosure of intellectual capital (VDIC); however, their roles are restricted by the inherent nature of IC that makes its identification, measurement and reporting complex. IA are more associated with this complexity than other types of assets such as physical and financial assets are, due to the high uncertainty in their value, ill-defined legal and ownership rights and the lack of active markets to provide reliable value estimates (Lev, 2001; Penman, 2007). Faced with this dilemma, it seems likely that companies would resort to alternative means of communicating their IC levels particularly as the traditional reporting model neither sufficiently conveys IA nor meets the public's demand for information. Furthermore, as regulators are unable to set minimum reporting standards, the onus is placed on companies to provide the necessary conduit for these disclosures. The alternative means is found within the traditional reporting framework, the annual report, and takes the form of words, sentences, pictures and diagrams and has been gaining importance as a means of communicating IC. Whereas the traditional reporting model places focus on quantitative audited financial statements this alternative approach examines qualitative, narrative and non-narrative disclosures. There has been a steady shift by investors and analysts towards analysing qualitative disclosures in particular for companies whose value remains hidden from the market. In response to these demands for information, companies implement policies that identify and report IC generated by the organisation. These policies maintain and disclose important sources of IC including research and development (R&D), sources of innovation and skilled employees. Companies recognise the importance of and economic benefits to be derived from a well-managed disclosure policy (Williams, 2001; Barako, 2006). As this IC is not visible, the existence of adequate structures for identifying, measuring, managing and reporting IC may be invaluable. Corporate governance mechanisms may assist in ensuring transparency and accountability through the provision of complete and credible IC disclosure. Furthermore, this process is likely to be influenced by the nature of the management culture and their risk attitudes towards IC investment, the resources available, the nature of the business, industry membership and the existence of monitoring and controlling mechanisms.

Companies have grown increasingly aware of the importance of disclosing IC and the perceptions that credible favourable disclosures have on the market. As such, narratives and qualitative reporting has been applied in disclosing IC in addition to explaining in part the difference between book and market value. Disclosing information on such categories of IC as structural capital (SC), relational or customer capital (RC) and human or employee capital (HC) is likely to reduce uncertainty about future prospects of a company and to facilitate a more precise valuation of the company (Botosan 1997; Lambert, Leuz, & Verrecchia 2007). The current wave of corporate collapse has in part been attributed to concerns on misleading financial disclosures. The very act of complying with mandatory regulations in financial statements may, in itself lead to misleading information, without the need for mal-practices due to the MVBV dilemma. However, cases of mal-practices have led to increased monitoring and control mechanisms through the introduction of various corporate governance codes, introduced to curb these high profile corporate scandals; however, the voluntary nature of these codes only adds credence to sceptics' arguments that they may be mere charade and as such hold no substance. Furthermore, markets are becoming increasingly aware that due compliance with accounting standards in a manner endorsed by audit firms does not generally provide adequate information on the wealth of the company, its growth or financial opportunities. Companies therefore supplement these mandatory regulations with voluntary disclosure to ensure information asymmetry is reduced between internal and external stakeholders and that the risk to the equity is minimised.

1.2 Voluntary Disclosure Framework and the Conceptual Framework

The literature has identified five motivational factors as driving management's disclosure decisions and five factors that may constrain disclosure (Graham, Harvey, & Rajgopal, 2005). The first is explained by Diamond and Verrecchia (1991) and Fu, Kraft, & Zhang (2012), who suggest that voluntary disclosure of IC reduces information asymmetry between uninformed and informed investors and thus increases the liquidity of the equity in the market, both by reducing information risk and the inherent risk of the security. The second factor relates to the availability of information to analysts; Lang and Lundholm (1996) argue that not all management information is revealed and therefore analysts may invest in information collection costs, however as voluntary disclosure lowers the cost of information acquisition management may be motivated to increase the amount of information available to analysts in order to ensure the quality of the forecasts (Lehavy, Li, & Merkley, 2011). The third motivational factor examines management performance. Healey and Palepu (2001) suggest that the risk of replacement due to poor share price performance encourages management to apply disclosure in reducing the likelihood of undervaluation (Too & Wan, 2015), and the need to explain poor performance. Moreover, Trueman (1986) argues that when management performance is above average, management may have an incentive to signal this performance. The fifth motivational factor emanates from the limitations imposed by

mandatory disclosures that ignore non-financial indicators of future earnings (Graham et al., 2005; Abdel-Maksoud, Cerbioni, Omran, & Ricceri, 2015). Management may therefore be motivated to disclose that which has been omitted by mandatory disclosure. On the other hand, management may be restricted in their voluntary disclosure policy as such the first constraint relates to setting a precedent that management may not be able to maintain in the future. Verrecchia (2001) and Branswijck and Everaert (2012) refer to this constraint as the commitment cost of increasing voluntary disclosure. The second constraint relates to the threat of litigation that may induce management not to disclose IC (Skinner, 1997) and that can potentially reduce management's incentives to provide forward-looking information which if materially misstated may result in litigation costs (Laux & Stocken, 2012). The third constraint explains why management do not provide full disclosure as it is understood that some disclosures may jeopardise the company's competitive position in the product market (Verrecchia, 2001; Amit & Schoemaker, 2012). This limitation is therefore associated with proprietary costs. The fourth constraint is associated with agency costs and asymmetric information that may result in reduced disclosure as management attempt to perpetuate and entrench their positions (Berle & Means, 1934; Core, Hail, & Verdi, 2015). Finally, the fifth constraint is motivated by management's need to reduce political costs. Watts and Zimmerman (1978 and 1986) suggest that political costs reduce voluntary disclosure as management shy away from undue attention from regulators (Miller & Skinner, 2015).

Given the aforementioned motivations and limitations of voluntary disclosure identified in the literature, this investigation examines the theoretical basis applied in these potential explanations. In terms of the theoretical approach, the paper refers to Abeysekera (2006) who outlines the development of a theoretical framework underlying IC disclosure. Theories that have been considered include legitimacy and stakeholder (Guthrie, Petty, Yongvanich, & Ricceri, 2004; Abeysekera & Guthrie, 2005; Michelon, 2011), signalling (Bozzolan, Favotto, & Ricceri, 2003; Garcia-Meca & Martinez, 2005; Shi, Kim, & Magnan, 2014), resource based (Barney, 2001; Palmer, 2008), agency (Bozzolan et al., 2003; Garcia & Martinez, 2005) and information asymmetry (Amir & Lev, 1996; Lang & Lundholm, 2000). Although the IC literature illustrates the application of various theoretical approaches, the general disclosure literature has overall indicated a close association with agency and signalling theories. The number of different theoretical approaches in prior studies is indicative that a theoretical framework of IC reporting has not been established. It is expected nevertheless that various conflicting forces influence management who are contractual bound as agents of the company but who may not necessarily behave as such at all times. This section examines the theoretical underpinnings of the three potential disclosure outcomes maximum, partial and minimal disclosure and appraises the role played by voluntary disclosure at the corporate level. This paper proposes that companies' pursuit of a maximum disclosure policy may be explained by signalling theory. A minimal or no disclosure policy may be explained by proprietary cost theory. Where mitigating factors exist however, a partial disclosure outcome may result from barriers to entry limiting the perceived potential disclosure costs.

This paper adopts a positivist approach by developing several hypotheses based on selected theories to explain observed management behaviour. The model for this paper is based on the premises of positive accounting theory (Milne, 2002; Watts & Zimmerman, 1978 and 1986). The theory utilises economics, in particular agency theory (Jensen & Meckling, 1976) to explain and predict observed behaviour. Explanations of accounting behaviour are important, as any changes of accounting practice depend on existing political and economic forces (Gould, 1977; Zarzeski, 1996). The first theoretical approach proposed by this paper is agency theory that may explain management behaviour when objectives are not aligned with those of shareholders. The second theoretical approach is signalling theory in which management need to decide on whether the voluntary IC attributes are associated with disclosure costs that take the form of proprietary costs. The existence of proprietary costs generally leads to minimal or no disclosure however, the existence of mitigating circumstances such as barriers to entry may lead to partial disclosure of IC attributes. These barriers to entry may render otherwise costly disclosures, less costly resulting in partial disclosure depending on management's ability to accurately quantify related benefits and costs. Nevertheless, the lack of mitigating factors renders disclosure costly and may lead to little or no disclosure that may be explained by competitive costs hypothesis and proprietary cost hypothesis.

Agency theory illustrates that the separation of ownership and control in companies results in conflicts of interest between a company's management and its shareholders. Several potential areas of conflict between management and shareholders have been identified including insufficient effort, extravagant investments, entrenchment strategies and self-dealing (The Economist, 2006). When such conflicts emerge, agency theory suggests that management tends to pursue their own interests over those of shareholders, resulting in conflicts of interest. Costs are incurred in monitoring these agents. Nevertheless, given that these costs reduce their compensation,

management have an incentive to keep them low. Jensen and Meckling (1976) categorise this cost into monitoring, expenses incurred by the principal to limit aberrant activities of the agent; bonding costs, expense incurred to ensure that the agent does not undertake actions that are not in the principals' interests and residual loss, due to sub-optimisation by the agent of the welfare-maximisation objective (Barako, Hancock, & Izan, 2006). As the equity market is not perfect, management can enrich themselves at the expense of shareholders without being displaced (Berle & Means, 1934). Management would be expected to disclose positive information and conceal negative information about the company in attempting to avoid dismissal or a reduction in incentive contracts. Highlighting positive information and concealing negative information may also help maintain shareholder confidence in the company's management, provides senior management time to turn-around failing projects as the constant pressure to increase shareholder value and the fear of being replaced motivates management to develop communication strategies aimed at shaping shareholder impressions about their managerial performance (Cheney & Carroll, 1997).

Proprietary costs arise when information is revealed that potentially damages the company if it results in increased competition and or government regulation (Gray, Meek, & Roberts, 1995). These costs result from a disadvantage in the product market. The harmful effect of these competitive costs has also a major impact on the equity market as it reduces VDIC i.e. disclosing sensitive data to existing and potential investors and creditors. These factors, proprietary costs and competitive costs, may restrict full disclosure of IC as disclosure may lead to a potential unfavourable change in future earnings (Dye, 1985; Jones, 2007). Nevertheless, the identification and measurement of these proprietary costs is complex, being forecasts of actual costs and intangible in nature, it is necessary for management to have appropriate management procedures in place to assist in the coalition of accurate information for these estimates. Proprietary cost theory states that the incentive to disclose information is a decreasing function of the potential proprietary costs attached to a disclosure and an increasing function of the favourableness of the news in a disclosure (Verrecchia, 1983; Suijs, 2005). As such, the better the prospects of the company in the IC disclosure and the greater the barriers to entry the more likely management are likely to disclose IC attributes. Signalling theory has developed into a mechanism for explaining the disclosure of good news (Spence, 1973). Information asymmetry may produce the problem of adverse selection (Akerlof, 1970) however, management apply disclosure to indicate the underlying reality and to influence stakeholders. Signalling mechanisms improve the allocation of resources ensuring that companies that are more efficient receive more capital (Inchausti, 1997; Reber, Berry, & Toms, 2005) as signalling reveals the company's competitive advantage within the market. Management of such companies signal their superior capabilities in order to differentiate themselves from companies without such a competitive advantage. IC intensive companies may prefer such a regulatory environment that enables signalling of the correct valuation of equity and enables companies to distance themselves from the next best.

1.3 Influence of Firm Characteristics on Intellectual Capital Disclosure

1.3.1 Size

The selection of MV is based on the association between IC and MVBV and on the association between IC and MVTA. Both tangible and intangible assets contribute to the generation of turnover, SALES is therefore included as a measure of size irrespective of the IC intensity of the company. The selection of TA examines the relation between capital intensity on the one hand and size on the other. Capital intensity as measured by TA does not account for the IC of equities and as such may be negatively associated with VDIC whilst concurrently, TA is the tangible capital applied in the company to generate operations and may not measure the entire capital applied in IC intensive companies. The inclusion of the three size variables provides a comparative analysis, in which by utilising TA and SALES as controls, the effectiveness of MV as a size variable can be established. In this way, the trend in the influence of or lack of application of IC in companies' operations may begin to be chartered. The finding that size, as measured by TA, is positively associated with disclosure is consistent with the work of Cooke (1989) and McNally, Eng, & Hasseldine, (1982). Size appears to be an important explanatory variable whether measured by TA, SALES (Firth, 1979), or MV (Hossain, Tan, & Adams, 1994; Lang & Lundholm, 1993; Uyar & Kiliç 2012). Signalling theory explains the competitive resources available to larger companies in providing VDIC. The perceived benefits of signalling IC are expected to outweigh the potential disclosure costs arising from political costs. A significant positive association is expected. It may therefore be hypothesized that:

H1.1: Size as measured by SALES is a positive significant explanatory variable of the variation in the extent of VDIC.

H1.2: Size as measured by MV is a positive significant explanatory variable of the variation in the extent of VDIC.

H1.3: Size as measured by TA is a positive significant explanatory variable of the variation in the extent of VDIC.

1.3.2 Growth (GRWT)

A higher GRWT is expected to lead to more voluntary disclosure as management signal the realisation of company potential previously held in IA (Fontana & Macagnan, 2013). Management of high GRWT companies may signal IC to indicate company success (economic theory), management expertise and competence (agency theory) and to maximise shareholder value in the markets (shareholder maximisation). Lev and Stefano (2003) believe that the major drivers of company GRWT are IA, innovation, information and communication technologies, networks and alliances, the quality of human resources and management processes that continue to be vital to companies. These results are consistent with Del Monte and Papagni (2003) who maintained that companies with a strong commitment to R&D had a higher rate of GRWT. This paper extends this work, by applying a compound annual growth rate over a five-year period, to minimising year on year changes in economic conditions. It can therefore be hypothesised that:

H2: GRWT is a positive significant explanatory variable of the variation in the extent of VDIC.

1.3.3 Intellectual Capital Investment

High investment in employee remuneration and benefits may result in management signalling IC attributes to disclose investment in IA that differentiates it from its competitors. The motivation for the variation in VDIC due to the variation in employee cost (EMPC) may be explained by signalling theory. EMPC captures the degree to which management is efficient in hiring the optimal number of employees under the assumptions of competitive labour and product markets and in extracting value from investment in HC. High remuneration may provide the company with a competitive edge in attracting quality employees and retaining existing ones, signalling of ICCA attributes may ensue as management disclose successful management practice. Furthermore, Sofian, Tayles, & Pike (2005) and Wyatt and Frick (2010) reiterate the importance of investment in HC adding that such investment is associated with management accounting practices, organisational culture and corporate performance. However, despite the benefits to be gained from disclosure of these investments, pressure from competitors, may curb full disclosure due to the mobility of employees in some industries. Furthermore, political costs may restrict such voluntary disclosures due to the risk of pressure from labour unions and other regulatory bodies. Where management voluntarily disclose, companies can differentiate themselves from their peers within their industry through the signalling of high-quality HC (Akerlof, 1970). An expectation to see companies with a higher investment in human resources voluntarily disclosing more HC exists. This paper expects that higher EMPC as measured by staff costs including all employee benefits such as health insurance and pension plan contributions divided by the number of employees representing both full and part time employees of the company may lead to more VDIC. The arguments are derived from signalling theory and the propensity of companies to disclose their competitive advantage. These motivations are expected to outweigh any competitive pressures and labour related proprietary costs that are associated with such disclosures. It may be hypothesised that EMPC is positively associated with VDIC.

H3.1: EMPC is a positive significant explanatory variable of the variation in the extent of VDIC.

The expectation is a positive association between research and development expenditure (R&D) and VDIC. High R&D companies are likely to be characterised by high levels of VDIC. This variable identifies whether R&D necessarily leads to VDIC. Although R&D is associated with IA generation, IP registration of patents and copyrights may take lengthy processes before successful registration. R&D may signal success to the market, as investment in IC is made possible by surplus earnings. The theoretical argument may be unclear, no previous study has been found to investigate this relationship. Gray et al., (1995) confirmed a positive significant relationship with the voluntary disclosure of 64 UK and 116 USA companies and R&D information. R&D is defined as all direct and indirect costs related to the creation and development of new processes, techniques, applications and products with commercial possibilities. As R&D has been found to increase IA and growth prospects, the paper expects an increase in VDIC associated with new venturing activities/projects. Greater R&D spending translates into lower expected marginal costs. Management in R&D intense companies may provide more VDIC as a measure of signalling potential and successful projects (Jones, 2007). Nevertheless, as indicated by Williams (2001), where IC performance is too high the amount of disclosure may be reduced, suggesting that companies reduce VDIC when performance reaches a threshold level for fear of competitive losses. However, competitive costs may be exceeded by potential benefits of signalling when proprietary costs may be mitigated by barriers to entry. These barriers may be due to the complexity of IC and the requirement for additional financial resources, technical expertise and corporate governance mechanisms. It may therefore be hypothesised

that R&D is positively associated with VDIC.

H3.2: R&D is a positive significant explanatory variable of the variation in the extent of VDIC.

Consistent with Edvinsson and Malone (1997) who define the difference between a company's BV and MV as the value of IC this paper acknowledges the existence of this "hidden value" due to the inability of traditional financial statements to report SC, RC and HC. IC intensive companies are likely to have a larger difference between MV and BV. VDIC is likely to be higher where MVBV ratio is larger. Few studies have conducted a direct empirical investigation on MVBV and disclosure. Patton and Zelenka (1997) found no significant relationship between mandatory disclosure and percentage of IA. The explanations were based on signalling theory however, little IA have been regulated as such the lack of a link between accounting figures and IA may have restricted this study. The existing literature suggests that IC represents the missing value in the balance sheet that may be attributed to IC, IA and IP. Tobin's Q has also been studied with respect to establishing a relationship with the "hidden value"; this paper applies MVBV and MVTA ratios as its proxies for this "hidden value". The theoretical approach applied in the development of this hypothesis is based on explanations from signalling theory. The motivations for an expectation of a positive association are derived from Garcia-Meca and Martinez (2005) that confirm MVBV as a positive significant variable in the voluntary disclosure of presentations to analysts. The main concern with bridging the MVBV gap is the reliability, objectivity of estimates required for capitalisation of IA. Signalling theory explains that management may be motivated to disclose more IC when the MVBV ratio is larger. Given the deficiency in book value as a measure, the paper develops a sensitivity test in the ratio of market value to total assets (MVTA) that may proxy for the difference between intangible and tangible assets based equities. The proxies for this "hidden value" are therefore MVBV and MVTA. It may therefore be hypothesized that:

H3.3: MVBV is a positive significant explanatory variable of the variation in the extent of VDIC.

H3.4: MVTA is a positive significant explanatory variable of the variation in the extent of VDIC.

1.3.4 Risk

The relationship between BETA and VDIC may be expected to be positive. A high BETA may motivate management to increase VDIC in an attempt to mitigate the exposure to systematic risk. By informing the markets and shareholders of IC within the company, management expect to reduce the risk associated with the company by reducing uncertainty as to its "hidden value" and potential. Although Foster (1978) found significant correlation between accounting annual report disclosure and systematic risk, Firth (1984) in the UK found the association of voluntary disclosure and earnings BETA to be insignificant in manufacturing companies but positive and significant with systematic risk. Following the theoretical approach adopted by Firth (1984), the paper applies agency theory as the explanation for management behaviour. A high BETA may result in management reducing VDIC (Hassan, Giorgioni, Romilly, & Power, 2011; Abdel-Azim & Abdelmoniem, 2015). These actions allow management to perpetuate their positions at the expense of shareholders and the market at large. Timely, unmanaged and maximum disclosure of a high systematic risk status may lead to a reduced share price and ultimately management replacement. It may therefore be hypothesised:

H4.1: BETA is a positive significant explanatory variable of the variation in the extent of VDIC.

Share price volatility is associated with complexity in firm valuation (Foster, 1986). Whereas, BETA measures a share's risk relative to the market, SHVOL measures the standard deviation of the share price around its mean. Management may withhold the disclosure of information that would otherwise see them replaced or see a reduction in their remuneration or prerequisites. Share price volatility has been used by Lang and Lundholm (1993) as a proxy for information asymmetry. Lang and Lundholm (1993) suggest a positive association between disclosure informativeness and price volatility. Smooth transitions in share prices suggest the absence of information asymmetries between the company and shareholders, or among investors, low levels of volatility suggest fewer information asymmetries (Leuz & Verrecchia, 2000). Guo, Lev, and Zhou (2004) and Fontana and Macagnan (2013) find that increased disclosure results in narrower bid-ask prices and lower stock volatility. Furthermore, Lev and Sougiannis (1999) argue that IC intensive companies SHVOL is likely to be higher, and may only be mitigated if non-financial information on the application of IC to generate competitive advantage is disclosed (Amir & Lev, 1996). The motivations are derived from agency theory as management adopt those attitudes that protect their employment and benefit their interests.

H4.2: SHVOL is a negative significant explanatory variable of the variation in the extent of VDIC.

This variable investigates the influence of a company's ability to honour its short-term obligations as they fall due without recourse to selling other assets in place (Wallace & Naser, 1995). Within the first approach,

companies with higher levels of liquidity (LQD) may be expected to signal successful cash flow management through increasing VDIC. In addition, the existence of liquidity indicates availability of financial resources necessary for investment in IC. Explanations for this association are based on signalling theory, consistent with management's intentions to indicate the underlying reality and to influence stakeholders. The current ratio is commonly accepted as a measure of LQD and therefore, of short-term financial risk. The association with market risk is expected to be negative. This view is based on the expectation that a financially strong company is more likely to disclose more information than a weak one. In this scenario, LQD might be perceived in the market as a measure of performance. Wallace, Naser, & Mora, (1994) in Spain found that liquidity suppressed disclosure whereas Camfferman and Cooke (2002) in the Netherlands, who applied the current ratio, and found a positive influence on disclosure. The acid-test ratio is operationalised as the liquidity proxy based on signalling theory as low LQD may lead to lower VDIC levels and higher LQD may lead to higher levels of VDIC as management signal successful cash flow management through VDIC (Wang, Ali, & Al-Akra, 2013). High LQD levels enable IC investment. Financially strapped companies are unable to invest in IC; as such, their disclosure levels may be lower. It may therefore be hypothesised that LQD is positively associated with VDIC.

H4.3: LQD ratio is a positive significant explanatory variable of the variation in the extent of VDIC.

The basis for the relationship with VDIC is based on the risk associated with increased levels of debt. As the proportion of debt increases, so too does the financial risk associated with repayment of interest and capital increases. Thus, an increase in the gearing ratio (GEAR) increases the probability of financial and insolvency risk and is likely to reduce disclosure (Bertomeu, Beyer, & Dye, 2011; Jankensgård, 2015). Firstly, to counteract this increase in risk, management may provide VDIC in a bid to illustrate transparency and accountability; and secondly, highly geared companies may not have the financial resources required firstly for investment IC and secondly for investment in the processes and procedures required to identify, manage and report IC. Agency theory views debt as a governance device useful in reducing the conflict between shareholders and management (Jensen, 1986). Debt reduces cash flow available to management as the company is contractually bound to repay interest and capital. Furthermore, companies investing in tangible assets are more likely to have assets that are more likely to be accepted as debt security as such debt may be associated with more tangible asset based companies that are less likely to report IC. In addition, Williamson (1988) concluded that debt providers might be unwilling to finance projects with high company specificity; such companies may exist in industries that may be associated with tangible and IA that have reduced tradability. Research evidence has shown that R&D of a company is negatively related to its GEARING (Balakrishnan & Fox, 1993; Baysinger & Hoskisson, 1989). This evidence is consistent with R&D as the driver of IA growth without which there is likely to be reduced levels of VDIC. With increasing insolvency risk, management may be expected to focus on short-term projects to the exclusion of R&D. VDIC is expected to decrease as the investment in IC decreases. It may therefore be hypothesised that GEAR is negatively associated with VDIC.

H4.4: GEAR is a negative significant explanatory variable of the variation in the extent of VDIC.

1.3.5 Industry

The understanding is that technological intense companies firstly, may apply more IC in their operations and secondly, may disclose such IC in their annual reports. Such high IC in technological, innovative and R&D intense companies may be represented in a listing on a technological index. The first classification is therefore represented by the LSE TMRK. TMRK is the LSE international market for innovative technology companies and includes computer hardware, computer servicing, internet, semi-conductors, software, telecom equipment, biotechnology, specialist pharmaceuticals, drug delivery and medical technology. Following Bozzolan et al. (2003), the expectation is of a positive significant association. Listing on this exchange may be justified through signalling theory as the company promotes its R&D and technological development. It may be hypothesised

H5.1: TMRK is positive significant explanatory variable of the variation in the extent of VDIC.

The second classification is supported by Camfferman and Cooke (2002), Cooke (1991) and Ho Wong (2001) who report a significant association between disclosure and MANUF. Industries are classified into manufacturing, high value tangible assets, low profile; and into non-manufacturing, low value tangible assets, service, high tech and high profile industries. The approach in this investigation is that manufacturing companies are less likely to have higher levels of VDIC as non-manufacturing companies that are expected to utilise more IC than tangible assets in their operations. The motivations are derived from signalling theory; non-manufacturing companies are expected to apply unique and non-replicable IA and IC in their operations. These companies disclose ICCA attributes due to the existence of hidden value and the lack of disclosure costs, consistent with disclosures in sectors of high entry barriers. It may therefore be hypothesised that:

H5.2: MANUF is a negative significant explanatory variable of the variation in the extent of VDIC.

A further industry classification is applied in this paper, INDG is a DataStream 6 level classification based on a company's primary activity. Equities are classified at the most detailed level. The theoretical approach is consistent with MANUF as the classification INDG charts the increasing IC content as companies move from Level 1 to level 6, from non-financials, non-financials excluding resources, resources to resources, basic industries, cyclical consumer products, non-cyclical consumer products, cyclical services, non-cyclical services, utilities and information technology. The classification codes "basic industries" with a lower score than it does more industries that are complex. The understanding is that basic industries will disclose less IC due to the lack of complexity in their operations. Complex industries may provide more VDIC comparatively as they may employ more IA in their operations. The results in the literature have been mixed. The motivations for industry grouping as a determinant of VDIC are derived from signalling theory. It may be hypothesised that:

H5.3: INDG is a positive significant explanatory variable of the variation in the extent of VDIC.

A further industry classification applied in this paper is that of the UK SIC of Economic Activities (National Statistics, 2003) that provides an ascending industry classification ranging from 0100 basic agriculture industry to 9000 complex service industry. Forestry and paper, food producers and processors, beverages and tobacco form the most basic industries whereas telecommunications, media and entertainment, health, leisure and hotels form the more complex service industries. Service industries are expected to apply more IA rather than tangible assets in production. Agriculture, forestry and tobacco are highly mechanised industries, employing a substantial amount of tangible assets in comparison. The motivations are derived from signalling theory. Service and highly complex companies are expected to apply IA and IC, unique to their organisation and therefore not easily replicable. It may therefore be hypothesised that:

H5.4: SIC is a positive significant explanatory variable of the variation in the extent of VDIC.

1.3.6 Corporate Governance

Non-executive directors (NONEXEC) are perceived as a tool for monitoring management behaviour and may result in more VDIC. Both Leftwich, Watts, & Zimmerman, (1981) and Fama and Jensen (1983) argued that the larger the proportion of NONEXEC on the board the more effective it will be in monitoring managerial opportunism and the more reliable in diffusing agency conflicts between managers and owners and in providing the necessary checks and balances needed to enhance board effectiveness. As such, NONEXEC may not exert sufficient monitoring power if their numbers only account for a small proportion of board membership (Ho and Wong, 2001). Furthermore, the paper acknowledges that the mere increase in the number of NONEXEC does not necessarily improve decision-making or performance (Haniffa & Cooke, 2002). This paper introduces EXPRCD, representing NONEXEC that hold more than one directorship in different listed companies. Although, Haniffa and Cooke (2002) argue for more NONEXEC on boards, due to their wider expertise, prestige and contacts, their results suggested a negative association indicating perhaps that NONEXEC lack the experience and knowledge. Therefore, it appears that only those directors that bring the expertise on board (Adawi & Rwegasira, 2011) may influence effective board monitoring and company performance (Useem, 1993). The paper adopts agency theory in explaining the variation in VDIC that may be associated with the variation in additional insight, links to the external environment, expertise, prestige and contacts attributable to EXPRCD. Multiple or cross-directorships are expected to promote transparency and accountability that may lead to increased VDIC. It may therefore be hypothesised that:

H6.1: The ratio of EXPRCD to total directors is a positive significant explanatory variable of the variation in the extent of VDIC.

A high EXCREM may be indicative of the underlying success of the company particularly when such remuneration is made transparently. Management may signal reduced financial risk as payments are made after accounting for debt payments and shareholders' returns thus reducing unsystematic risk. Furthermore, high EXCREM may be indicative of a quality or performing executive that is aligned to shareholder interests. However, excessive compensation may indicate the presence of agency costs. Increased disclosure is expected to mitigate this risk (Chung, Judge, & Li, 2015). This quality may be associated with the HC of the company in a similar manner to EMPC. Signalling theory is applied as the theoretical approach suggesting that companies associated with EXCREM disclose IC. It may be hypothesised that:

H6.2: EXCREM is a positive significant explanatory variable of the variation in the extent of VDIC.

Within corporate governance, an important issue often discussed is the existence of dual roles within management. According to agency theory, combined functions can significantly impair the board's most

important functions of monitoring, disciplining and compensating senior managers (Barako et al., 2006). Such combined roles may enable the engagement of opportunistic behaviour because of dominance over the board. Forker (1992) presented evidence of a negative relationship between disclosure quality and corporate governance as measured by "dominant personality" providing additional support for the findings of Fama and Jensen (1983) that combined roles signal the absence of separation of decision management and decision control. The optimum balance would be to remove the risk to the company of the CNED being accountable for two functions, non-executive director and chair (Haniffa & Cooke, 2002). Forker (1992) asserts that a dominant personality in a dual role poses a threat to monitoring quality and is detrimental to the quality of disclosure. The paper applies agency theory, as the combined role of CNED is likely to require increased monitoring. A negative association is expected between VDIC and CNED consistent with the model, the first theoretical approach. A dichotomous proxy is developed scoring "0" for an executive chair and "1" for a CNED. It may therefore be hypothesized that:

H6.3: The Role of CNED is a negative significant explanatory variable of the variation in the extent of VDIC.

The reasons for expecting managerial share ownership (DIRSHS) to be associated with VDIC are mainly based on agency theory. Jensen and Meckling (1976) and Leftwich et al., (1981) noted that agency costs are associated with increasing level of non-owner management in a firm. These agency costs arise from the separation of the principals (shareholders) from the decision-making function in the firm. DIRSHS may be an effective approach to aligning management attitudes and objectives with those of shareholders, providing the impetus to act in the best interests of all shareholders including themselves (Baek, Johnson, & Kim, 2009). In terms of Gray (1988), "secrecy hypothesis", with increased DIRSHS, as directors' preference for secrecy is likely to decrease leading to disclosure of more information as directors, act more as principals than as agents do. Share options and management shareholdings have been introduced over the past years to bridge the gap between the agent and the principle. By rewarding the agent with a share of ownership and a share of profits, shareholders have hoped to align their own goals and the objectives of management. On the one hand, agency theory explains manager behaviour commensurate with self-serving interests below a threshold level of beneficial ownership. On the other, above this threshold, the manager tends to behave more like a shareholder than an agent, management and shareholder aims may be aligned, however entrenchment costs are likely to increase with increasing directors' beneficial shareholding in the ordinary equity of the company. It may therefore be hypothesised that:

H6.4: DIRSHS is a positive significant variable in the variation of the extent of VDIC.

2. Data and Method

2.1 Firm Characteristics and Sampling Procedures

Companies were selected from the FTSE All Share Index for the year 2003/2004 in the Financial Times with the exclusion of companies in the banks, financial, insurance, life assurance, mining, oil and gas, real estate, speciality and other finance and investment and property industries. A content analysis of the entire annual reports of a sample of listed companies was conducted by adapting the methodologies of Guthrie, Petty, Ferrier, & Well, (1999), Bozzolan et al., (2003) and Milne and Adler (1999). This involves codifying IC attributes into SC, RC and HC in order to derive patterns in the presentation and reporting of IC (Guthrie & Petty, 2000). The ICF adopted by this paper encompasses 23 IC attributes grouped into the three IC categories of SC, RC and HC as summarised in Appendix 1.3. This paper proposes its operational definition of a voluntary disclosure IC attribute as "Any IC information, financial or non-financial, illustrations, diagrams and graphical presentation contained in the annual reports that is not required to be disclosed by the Companies Act (1989), European Economic Community Directives (Fourth, 1978; Seventh, 1983), Statement of Standard Accounting Practice (SSAP), Financial Reporting Standards (FRS) (7, 10 and 11) and the disclosure rules issued by the London Stock Exchange (LSE)".

2.2 Research Design and Methods

A recording unit that captures all manner of IC attribute disclosure including phrases, sentences, groups of words, pictures, diagrams and graphs may be more appropriate, as individual words are deemed insufficient to meet the requirements of an IC attribute (Davison & Skerratt, 2007), sentences may contain more than one IC attribute and both words and sentences ignore non-narratives. As such with respect to narrative disclosures, consistent with the approach applied by Beattie, McInnes, & Fearnley, (2004), this paper splits sentences into text units with each group of words able to meaningfully convey independently, a single IC attribute. With respect to non-narrative disclosures, consistent with the suggestions of Davison and Skerratt (2007) and Unerman (2000), the use of narratives alone will capture only partial disclosures. This paper therefore includes other visual forms of communication that have been found to provide an immediate and effective means of corporate disclosure

(Beattie & Jones, 2001; Beattie & Thompson, 2006). Davison and Skerratt (2007) provide evidence that within the top 100 UK companies, 94% of pictures communicated intangible aspects of companies businesses. As illustrated in Table 1.2 the 23 IC attributes have been identified as representative of the spread of IC attributes that may bring comparability to existing IC studies (Guthrie et al., 2004; Bozzolan et al., 2003). To ascertain that the scoring was consistent and accurate according to the chosen scoring procedure a verification test was carried out by three researchers from the field in a similar process as that conducted by Guthrie and Petty (2000). Toms (2002) proposes that the volume of disclosures may be potentially misleading when it is the credibility or quality of disclosure that is important. Furthermore, Hasseldine et al., (2005) proposes that to capture the underlying relationship, a quality adjusted content analysis method in which disclosures are counted and weighted to identify their likely significance (Beattie & Thompson, 2006). This approach minimises coding errors that may be associated with as Toms (2002) describes, rhetoric and non-verifiable disclosures that are largely without commitment as opposed to the more informative and higher quality disclosures. The competitive advantage scheme applied in this paper, accounts for the proactive identification, development, management and utilisation of IA in organisations. The coding was conducted by the researcher. Disclosure illustrating a competitive advantage earned a score of "2" under WDI and disclosure earned a score of "1" under DI. In both cases, no disclosure earned a score of "0". This paper refers to WDI as disclosure of the IC competitive advantage (ICCA) attribute. The classification of an ICCA attribute disclosure is defined by this paper as, "The competitive advantage of signalling a unique product, service, process, IP, relationship or human resource when the competitive advantage cannot be replicated due to barriers to entry, the company can sustain above normal returns that place it ahead of competitors". Companies compete by erecting barriers in order to maintain their demand-side advantage or cost-side advantage (Abernathy & Clark, 1995). Generally, any advantage generated from standard and tangible asset investment is easy for competing companies to imitate (Webster, 1999). IA investment on the other hand is often company specific, making it difficult for companies to imitate. Hayton (2005) argues that IC offers a unique source of advantage that facilitates entrepreneurial activities by reducing the firm-specific risk and increasing the returns from investment in innovation and venturing (new projects). In this way, IA can achieve competitive advantage.

3. Results

3.1 Investment in IC

The results of the descriptive statistics on WDI (Note 1) indicate that there is a wide range of variation in the extent of VDIC. This result indicates that the sample companies have great flexibility in their IC voluntary disclosure practices. Dichotomous variables indicate that 16% of the sample companies are members of the TechMARK listing and that 48% companies are involved in manufacturing activities. Although variables EMPC and R&D indicate large standard deviations in their distribution, data and statistical analysis indicates that of the continuous variables, only MV required transformation to achieve normal distribution. A significant correlation is found between WDI and MV, TMRK, MANUF, EMPC and R&D; in general, the direction of the relationships is consistent with the expected sign; however, the partial correlation coefficient of WDI with R&D is negative indicating that increasing R&D expenditure may result in lower VDIC. The paper attributes this trend with management's awareness of competitive losses that may result in the disclosure of proprietary information. The benefits of signalling may be outweighed by disclosure costs resulting in R&D being insignificant in explaining the variation in VDIC. MANUF as a non-IC based industry classification is negative and significant at 1% confidence level.

Table 1. Intellectual capital investment

Variable	Mean	SD	Min	Max	COR		SRWDI		LNMV		TMRK		MANUF		EMPC	R&D
SRWDI	0.561	0.118	0.265	0.866			1									
LNMV	5.624	2.013	0.536	11.436	0.455	***	0.393	***	1							
TMRK	0.164	0.371	0.000	1.000	0.225	***	0.217	***	-0.127	***	1					
MANUF	0.476	0.500	0.000	1.000	-0.234	***	-0.230	***	0.129	***	-0.324	***	1			
EMPC	48.210	302.911	0.000	6323.900	0.096	**	0.112	**	0.038		0.003		-0.048		1	
R&D	66.161	386.396	0.000	3841.780	-0.084	*	0.094	**	0.366	***	0.025		0.028		-0.013	1

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; the annotation *** indicates results

significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN;

SRWDI: Weighted disclosure index based on disclosed ICCA attributes measured as a square root transformation;

LNMV: Size being MV representing the share price multiplied by the number of ordinary shares in issue measured as a log-transformed variable;

TMRK: dichotomous variable that scores "1" for listing on the TechMARK listing and "0" otherwise;

MANUF: dichotomous variable that scores "1" for manufacturing and "0" for non-manufacturing;

EMPC: staff costs including all employee benefits such as health insurance and pension plan contributions / number of employees (representing the number of both full and part time employees of the company);

R&D: research and development expenditure.

The direction of the association is consistent with the expected sign. The MANUF variable indicates that disclosure of IC attributes is industry specific varying from low to high levels as sectors move from manufacturing to non-manufacturing. The expectation that large companies as measured by MV are associated with VDIC has been realised. Tests of association indicate that there is no significant correlation between WDI and any of the independent variables. The results of the correlation test illustrate that companies that engage in R&D expenditure make significantly more IC disclosures than those with no R&D investment. The collinearity between TMRK and MANUF (-0.32) illustrates that high-tech companies are non-manufacturing. The largest level of collinearity in Model I exists between MV AND R&D (+0.37). This association indicates increasing shareholder value with increasing investment in R&D. Significant collinearity identified between the IC variables suggests that TMRK companies are generally not very large. However, these companies are associated with non-manufacturing; this finding is consistent with non-manufacturing companies being more IC intensive and consistent with evidence that suggests manufacturing companies are larger.

Table 2. Intellectual capital investment: regression results

$$WDI = \beta_0 + \beta_1 LNMV + \beta_2 TMRK - \beta_3 MANUF + \beta_4 EMPC + \beta_5 R\&D + \varepsilon \qquad (1)$$

Model I : INTELLECTUAL CAPITAL (WDI)

		(i)		(ii)		(iii)		(iv)		(v)		(vi)		(vii)	
		OLS		QREG		QREG		QREG		QREG		QREG		QREG	
Independent V	Predicted sign	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	+	0.418	***	0.411	***	0.411	***	0.441	***	0.391	***	0.414	***	0.430	***
LNMV	+	0.028	***	0.029	***	0.029	***	0.027	***	0.027	***	0.029	***	0.026	***
TMRK	+	0.066	***	0.073	***	0.073	***			0.088	***	0.068	***	0.056	***
MANUF	-	-0.051	***	-0.063	***	-0.063	***	-0.077	***			-0.072	***	-0.067	***
EMPC	+	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***			0.000	***
R&D	+	0.000	**	0.000		0.000		0.000		0.000		0.000			
Mean VIF		1.120													
z		0.14													
F		63.62	***												
R^2		0.28		0.16		0.16		0.13		0.13		0.15		0.15	
N		439		439		439		439		439		439		439	

The results of the QREG model provide supporting results to that of the OLS model, with the exception of R&D that is insignificant in the QREG model. Although the results of the partial and Pearson correlation matrix provide inconsistent results with respect to the influence of R&D on VDIC, the multivariate analysis is consistent with respect to the predicted sign. Furthermore, analysis of the residuals in the OLS model provides assurance of their normal distribution indicating that the model is robust. In general, the results indicate that no company is consistent in disclosing all IC attributes. DI and WDI have exhibited similar characteristics, particularly as all companies that disclose a competitive advantage (WDI) disclose an IC attribute (DI) as such, a significant number of companies (69%) that disclose IC attributes disclose a competitive advantage. WDI measures both the construct of existence of an IC attribute (DI) and the construct of competitive advantage (WDI) as such the paper applies WDI as the dependent variable for Models I to V. DI is applied as the dependent variable, in addition to WDI in the Full Model. Overall, the results indicate that management discloses more RC

than either SC or HC. Although at the individual attribute, the top three IC attributes are disclosed from HC category, on an overall basis however total RC attributes disclosed exceed HC attributes disclosed.

The results of the empirical tests in Model I indicate that IC investment proxies representative of SC, RC and HC are associated with VDIC. The parametric tests indicate that VDIC by service, highly complex and high-tech companies whose equity is made up of intangible value may be restricted by competitive costs and political costs as illustrated by the weak relationship. Nevertheless, the multivariate results indicate that R&D companies have greater levels of VDIC. As a HC measure of the level of technical expertise, higher levels of EMPC is indicative of the value management places on HC, disclosure of HC attributes signals the existence of this underlying value. The results of Model I are consistent with EMPC as a proxy for HC, TMRK for IP (SC) and R&D for SC. Of interest, MV is significant as a representative of RC; companies strive to increase market share in an effort to increase shareholder value through larger returns. RC is generated in creating markets, larger companies have the resources and technical expertise to signal the existence of this IC that due to its inherent intangible nature may otherwise remain hidden.

3.2 Financial Measures of Risk

Descriptive statistics for the mean value for BETA that is equal to 1 indicates that the sample systematic risk is close to that of the market. Both GEAR and LQD indicate a mean close to 1 signifying that within the sample, the value of equity finance has been matched by the value of debt finance and that current liabilities are matched by liquid current assets. The mean for SHVOL on the other hand indicates that the sample is made up of companies whose share prices fluctuate significantly about their mean indicating potential lack of stability and probable higher firm-specific risk. The descriptive statistics indicate that GRWT and MVBV have negative minimum balances indicating that some sample companies have declining sales and that some sample companies have book values that exceed their MV. Furthermore, the mean of 2.8 for MVBV indicates that overall, shareholder value is three times that of the book value and may be an indication of the existence of "hidden value" in the sample companies.

Table 3. Financial Measures of Risk

Variable	Mean	SD	Min	Max	COR	SRWDI	LNTA	BETA	SHVOL	LQD	GEAR	SRSIC	GRWT	MVBV
SRWDI	0.561	0.118	0.265	0.866		1								
LNTA	5.796	2.066	0.747	11.937	0.366 ***	0.311 ***	1							
BETA	0.986	0.429	0.000	2.330	0.091 **	0.160 ***	0.037	1						
SHVOL	5.517	2.951	1.000	20.000	-0.035	-0.075	-0.212 ***	0.104 **	1					
LQD	1.089	1.247	0.000	13.380	0.171 ***	0.080 *	-0.241 ***	0.178 ***	0.144 ***	1				
GEAR	0.931	12.379	-6.820	259.530	-0.037	-0.023	0.038	-0.112 **	-0.008	-0.027	1			
SRSIC	71.609	16.575	14.213	95.969	0.223 ***	0.165 ***	-0.121 **	0.097 **	-0.029	-0.095 **	0.070	1		
GRWT	0.133	0.343	-0.550	3.890	0.119 **	0.122 **	-0.079	0.091 *	0.042	0.111 **	-0.022	0.075	1	
MVBV	2.823	7.284	-52.360	86.000	0.102 **	0.097 **	0.001	0.001	0.070	0.027	-0.027	-0.005	0.024	1

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; The annotation *** indicates results significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; Variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN;

SRWDI: weighted disclosure index based on disclosed ICCA attributes measured as a square root transformation;

LNTA: Size being TA representing the sum of tangible fixed assets, intangible assets, investments (including associates), other assets, total stocks & WIP, total debtors & equivalent and cash & cash equivalents is measured as a log-transformed variable;

BETA: systematic risk as measured by a company's beta factor;

SHVOL: firm-specific risk as measured by share price volatility;

LQD: quick assets ratio;

GEAR: total debt / total capital % (long-term debt + short-term debt & current portion of long-term debt) / (total capital + short term debt & current portion of long term debt) * 100;

SRSIC: standard industry classification measured as a square root transformation;

GRWT: compounded five-year annual sales growth rate;

MVBV: market value to book value ratio.

The results of the univariate hypotheses tests reported in Table 2.1 indicate that the coefficients of the variables all have the predicted signs but that not all hypotheses are statistically validated. The results of the univariate analysis indicate significant correlation between WDI and TA, LQD, SIC, BETA, GRWT and MVBV. The parametric tests indicate that risk variables, SHVOL and GEAR are not significant although consistent with the expected sign.

The direction of the relationship with BETA indicates that higher levels of systematic risk motivate management to disclose IC. Management provide VDIC in an attempt to mitigate the risk of uncertainty inherent in IA investments, and thus reduce asymmetry of information. Although companies with higher SHVOL are likely to display less VDIC than those companies with lower firm specific risk, this result is not significant. In the presence of high market risk and reduced liquidity risk, GEAR is not a significant component of firm-specific risk in influencing VDIC. The univariate analysis supports the hypothesis of high growth companies disclosing IC. Such disclosure signal success and sustain growth by informing the markets of management's ability. Successful management practices and investment in IC are attributed as the driving force behind company growth. As such, it may be expected that companies with higher MVBV are associated with higher levels of VDIC; the lack of a conduit for reporting IC leads companies to disclose IC in the narratives, non-narratives and illustrations that are able to communicate qualitative and quantitative IC information that is not included in the audited financial statements of the company.

Table 4. Risk: regression results

$$WDI = \beta_0 + \beta_1 LNTA + \beta_2 BETA - \beta_3 SHVOL + \beta_4 LQD - \beta_5 GEAR + \beta_6 SIC + \beta_7 GRWT + \beta_8 MVBV + \varepsilon \qquad (2)$$

Model II : RISK (WDI)

		(i)		(ii)		(iii)		(iv)		(v)		(vi)		(vii)	
		OLS		QREG		QREG		QREG		QREG		QREG		QREG	
Independent Variable	Predicted sign	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	+	0.286	***	0.257	***	0.257	***	0.260	***	0.246	***	0.282	***	0.256	***
LNTA	+	0.022	***	0.023	***	0.023	***	0.026	***	0.024	***	0.021	***	0.023	***
BETA	+	0.024	*	0.028	**	0.028	**			0.029	**	0.037	**	0.029	**
SHVOL	-	-0.001		-0.004	**	-0.004	**	-0.003	*			-0.004	**	-0.004	**
LQD	+	0.016	***	0.016	***	0.016	***	0.021	***	0.014	***			0.016	***
GEAR	-	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***		
SRSIC	+	0.002	***	0.002	***	0.002	***	0.002	***	0.002	***	0.002	***	0.002	***
GRWT	+	0.037	*	0.039	**	0.039	**	0.045	***	0.042	***	0.052	***	0.039	***
MVBV	+	0.001	***	0.002	**	0.002	**	0.001	*	0.002	**	0.002	**	0.002	**
Mean VIF		1.07													
z		0.24													
F		25.21	***												
R^2		0.20		0.13		0.13		0.12		0.12		0.11		0.13	
N		439		439		439		439		439		439		439	

Table 3 confirms that size, as measured by TA, is positively associated with VDIC consistent with MV as reported in Table 1. On the one hand, the results indicate that TA as a size proxy is associated with high disclosing companies; on the other hand, the results suggest that there may be no grounds to expect asset intensive companies not to disclose IC. Consistent with Table 1, industrial trends are evident in the disclosure of IC as suggested by the significant association between VDIC and SIC. In addition, investigation of the inter-collinearity between the variables themselves reveals similar results that BETA is significantly correlated to SHVOL, LQD and GEAR. This result is consistent with the approach adopted by Abdelghany (2005), as beta is a measure of market risk, if an accounting determined risk measure is found not to be associated with market-based beta, the relevance of employing such a measure may be questioned (Beaver, Kettler, & Scholes, 1970).

The correlation of these variables in Model II, suggests that the inclusion of these variables as measures of risk

may be justified. In addition, results indicate that risk may be industry specific with respect to the SIC industry variable. The association between BETA and SIC suggests that high technology and innovative companies are associated with higher levels of systematic risk, given that these companies may be expected to have higher levels of hidden value. Both GRWT and MVBV have been associated with IA generation; the results are consistent with the predicted sign illustrating that high growth companies that have significant IA in their equity tend to disclose IC. Inter-collinearity between the risk variables suggests that tangible assets intensive companies are associated with less share volatility given the fact that shareholder value is supported by physical or financial resources. Furthermore, these larger companies have less liquidity, therefore suggesting that their tangible assets are in the form of fixed assets and investments as cash may be easily accessible from lines of credit. Collaborating evidence is provided in the relationship between TA and SIC, that suggests that increasing technological and innovative processes are conducted by smaller companies.

The Pearson correlation matrix provides evidence that SHVOL is associated with only one risk variable, LQD; as liquidity increases so too does firm specific risk, perhaps due to the inability of management to apply profits to new ventures. Similarly, high levels of liquidity are associated with higher market risk that may be attributed to companies with higher growth rates. However, the results suggest that those companies with higher levels of liquidity are associated with the more basic industries. Service orientated and high technology companies may be associated with less liquidity. The next section discusses the results of the multivariate analysis; in general, various components of risk are significant in influencing the variation in VDIC. High financial risk as measured by LQD and GEAR leads to lower levels of VDIC. Market measures of risk on the other hand have provided generally weaker results in particular SHVOL that has proved insignificant in all but the QREG model. BETA on the other hand, indicates that market risk is a positive determinant of the variation in the extent of VDIC. Although the relationship is weak in the OLS model, the partial correlation matrix, the Pearson correlation matrix and the QREG model report a significant association between BETA and VDIC

3.3 Industry Membership

The descriptive statistics indicate that 16% of the sample companies are listed on the TechMARK exchange whilst 48% of companies are manufacturing. The ratio of MVTA is 1.16, it indicates that TA is as representative a proxy for size as is MV. Furthermore, the mean value for MVTA indicates that on average the sample MV exceeds TA by 16%. However, the minimum and maximum values for MVTA indicate that the "hidden value" varies from a fraction of the TA value to over ten times the value of TA. Industry variables INDG and SIC indicate a wide range of economic activities within the sample as illustrated by the minimum and maximum values. A significant association is established between WDI and SALES, TMRK, SIC, MVTA, MANUF and INDG. GEAR is insignificant in the univariate analysis whereas other variables in the parametric results of Model II are consistent with the predicted sign. The size variable is a significant determinant of VDIC whether measured by TA, MV or SALES. GEAR is included as a measure of financial risk that accounts for the variation in the extent of disclosure that may be attributed to agency costs. The partial correlation results indicate that gearing may be unimportant in the disclosure decision. The existence of "hidden value" accompanied by large sales revenue is sufficient motivation for companies in high technology and innovative industries to disclose IC. It may be that these companies do not rely on debt to finance their operations due to the lack of adequate debt security and the specificity and non-tradability of their assets.

Table 5. Industry membership

Variable	Mean	SD	Min	Max	COR	SRWDI	LNSALES	TMRK	MANUF	INDG	SRSIC	MVTA	GEAR
SRWDI	0.561	0.118	0.265	0.866		1							
LNSALES	5.811	2.013	0.501	11.404	0.426 ***	0.278 ***	1						
TMRK	0.164	0.371	0.000	1.000	0.216 ***	0.217 ***	-0.284 ***	1					
MANUF	0.476	0.500	0.000	1.000	-0.105 **	-0.230 ***	0.239 ***	-0.324 ***	1				
INDG	80.970	35.234	30.000	157.000	0.118 **	0.264 ***	-0.110 **	0.382 ***	-0.425 ***	1			
SRSIC	71.609	16.575	14.213	95.969	0.131 ***	0.165 ***	-0.142 ***	0.032	-0.453 ***	0.286 ***	1		
MVTA	1.164	1.180	0.070	10.880	0.147 ***	0.144 ***	-0.237 ***	0.240 ***	-0.263 ***	0.172 ***	0.040	1	
GEAR	0.931	12.379	-6.820	259.530	-0.050	-0.023	0.062	-0.025	0.053	0.016	0	-0.045	1

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; The annotation *** indicates results

significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; Variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN;

SRWDI: weighted disclosure index based on disclosed ICCA attributes measured as a square root transformation;

LNSALES: Size being the sum of net sales or revenues representing gross sales and other operating revenue less discounts, returns and allowances as a log-transformed variable;

TMRK: dichotomous variable that scores "1" for listing on the TechMARK listing and "0" otherwise;

MANUF: dichotomous variable that scores "1" for manufacturing and "0" for non-manufacturing;

INDG: this variable returns the DataStream level 6 industrial classification number;

SRSIC: standard industry classification measured as a square root transformation;

MVTA: ratio of market value to total assets

GEAR: total debt / total capital % (long-term debt + short-term debt & current portion of long-term debt) / (total capital + short term debt & current portion of long term debt) * 100;

The existence of a low level of collinearity between industry classifications confirms the existence of a common basis; high levels of IC within non-manufacturing companies and increasing levels of IC with ascending SIC code, as is the case with non-manufacturing and increasing complexity from basic to service goods in INDG. MVTA represents the existence of "hidden value" within high technological and innovative companies.

Table 6. Industry: Regression Results

$$WDI = \beta_0 + \beta_1 LNSALES + \beta_2 MVTA - \beta_3 GEAR + \beta_6 TMRK - \beta_4 MANUF + \beta_3 INDG + \beta_5 SIC + \varepsilon \qquad (3)$$

Model III : INDUSTRY MEMBERSHIP (WD)I

		(i)		(ii)		(iii)		(iv)		(v)		(vi)		(vii)		(vii)	
		OLS		OLS		QREG		QREG		QREG		QREG		QREG		QREG	
Independent V	Predicted sign	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	+	0.299	***	0.321	***	0.297	***	0.514	***	0.293	***	0.259	***	0.299	***	0.370	***
LNSALES	+	0.026	***	0.025	***	0.026	***	0.027	***	0.025	***	0.024	***	0.028	***	0.024	***
MVTA	+	0.014	***	0.015	***	0.018	***	0.013	**	0.021	***	0.018	***	0.020	***	0.017	***
GEAR	-	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***	0.000	***
TMRK	+	0.070	***			0.077	***					0.083	***	0.086	***	0.059	***
MANUF	-	-0.027	**			-0.032	**			-0.029	**			-0.035	**	-0.050	***
INDG	+	0.000	**			0.000	*			0.001	***	0.000	**			0.001	**
SRSIC	+	0.001	**			0.001	**			0.001	*	0.001	**	0.001	**		
BASIC	?			0.014				-0.186	***								
CHEM	?			(dropped)				-0.234	***								
ENG	?			-0.005				-0.210	***								
ELEC	?			0.115	***			-0.096	**								
PHAR	?			0.208	***			(dropped)									
RET	?			0.003				-0.218	***								
COMP	?			0.128	***			-0.077	*								
SERV	?			0.118	***			-0.094	**								
Mean VIF		1.29		2.30													
z		0.1975		0.3268													
F		40.50	***	53.43	***												
R2		0.2682		0.3874		0.1513		0.2368		0.13		0.15		0.15		0.14	
N		439		439		439		439		439		439		439		439	

This association is supported by the negative association between MANUF and MVTA that supports non-manufacturing companies as having a higher incidence of "hidden value". The direction of the association between INDG and SIC indicates the consistency of the two classifications in the measurement of innovation, complexity and technology. The results of the QREG model is consistent with the OLS model, however the

variation in INDG between the two models is not material given the significant associations reported in the partial and Pearson correlation matrices. Significant for the multivariate analysis is the negative significant relationship between VDIC and GEAR that was reported as insignificant in both the partial and Pearson correlation matrices. The paper proposes that in the presence of "hidden value" large companies with low debt levels operating in high technology and innovative industries provide a high level of IC disclosure. The results of Model III appear to be robust; the results of the four industry classifications have provided significant results, consistent with the theoretical approach based on signalling theory. The dummy variables (Appendix 1) on the other hand provide more interesting and more detailed results. First, the explanatory variables SALES, MVTA and GEAR remain significant irrespective of whether industry classifications are applied or dummy industry variables are applied. Second, industry variables TMRK, MANUF, INDG and SIC are consistent in basing their association with VDIC on ascending TechMARK listing membership (i.e. increasing third party recognition of IC content), on increasing non-manufacturing (MANUF) economic activity, on increasing complexity in INDG and on increasing service activity in SIC. Both the OLS and QREG models provide consistent results with respect to these industry variables nevertheless, it is noted that INDG provides a weaker result in the QREG model. Third, certain dummy variables, electric and services are significant in both the OLS and QREG modes. Fourth, coefficients in both the OLS and QREG model are consistent in terms of basic, engineering and retail sectors having the lowest coefficients and computer, services and electric having the highest coefficients. The order of significance is maintained in both the OLS and QREG models consistent with expectation that the more basic resources, manufacturing, less complex and retail organisation may be expected to disclose less IC than those organisations associated with more processing, non-manufacturing activities, more complex and service organisations that are characterised by greater VDIC. Fifth, consistent with four above, although coefficients of the dummy variables in the QREG model are negative, the paper examines the order in the size of the coefficients to establish their relative positions in their influence on VDIC. Considering only the significant results and the highest coefficients, pharmaceuticals is the industry that discloses the most IC attributes under the OLS model and services under the QREG model. The results indicate that companies associated with high technological and innovative characteristics whether classified under TMRK, MANUF or SIC and to a lesser extent INDG provide higher levels of VDIC; these companies include those from pharmaceutical, computer, services and electric industry sectors. Disclosure of ICCA attributes appears to be motivated by the presence of "hidden value" as measured by MVTA. Furthermore, consistent with the characteristics of larger companies, the availability of resources to manage the IC disclosure process coupled with reduced financial risk is sufficient explanation for the signalling of IC attributes.

3.4 Corporate Governance

The descriptive statistics indicate that on average, equity value exceeds book value threefold consistent with the expectation of the content of "hidden value"; furthermore, the minimum and maximum values of MVBV indicate significant variation between companies, this is also matched by the significant variation in the extent of VDIC as illustrated by the dependent variable WDI. The descriptive statistics for untransformed variables EXPRCD and DIRSHS are not reported in Table 4.1 nevertheless, summary statistics indicate that 40% of the board consists of experienced non-executive directors and 8% of the company's equity is held by directors. In addition, CNED indicates that 52% of chairs are non-executive directors. The results of the partial correlation matrix indicate that companies with "hidden value", consistent with companies in more complex industries, that remunerate both employees and directors equally well provide substantially more IC disclosure.

Table 7. Corporate Governance

Variable	Mean	SD	Min	Max	COR	SRWDI	EXCREM	CNED	SREXPRCD	SRDIRSHS	TMRK
SRWDI	0.561	0.118	0.265	0.866		1					
EXCREM	1864.480	2321.618	0.000	27942.510	0.196 ***	0.236 ***	1				
CNED	0.522	0.500	0.000	1.000	-0.169 ***	-0.121 **	-0.064	1			
SREXPRCD	0.595	0.226	0.000	1.622	0.073	0.081 *	0.148 ***	0.318 ***	1		
SRDIRSHS	0.189	0.214	0.000	0.927	-0.198 ***	-0.213 ***	-0.213 ***	-0.126 ***	-0.114 **	1	
TMRK	0.164	0.371	0.000	1.000	0.252 ***	0.217 ***	0.070	0.055	0.056	0.021	1

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; The annotation *** indicates results

significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; Variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN;

SRWDI: weighted disclosure index based on disclosed ICCA attributes measured as a square root transformation;

EXCREM: executive remuneration

CNED: dichotomous variable that scores "1" for a chair who is a non-executive director and "0" for an executive chair;

EXPRCD: ratio of experienced non-executive directors to total directors measured as a square root transformation;

DIRSHS: Directors beneficial shareholding in the ordinary equity of the company measured as a square root transformation;

TMRK: dichotomous variable that scores "1" for listing on the TechMARK listing and "0" otherwise;

These companies have separate executive roles between chair and non-executive director and are characterised by lower director shareholding. The expectation of increasing director shareholding to increase VDIC has not been realised but the result has proved significant. The theoretical approach however may hold intact. The paper proposes that the motivation for management to align goals with those of shareholders may take place at a lower shareholding ratio than that currently held by the management of companies (8%). Dummy variables introduced as a sensitivity test on this variation are summarised in Appendix 2. VDIC increases when the roles of chair and non-executive director are segregated. The results indicate that although the relationship with EXPRCD is weak and that with GEAR is insignificant, the direction of the relationships is consistent with the predicted sign. Inter-correlation amongst the independent variables indicates that corporate governance variables EXCREM and EXPRCD are correlated signifying higher directors' remuneration may be associated with board composition, when cross directorships are present amongst NONEXEC.

Table 8. Corporate Governance: Regression Results

$$WDI = \beta_0 + \beta_1 EXCREM - \beta_2 CNED + \beta_3 EXPRCD + \beta_4 DIRSHS + \beta_5 TMRK + \varepsilon \qquad (4)$$

Model IV :CORPORATE GOVERNANCE (WDI)

		(i)		(ii)		(iii)		(iv)		(v)		(vi)		(vii)		(viii)	
		OLS		QREG		QREG		QREG		QREG		QREG		OLS		QREG	
Independent Variable	Predicted sign	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
Constant	+	0.549	***	0.508	***	0.538	***	0.511	***	0.566	***	0.491	***	0.554	***	0.510	***
EXCREM	+	0.000	***	0.000	***			0.000	**	0.000	***	0.000	***	0.000	***	0.000	***
CNED	-	-0.040	***	-0.059	***	-0.056	***			-0.052	***	-0.054	***	-0.038	***	-0.057	***
SREXPRCD	+	0.037		0.102	***	0.106	***	0.051				0.093	***	0.041		0.098	***
SRDIRSHS	+	-0.105	***	-0.074	***	-0.115	***	-0.089	**	-0.081	***						
TMRK	+	0.076	***	0.089	***	0.083	***	0.084	***	0.083	***	0.088	***	0.079	***	0.091	***
DS1	?													-0.033	**	-0.018	
DS2	?													-0.028		0.016	
DS3	?													0.048	***	-0.029	
DS4	?													-0.052	***	-0.025	
DS5	?													-0.071	***	-0.049	*
DS6	?													-0.062	*	-0.022	
Mean VIF		1.090												1.15			
z		0.17												0.21			
F		16.23	***											8.81	***		
R^2		0.16		0.10		0.08		0.07		0.09		0.09		0.17		0.07	
N		439		439		439		439		439		439		439		439	

However, with increasing director share ownership, it appears that executive remuneration is suppressed. Similarly, CNED encourages EXPRCD whilst restricting DIRSHS. On the other hand, the association between EXPRCD and DIRSHS and EMPC is negative indicating that fewer experienced NONEXEC are appointed when DIRSHS is larger, furthermore that the more EXPRCD present in the board, the less the employee remuneration. The correlation matrix identifies the conflicts of interest that exist within the governance function. To remain independent EXPRCD are encouraged to hold little or no equity. With increasing DIRSHS, conflicts of interest are expected to increase as entrenchment policies lead to reduced disclosure. As a non-executive director, CNED may be expected to increase the effectiveness of NONEXEC by appointing more EXPRCD. In contrast, an increase in DIRSHS may lead to better corporate governance mechanisms with respect to the separation of dual roles in CNED. The theoretical approach is adopted from agency theory as management may divert resources for self-objectives, shareholders may respond by increasing monitoring mechanisms, corporate governance mechanisms that may result in increased disclosure.

Within the OLS model, the expectation that additional experience and knowledge that may accrue from being a NONEXEC may result in an increase VDIC, has not been realised. The results indicate that additional experience and cross-directorships in NONEXEC does not lead to higher levels of VDIC. Nevertheless, the QREG model indicates a positive and significant association; however, the effect of this change is reflected in a weaker MVBV association. The sensitivity test applied to DIRSHS overall has no influence on other variables included in the model. Both the OLS and QREG model report consistent results in the presence of the dummy variables. Furthermore, EXPRCD becomes significantly stronger in its association with VDIC. With respect to DIRSHS, dummy variables indicate varying results for the respective equity percentages held by directors. Directors, who own on average 4.8% to 49% of share equity as represented by DS3, DS4 and DS5, disclose the least amount of IC attributes. This level of DIRSHS may be associated with entrenchment strategies as the executive board increases control and private benefits not available to minority shareholders. The relationship is found to be insignificant with respect to share equity held that is less than 2.9% and less than 4.8% with respect to the QREG model, perhaps signifying the lack of sufficient incentives to VDIC at such equity ownership levels. However, the OLS model finds a significant negative association at the 2.9% level, but an insignificant association between 2.9% and 4.8%. Within the 4.8% to 9.6% equity ownership band, the band in which the average sample company falls, director ownership suppresses IC attribute disclosure consistent with the beginnings of shareholder control conflicts and entrenchment policies. Corporate governance mechanisms address the agency problem and the separation of ownership and control. The extent to which management disclose IC is influenced by the composition and quality of the board of directors. The corporate governance variables included in Model IV have returned mixed results on their influence on VDIC. The theoretical approach is adopted on agency theory, as there are important connections between the VDIC and corporate governance mechanisms. Both concepts focus on value creation for shareholders; IC leverages a company's IA and corporate governance focuses on stakeholder influences that affect managerial decision-making (Weimer & Pape, 1999). As such, corporate governance is accountable for its traditional role with respect to financial and physical capital and in addition for IC. Furthermore, corporate governance mechanisms are themselves IC, being mobilisations of human, culture, innovation, external and internal structure capital geared towards achieving company objectives (Keenan & Aggestam, 2001). As such the results of Model IV, confirm that shareholders apply corporate governance mechanisms to increase monitoring; these mechanisms assure shareholders of a return on their investment. Investors cannot rely on financing without corporate governance mechanisms. Further, legal protection of investor rights is one essential element of corporate governance mechanisms.

3.5 Full Model

WDI measures both the construct of existence of an IC attribute (DI) and the construct of competitive advantage (WDI) as such the research applies WDI as the dependent variable for Models I to IV. In the Full Model however, DI is applied as the dependent variable, in addition to WDI as a sensitivity test. The results of the descriptive analysis of DI and WDI are presented in Tables 5.1 and 5.2 that illustrate DI has a range of 0.09 to 0.86, with a mean of 0.48. The range for WDI is 0.07 to 0.75 and the mean is 0.33. For both DI and WDI, the mean and median are close and the standard deviation is marginal indicating that the content analysis methodology was appropriate and reliable in measuring disclosure quality in ICCA; results suggest normal distribution for both DI and WDI. As WDI<DI, 48% of IC attributes were disclosed, whereas only 33% of ICCA attributes were disclosed. This variance indicates that fewer disclosures are competitive advantage related.

Table 9. Full Model (WDI)

Variable	Mean	SD	Min	Max	COR	SRWDI	LNSALES	MVTA	GEAR	TMRK	SRSIC	EMPC	SREXPRCD	CNED
WDI	0.330	0.130	0.070	0.750										
SRWDI	0.561	0.118	0.265	0.866		1.000								
LNSALES	5.811	2.013	0.501	11.404	0.414 ***	0.278 ***	1.000							
MVTA	1.164	1.180	0.070	10.880	0.173 ***	0.144 ***	-0.237 ***	1.000						
GEAR	0.931	12.379	-6.820	259.530	-0.060	-0.023	0.062	-0.045	1.000					
TMRK	0.164	0.371	0.000	1.000	0.305 ***	0.217 ***	-0.284 ***	0.240 ***	-0.025	1.000				
SRSIC	71.609	16.575	14.213	95.969	0.234 ***	0.165 ***	-0.142 ***	0.040	0.070	0.032	1.000			
EMPC	48.210	302.911	0.000	6,323.900	0.144 ***	0.112 **	0.003	0.031	-0.006	0.003	-0.069	1.000		
SREXPRCD	0.595	0.226	0.000	1.622	0.110 **	0.081 *	-0.018	0.025	-0.018	0.056	0.081 *	-0.116 **	1.000	
CNED	0.522	0.500	0.000	1.000	-0.122 **	-0.121 **	-0.121 **	0.014	-0.050	0.055	-0.023	-0.045	0.318 ***	1.000

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; The annotation *** indicates results significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; Variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN.

SRWDI: weighted disclosure index based on disclosed ICCA attributes measured as a square root transformation;

LNSALES: Size being the sum of net sales or revenues representing gross sales and other operating revenue less discounts, returns and allowances as a log-transformed variable;

MVTA: ratio of market value to total assets;

GEAR: total debt / total capital % (long term debt + short term debt & current portion of long term debt) / (total capital + short term debt & current portion of long term debt) * 100;

TMRK: dichotomous variable that scores "1" for listing on the TechMARK listing and "0" otherwise;

SIC: standard industry classification measured as a square root transformation;

EMPC: staff costs including all employee benefits such as health insurance and pension plan contributions / number of employees (representing the number of both full and part time employees of the company);

EXPRCD: ratio of experienced non-executive directors to total directors measured as a square root transformation;

CNED: dichotomous variable that scores "1" for a chair who is a non-executive director and "0" for an executive chair.

The partial correlation (COR) results illustrate that consistent with the predicted sign, variables SALES, MVTA, TMRK, SIC, EMPC and CNED are associated with ICCA attributes. Generally, the results of DI and WDI are consistent with GEAR being the only variable not associated with VDIC in both WDI and DI variations. The partial correlation matrix indicates that large companies signal their competitive advantage through disclosure; the "hidden value" as represented by MVTA leads to the disclosure of IC that may otherwise remain invisible to shareholders and investors. As a representative of the investment in IC, EMPC is associated with VDIC as companies signal the value of HC in generating competitive advantage. The results of Models II, III and IV indicate that GEAR is not a significant component of firm-specific risk within the univariate analysis; nevertheless, its inclusion is significant within the multivariate analysis suggesting that it is an important control variable. The existence of "hidden value" accompanied by large sales revenue is sufficient motivation for companies in high technology and innovative industries to disclose IC. It may be that these companies do not rely on debt to finance their operations due to the lack of adequate debt security and the specificity and non-tradability of their assets. Consistent with Tables 5.1 and 5.2, industrial trends are determinants of VDIC as suggested by the significant association between VDIC and SIC. The positive association with TMRK is based on the high IC required for membership that is found in technological, innovative and R&D intense companies. Similarly, SIC differentiates companies on a basis of technology content and complexity. The variable CNED exhibits a negative association. VDIC decreases when the roles of chair and NONEXEC are combined.

Table 10. Full Model (DI)

Variable	Mean	SD	Min	Max	Cor	SRDI	LNSALES	MVTA	GEAR	TMRK	SRSIC	EMPC	SREXPRCD	CNED
DI	0.480	0.140	0.090	0.860										
SRDI	0.684	0.108	0.300	0.927		1								
LNSALES	5.811	2.013	0.501	11.404	0.466 ***	0.384 ***	1							
MVTA	1.164	1.180	0.070	10.880	0.130 ***	0.073	-0.237 ***	1						
GEAR	0.931	12.379	-6.820	259.530	-0.054	-0.017	0.062	-0.045	1					
TMRK	0.164	0.371	0.000	1.000	0.267 ***	0.145 ***	-0.284 ***	0.240 ***	-0.025	1				
SRSIC	71.609	16.575	14.213	95.969	0.108 **	0.039	-0.142 ***	0.040	0.070	0.032	1			
EMPC	48.210	302.911	0.000	6323.900	0.136 ***	0.111 **	0.003	0.031	-0.006	0.003	-0.069	1		
SREXPRCD	0.595	0.226	0.000	1.622	0.122 **	0.074	-0.018	0.025	-0.018	0.056	0.081 *	-0.116 **	1	
CNED	0.522	0.500	0.000	1.000	-0.138 ***	-0.140 ***	-0.121 **	0.014	-0.050	0.055	-0.023	-0.045	0.318 ***	1

The table reports the results of the descriptive statistics, the univariate analysis (COR) and the person correlation matrix of the disclosure index (WDI) and the independent variables; The annotation *** indicates results significant at a 0.01%, **, at 0.05% and * at 0.10% levels of significance; Variables transformed by square roots are prefixed with SR; Variables transformed by logs are prefixed with LN.

SRDI: disclosure index based on disclosed IC attributes measured as a square root transformation;

LNSALES: Size being the sum of net sales or revenues representing gross sales and other operating revenue less discounts, returns and allowances as a log-transformed variable;

MVTA: ratio of market value to total assets;

GEAR: total debt / total capital % (long term debt + short term debt & current portion of long term debt) / (total capital + short term debt & current portion of long term debt) * 100;

TMRK: dichotomous variable that scores "1" for listing on the TechMARK listing and "0" otherwise;

SIC: standard industry classification measured as a square root transformation;

EMPC: staff costs including all employee benefits such as health insurance and pension plan contributions / number of employees (representing the number of both full and part time employees of the company);

EXPRCD: ratio of experienced non-executive directors to total directors measured as a square root transformation;

CNED: dichotomous variable that scores "1" for a chair who is a non-executive director and "0" for an executive chair.

The expectation that, additional experience and knowledge that may accrue from being a NONEXEC may result in a motivation to increase VDIC has not been realised. An association thus exists between EXPRCD and WDI, consistent with the monitoring role of NONEXEC that is hypothesised to reduce agency costs through IC disclosure. Overall, the results indicate that companies with "hidden value", consistent with companies in more complex industries, that remunerate employees well provide substantially more IC disclosure. These companies have separate executive roles between chair and non-executive director and favour relative more appointments of EXPRCD.

The results of the Pearson correlation indicate consistency of results with those of the partial correlation matrix for both WDI. The results of DI provide different results, MVTA, SIC and EXPRCD are not associated with VDIC in the Pearson correlation matrix although significant in the partial correlation matrix. This result provides further evidence of the quality of WDI as a measure of both constructs of existence of IC and competitive advantage in ICCA. The results of inter-collinearity between the independent variables, indicates that the larger companies are associated with lower levels of "hidden value". Furthermore, it is the smaller companies that are associated with industries involved in technological and innovative operations as well as more complex service orientated activities.

Table 11. OLS AND QREG Regression - Model V: The Full Model

$$WDI = \beta_0 + \beta_1 EXPRCD - \beta_2 GEAR - \beta_3 CNED + \beta_4 EMPC + \beta_5 MVTA + \beta_6 SIC + \beta_7 TMRK + \beta_8 SIZE + \varepsilon \qquad (5)$$

Model V : Dependent Variable		WDI				DI			
		OLS		QREG		OLS		QREG	
Independent Variable	Predicted sign	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Constant	+	0.258	***	0.261	***	0.446	***	0.460	***
LNSALES	+	0.025	***	0.023	***	0.026	***	0.026	***
MVTA	+	0.016	***	0.020	***	0.011	***	0.012	**
GEAR	-	0.000	***	0.000	***	0.000	***	0.000	***
TMRK	+	0.092	***	0.098	***	0.073	***	0.075	***
SRSIC	+	0.001	***	0.001	***	0.001	**	0.000	
EMPC	+	0.000	***	0.000	***	0.000	***	0.000	***
SREXPRCD	+	0.053	**	0.091	***	0.053	**	0.065	**
CNED	-	-0.026	**	-0.046	***	-0.027	***	-0.045	***
Mean VIF		1.09				1.09			
z		0.21				0.17			
F		0.53	***			0.56	***		
Adj. R^2		0.27		0.17		0.27		0.16	
N		439		439		439		439	

The association between size and CNED reveals that larger companies generally separate the executive roles of chair and NONEXEC. This choice may be due to the availability of more resources in larger companies. Companies that are associated with greater numbers of EXPRCD are associated with less remuneration for employees that may be attributed to their monitoring and control function. However, EXPRCD may be seen to encourage the appointments of chairs who are NONEXEC consistent with their own roles as NONEXEC. TMRK listed companies are confirmed as having higher levels of "hidden value". Overall, the results are consistent in both WDI and DI and in the partial and Pearson correlation matrices. The major finding however is that WDI is more responsive than DI, as a quality disclosure index WDI is able to capture the "hidden value" as in MVTA, the industry reporting trends in SIC and number of NONEXEC as in EXPRCD. The next section discusses the results of the multivariate analysis. The results of Model V indicate that SALES, MVTA, GEAR, TMRK, SIC, EMPC, EXPRCD and CNED are significant determinants of the level of VDIC. Generally, all variables are significant in all variants of Model V, WDI and DI, OLS and QREG models with the exception of SIC which is insignificant only in the QREG model applying DI as the disclosure index. These results are consistent with the parametric tests of Tables 5.1 and 5.2, GEAR however, which is negative in the tests of association, is positive in the regression analysis. The results of the sensitivity analysis that introduce the dummy industry variables into the OLS and QREG models are consistent between WDI and DI variants.

The results of Model V have returned significant F-statistics, confirming the existence of a strong linear relationship. First, as reported in Table 5.3 the necessary conditions for IC disclosing companies are retained in the results of the dummy variables; larger companies signal hidden value generated by investment in employees and generally characterised by lower financial risk. These determinants are consistent irrespective of the industry variables applied whether industry classifications or dummy industry variables and whether the quantitative index (DI) or qualitative index (WDI) is applied. EXPRCD and CNED provide weaker support in the weighted index. Nevertheless, the QREG model provides a significant result indicating that NONEXEC with experience attained through cross-directorships, provide transparency, accountability and monitoring through IC disclosure. Companies that have separated the executive roles of chair and NONEXEC are characterised by higher levels of IC disclosure. Larger companies may have such resources to enable the segregation of these functions. Overall, DI provides support for WDI; the results of DI indicate that there is a significant difference between the quantitative and the qualitative indices in the multivariate analysis; the insignificant result in the OLS model and weak association in the QREG model for variables EXPRCD and CNED illustrate that disclosure indices are based on different constructs.

Table 12. Model V: The Full Model with Dummy Industry Variables

$$WDI = \beta_0 + \beta_1 EXPRCD - \beta_2 GEAR - \beta_3 CNED + \beta_4 EMPC + \beta_5 MVTA + \beta_6 SIZE + \beta_7 BASIC + \beta_8 ENG + \beta_9 ELEC + \beta_{10} PHAR \quad (8)$$
$$+ \beta_{11} RET + \beta_{12} COMP + \beta_{13} SERV + \varepsilon$$

Model V : Dependent Variable		WDI				DI			
		OLS		QREG		OLS		QREG	
Independent Variable	Predicted sign	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.	Coefficient	Sig.
Constant	+	0.314	***	0.283	***	0.464	***	0.460	***
LNSALES	+	0.024	***	0.024	***	0.025	***	0.025	***
MVTA	+	0.015	***	0.012	**	0.011	***	0.014	***
GEAR	-	-0.001	***	-0.001	***	0.000	***	0.000	***
EMPC	+	0.000	***	0.000	***	0.000	***	0.000	***
SREXPRCD	+	0.037		0.045	*	0.044	**	0.071	***
CNED	-	-0.018	*	-0.025	**	-0.022	**	-0.035	***
BASIC		0.01		0.049	**	0.019		0.029	
CHEM		(dropped)		(dropped)		(dropped)		(dropped)	
ENG		0.00		0.025		-0.009		-0.011	
ELEC		0.11	***	0.146	***	0.088	***	0.096	***
PHAR		0.20	***	0.224	***	0.126	***	0.111	***
RET		0.00		0.014		-0.013		-0.035	
COMP		0.12	***	0.152	***	0.067	***	0.055	**
SERV		0.12	***	0.142	***	0.069	***	0.059	**
Mean VIF		2.05				2.05			
z		0.27				0.49			
F		0.56	***			0.37	***		
Adj. R^2		0.40		0.25		0.33		0.21	
N		439		439		439		439	

Second, in Table 5.3, industry variables TMRK and SIC are consistent in basing their association with VDIC on ascending IC content; TMRK on increasing third party recognition of IC content and SIC on increasing service activity and complexity. In Table 5.3, both the OLS and QREG models provide results consistent with respect to these industry variables; these industry reporting trends are mirrored in the results of the dummy variables as reported in Table 5.4. Consistent with the results of Model III, coefficients in both the OLS and QREG model are consistent in terms of basic, engineering and retail sectors having the lowest coefficients and computer, services and electric having the highest coefficients. The order of significance is maintained in both the OLS and QREG models consistent with expectation that the more basic resources, manufacturing, less complex and retail organisation may be expected to disclose less IC than those organisations associated with more processing, non-manufacturing activities, more complex and service organisations that are characterised by greater VDIC. Table 5.4 illustrates that industries that are significant in disclosing the most IC attributes under the OLS and QREG models pharmaceuticals, electrical, services and computers are industries associated with innovation and technological economic activities. Although coefficients of the dummy variables in the QREG model are negative, the research examines the order in the size of the coefficients to establish their relative positions in their influence on VDIC.

All variations of Model V are consistent in illustrating that industries with IC content generally disclose more IC than those without. In the next, section the research examines the results of the individual independent variables in order to confirm the hypothesised influence on VDIC.

3.5.1 Size

The result of Model V confirms that for larger companies, the benefits of signalling IC outweigh the potential disclosure costs. Being larger and having access to more resources, larger companies may be able to institute barriers to entry. Management behaviour is explained by signalling theory as successful management practices

are advertised to inform markets of the company's competitive advantage.

Consistent with the disclosure of RC attributes that signal the IC embedded in the processes that expand markets, build and maintain customer relations and ensure adequate distribution channels. Therefore, this research confirms that SALES is a significant positive variable on the extent of VDIC, hypothesis H1.1: in Model V is accepted.

H1.1: Size as measured by SALES is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.2 MVTA

Consistent with Edvinsson and Malone (1997) who define the difference between a company's BV and MV as the value of IC; this research acknowledges the existence of this "hidden value" due to the inability of traditional financial statements to report SC, RC and HC. The results are consistent in all variants of Model V. Furthermore, in response to the measurement problems associated with the denominator in the MVBV ratio, the alternative proxy for the hidden value MVTA is associated with VDIC. The result suggests that as a proxy for IC intensive companies, MVTA is associated with VDIC that signals the existence of equity value not accounted for in the traditional reporting framework. Signalling theory explains that management may be motivated to disclose more IC when the MVTA ratio is larger. This explanation is supported as service, high technology, R&D and computer and software development companies are more disadvantaged by current accounting regulations than are traditional tangible assets based companies, being IC intensive there companies are expected to have a higher MVTA ratio that may proxy for the difference between intangible and tangible asset based equities. The proxies for this "hidden value" MVTA has been found to be positive and significantly associated with VDIC in both the partial and Pearson correlation matrices and in both the OLS and QREG models. Therefore, the hypothesis H5.4: in Model V is accepted.

H5.4: MVTA is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.3 Gearing (GEAR)

The results of Model V indicate that the higher the proportion of debt in a company's capital structure, the lower the disclosure of IC. Highly geared companies apply debt to finance expansion and purchase of long-term tangible assets. The financial risk associated with such debt levels does not lead to VDIC. Debt providers may demand specific information through alternative channels particularly when the level of financial risk increases. The explanation for this negative result may be based on agency theory that proposes motivation based on management reducing VDIC to facilitate project turnaround tactics that may sustain their positions and /or sustain the perception of success. Furthermore, by perpetuating this position, increased asymmetric information leads to more agency costs. Generally, tangible asset intensive companies tend to be concentrated in manufacturing and less-technological industries that are characterised by less VDIC. In addition, tangible asset based companies may have the physical assets against which debt may be secured, unlike IC intensive companies that may have to rely on internal generated capital or equity finance thus rendering their gearing ratios to lower levels. Highly geared companies may not have the financial resources required firstly for investment in IC; secondly, highly geared companies may not have the necessary resources for investment in the processes and procedures required to identify, manage and report IC. Agency theory views debt as a governance device useful in reducing the conflict between shareholders and management (Jensen, 1986). Debt reduces cash flow available to management as the company is contractually bound to repay interest and capital. In addition, Williamson (1988) concluded that debt providers might be unwilling to finance projects with high company specificity; such companies may exist in industries that may be associated with tangible and intangible assets that have reduced tradability. Furthermore, with increasing insolvency risk, management may be expected to focus on short-term projects to the exclusion of R&D. VDIC is expected to decrease as gearing increases and as the investment in IC decreases. Despite both the Pearson correlation and the partial correlation coefficients, returning insignificant results the expectation of a negative association has been confirmed by both the OLS and QREG models in the multivariate analysis and in both WDI and DI. The research concludes that in Model V, the hypothesis H4.4: is accepted.

H4.4: Highly geared companies are more likely to provide less VDIC than less geared companies are.

3.5.4 TechMARK Listing

Companies that have been admitted as members of the TMRK listing are associated with higher levels of IC disclosure relative to non-members. Previous industry studies by Bozzolan et al., (2003), Williams (2001) and Cooke (1989 & 1991) yielded significant results. The theoretical motivation is derived from signalling theory.

TMRK is positively associated with the extent of VDIC in all variants of Model V. The conclusion for this variable therefore is that the hypothesis H3.1: is accepted.

H3.1: TMRK is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.5 SIC

The results of Model V indicate that this ascending industry classification ranging from 0100 basic agriculture industry to 9000 complex service industries is associated with WDI in the partial correlation, the Pearson correlation, the OLS model and the QREG model. These results are mirrored by the sensitivity test that is based on DI; however the QREG model provides the only insignificant result that indicates that TMRK may be sufficient in controlling for industry reporting trends. The motivations are derived from signalling theory. Service and highly complex companies are expected to apply IA and IC, unique to their organisation and therefore not easily replicable. The conclusion for this variable therefore is that the hypothesis H3.4: is accepted.

H3.4: SIC is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.6 Employee Cost (EMPC)

The results indicate that increasing remuneration per employee positively influences management to greater levels of VDIC. Increasing salary cost per employee may be attributed to higher levels of education, more experience and highly complex professions. In an environment in which measurement of HC is complex, EMPC is a proxy for the value of HC in companies or alternatively, the rent required to maintain the HC in place. The motivation for this hypothesis is based on signalling theory. Proprietary costs are mitigated in the first instance by the perceived benefits of signalling and in the second by the disclosure of "better than the worst case scenario" that the markets would have assumed. This signalling is consistent with investment in training, health insurance and pension plans as employers signal their successful investment in HC through VDIC. The theoretical explanations are taken from signalling theory the expectation of a significant positive relationship is confirmed. Effective human resource practices are expected to lead to signals that indicate a competitive labour force to the markets. The conclusion for this variable therefore, is that the hypothesis H5.1: is accepted.

H5.1: EMPC is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.7 EXPRCD

Model V confirms the hypothesis of a positive significant relationship between VDIC and EXPRCD. The multivariate analysis illustrates that the proportion of EXPRCD is significant in explaining the variation in VDIC (Table 5.3). Both the OLS and QREG models provide consistent results, in addition the qualitative and quantitative indices support the significant association. In Table 5.4 however, the OLS model provides a weaker result for the dummy industry variables; this result indicates that EXPRCD may be insignificant in the disclosure decision for electrical, pharmaceutical, computer and service companies. Nevertheless, the QREG model provides better results and in both the OLS and QREG models, applying DI as the dependent variable returns significant results. The association may be attributed to cross-directorships that provide experience and expertise. Furthermore, by enhancing transparency EXPRCD provide value relevant information comparable that of other organisations (Dahya, Lonie, & Power, 1996). The results confirm that EXPRCD have the intelligence, variety in information control and inside information to evaluate management and firm or industry specific information to add value. Although EXPRCD play a crucial role in the wider corporate governance role of limiting managerial discretionary behaviour and protecting shareholder interests, this monitoring role of EXPRCD is expected to reduce information asymmetry between management and shareholders, this expectation has been realised with respect to IC. The results of this research indicate that on average UK DIRSHS is 8% and may not be sufficiently large to influence the EXPRCD mandate. Despite the inconsistent results in the literature, inconsistent results of the bivariate analysis and the insignificant result in the OLS WDI dummy variables variation of Model V, the paper concludes based on the Full Model (WDI) that the results of Model V are consistent with the expectations generated by the theoretical basis, therefore, hypothesis H8.1: is accepted.

H8.1: The proportion of EXPRCD to total directors is a positive significant explanatory variable of the variation in the extent of VDIC.

3.5.8 Non-executive Chair (CNED)

The multivariate analysis indicates that non-executive chairs are associated with less VDIC, supporting the view that the position of chair and non-executive director should be separated. The results are consistent across the partial and Pearson correlation matrices, the OLS and QREG models and the variations of Model V with or without dummy industry variables. Where the roles of chair and NONEXEC are separate, increased VDIC may

ensue. Alignment of shareholder and management objectives by executive chairs may lead to reduced agency costs. However, as CNED suppresses VDIC monitoring costs remain high. Asymmetric information creates additional agency costs. The literature is not consistent with which governance system is better. No studies have yet investigated this relationship within IC, although Ho and Wong (2001) established an insignificant result with dominant personality and Haniffa and Cooke (2002) established a negative and significant result with independent chair confirming that the roles of chair and non-executive director may be better separated, this result is consistent with Model IV. Forker (1992) concluded combined roles in the executive signalled the absence of separation of decision management and decision control (Fama and Jensen, 1983). The results and the literature suggest that the combined role of CNED is likely to require increased monitoring, the direction of the relationship is negative and significant therefore hypothesis H8.4: is accepted.

H8.4: The CNED is a negative significant explanatory variable of the variation in the extent of VDIC.

4. Conclusion

A significant association has been established between WDI and MV, TMRK, MANUF, EMPC and R&D; in general, the direction of the relationships is consistent with the expected sign; however, the partial correlation coefficient of WDI with R&D is negative indicating that increasing R&D expenditure may result in lower VDIC. The results of DI do not indicate significant variance from WDI in the analysis of individual IC attributes. The dispersion of attributes amongst the IC categories is almost identical. Entrepreneurial spirit and innovativeness are the two most disclosed individual IC attributes. Patents and vocational qualifications are the least disclosed IC attributes. Customers, customer loyalty and distribution channels are again amongst the top six disclosing IC categories. Overall between the three classifications of IC, SC attributes have been least disclosed and RC most disclosed. Companies that engage in R&D expenditure make significantly more IC disclosures than those with no R&D investment; these firms are able to increase shareholder value with increasing investment in R&D. In addition, industry variation indicates that high-tech companies are non-manufacturing. As a HC measure of the level of technical expertise, higher levels of EMPC is indicative of the value management places on HC, disclosure of HC attributes signals the existence of this underlying value.

The research concludes that the necessary conditions for a maximum disclosure policy include the existence of programmes aimed at R&D investment that have overtime developed IP to an extent recognisable by third parties and commensurate with membership of a technological listing.. Furthermore, such companies are expected to be non-manufacturing consistent with higher remuneration paid to highly skilled employees in service industries. Above all, these high disclosing companies are characterised by large MV, indicative of above average shareholder value generated by large markets. . A robustness check on the composition of the model by application of the pairwise tests confirms that BETA is significantly associated with SHVOL, GEAR and LQD providing collaborating evidence for inclusion of these proxies as measures of risk. The paper concludes that larger more financially stable companies that are characterised by reduced insolvency and liquidity risk are more likely to disclose IC given that their "hidden value" is larger, as evidenced by their higher MVBV ratio and by their membership of more complex service industries. Some industries are regulated due to the technical nature of their operations as such the traditional financial statements have been adjusted, amended and annexed to ensure disclosure of appropriate information. Financial, insurance, banking, mining and oil and gas industries show such characteristics. As is applied to the case of companies associated with higher levels of risk, standard setters encouraging more disclosure of risk information may be expected to support the argument for more IC disclosure with respect to companies associated with higher levels of "hidden value". Such regulation may mandate specific industries to follow specific reporting practices, practices developed, implemented and upheld by the regulator in order to provide appropriate value relevant information.

VDIC represents such a monitoring tool as additional disclosure reduces agency costs between management and shareholders in addition to creating value with respect to disclosure of the "hidden value". Furthermore, the separation of executive roles through segregation of duties reduces the power held by one individual. The separation of directors into executive and non-executive maintains the independence of the monitors and reduces agency costs. Consistent with the existence of "hidden value" companies providing better financial benefits for their employees both executives and non-executives are able to retain HC; corporate governance mechanisms advocate transparency and accountability, VDIC provides the signalling mechanisms that convey this HC to the markets.

Management behaviour responds to internal factors and to external market forces that have a bearing on shareholder value. VDIC is aimed at mitigating the risks associated with the MVBV dilemma by informing markets of the intangible value of firms. However, this research has illustrated that several other factors are

significant in explaining the variation in VDIC; as a proxy for MVBV, VDIC therefore may fall short and perhaps this line of study should be reconsidered. Nevertheless, as part of the disclosure literature, VDIC is expected to continue to play a significant role.

Certain factors specific to IC were found to suppress disclosure; the absence of a framework for IC, the necessity to disclose credible information, the threat of loss of competitive advantage and the risk of litigation has restricted the level of IC disclosure rendering markets less efficient particular in risk assessment, equity valuation and resource allocation. Compounding the issue is the existence of other avenues for the disclosure of IC in particular for firms that are highly intangible. VDIC may reduce information asymmetries that may otherwise be exploited by internal agents and external analysts. Information asymmetry provides the opportunity to generate value by moving share prices closer to their intrinsic values. These opportunities may arise in companies with higher levels of unreported IC.

At the heart of the MVBV dilemma is both the market value, which is supported by a willing buyer and willing seller and the book value which based on the historical cost concept as the basis for financial reporting. On the one hand, the market price is influenced by how well the buyer and the seller are informed and on the other hand, historical information does not lend itself well to forecasts of future performance. Although, various stakeholders have lobbied for fair value accounting, problems associated with home grown intangibles and directors valuations have limited this approach particular for unique and firm specific assets with no external market. Management accountants introduced the balanced scorecard as an internal performance measure acknowledging the existence and importance of IA. Although, this approach is commended for improving firm value by developing IC it is a management accounting tool and may not be suited for financial reporting.

Companies have therefore looked at other avenues of disclosure in particular the narratives to the annual report and in addition industry bulletins, trade magazines and trade articles. This in part is an indication of the acceptance of firms that the annual report alone may not be sufficient to convey the existence and value of IA. Furthermore, although disclosure improves the image and reputation of the company, provides better investment decisions for stakeholders, improves accountability to shareholders, enables more accurate risk assessment by shareholders and provides a more accurate valuation of share prices. Nevertheless, despite these potential benefits, companies do not always disclose IC; constraints to voluntary disclosure take different forms. Costs of competitive disadvantage and costs, agency costs, costs of data collection and processing that may be higher for IC due to its intangible nature and inherent problems of identification, measurement and reporting. Companies with substantial resources may be able to dedicate more resources to this function. This paper extends this work by examining the influence of investment in IC, financial measures of risk, industry membership and corporate governance mechanisms in the context of IC financial reporting.

Acknowledgements

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Note

Note 1. The results of DI do not indicate significant variance from WDI in the analysis of individual IC attributes. The dispersion of attributes amongst the IC categories is almost identical. Entrepreneurial spirit and innovativeness are the two most disclosed individual IC attributes. Patents and vocational qualifications are the least disclosed IC attributes. Customers, customer loyalty and distribution channels are again amongst the top six disclosing IC categories. Overall between the three classifications of IC, SC attributes have been least disclosed and RC most disclosed.

Appendix

Appendix 1. SIC Industry Codes and Dummy Variables

SIC Code		Industry	# of Obs
202	Basic	Forestry and paper	2
1589		Food producers and processors	18
1596		Beverages	6
1600		Tobacco	2
4521		Construction and bldg materials.	34
2410	Chem	Chemicals	12
2463		Personal care and h'hold prods	5
5212		Household goods and textiles	14
2840	Eng	Steel and other	2
2710		Engineering and machinery	24
3430		Automobiles and parts	10
3530		Aerospace and Defence	7
3002	Elec	Info Tech Hardware	17
3210		Electronic and electrical equip't	16
4013		Electricity	3
4100		Utilities (Ex-electricity	8
5147		Diversified industries	6
2441	Phar	Pharmaceuticals and biotech	14
5211	Ret	General retailers	35
5211		Food and drug retailers	6
7222	Comp	Software and computer services	31
7412		Support services	59
7420		Telecommunication services	12
7440		Media and entertainment	39
6340	Serv	Transport	22
8511		Health	14
9210		Leisure and hotels	25

Source: National Statistics (2003)

Basic: dichotomous variable that scores "1" for companies under SIC code 202, 1589, 1596, 1600 and 4521 and "0" otherwise;

Chem: dichotomous variable that scores "1" for companies under SIC code 2410, 2463 and 5212 "0" otherwise;

Eng: dichotomous variable that scores "1" for companies under SIC code 2840, 2710, 3430 and 3530 and "0" otherwise;

Elec: dichotomous variable that scores "1" for companies under SIC code 3002, 3210, 4013, 4100 and 5147 and "0" otherwise;

Phar: dichotomous variable that scores "1" for companies under SIC code 2441 and "0" otherwise;

Ret: dichotomous variable that scores "1" for companies under SIC code 5211 and "0" otherwise;

Comp: dichotomous variable that scores "1" for companies under SIC code 7222, 7412, 7420 and 7440 and "0" otherwise;

Serv: dichotomous variable that scores "1" for companies under SIC code 6340, 8511 and 9210 and "0" otherwise.

Appendix 2. Directors' Shareholding and Dummy Variables

Shareholding	Minimum		Dummy Variables		Maximum
3% Shareholding	0.000	<	DS1	≤	0.029
5% Shareholding	0.029	<	DS2	≤	0.048
10% Shareholding	0.048	<	DS3	≤	0.096
30% Shareholding	0.096	<	DS4	≤	0.292
50% Shareholding	0.292	<	DS5	≤	0.490
50%+ Shareholding	0.490	<	DS6		

DS1: dichotomous variable that scores "1" for directors' shareholding greater than zero and equal to or less than 2.9% and "0" otherwise;

DS2: dichotomous variable that scores "1" for directors' shareholding greater than 2.9% and equal to or less than 4.8% and "0" otherwise;

DS3: dichotomous variable that scores "1" for directors' shareholding greater than 4.8% and equal to or less than 9.6% and "0" otherwise;

DS4: dichotomous variable that scores "1" for directors' shareholding greater than 9.6% and equal to or less than 29.2% and "0" otherwise;

DS5: dichotomous variable that scores "1" for directors' shareholding greater than 29.2% and equal to or less than 49% and "0" otherwise;

DS6: dichotomous variable that scores "1" for directors' shareholding greater than 49%.

Appendix 3. IC Framework

Internal Structural Capital (SC)	External Relational Capital (RC)	Human Capital (HC)
Patents	Brands	Know-how
Copyrights	Customers	Education
Trademarks	Customer loyalty	Vocational qualifications
Management philosophy	Distribution channels	Work-related knowledge
Corporate culture	Business collaborations	Work-related competencies
Management processes	Licensing agreements	Entrepreneurial spirit,
Information systems	Favourable contracts	Innovativeness, proactive and reactive abilities, changeability
Networking systems	Franchising agreements	
Financial relations		

Source: Adapted from Stewart (1997)

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